APPARATUS FOR FILLING, CLOSING, AND LABELING CONTAINERS

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ABSTRACT

A compact, simplified machine is provided for sealing and labeling containers such as bottles. The machine is designed particularly for hospitals and the like requiring a relatively small number of one-dose bottles to provide liquid medicine for patients. Stations are provided for filling the bottles and placing caps thereon. The machine also has a station where the bottles are rotated to simultaneously crimp the caps thereon and apply labels thereto. A printing device is located on the machine which applies the proper indicia to the labels prior to being affixed to the bottles, and a unique system for feeding the labels to the bottles.

22 Claims, 6 Drawing Figures
APPARATUS FOR FILLING, CLOSING, AND LABELING CONTAINERS

This invention relates to a machine for handling containers, and specifically a machine for sealing and labeling bottles.

Recently, there has been a trend toward providing medicinal doses for hospital patients in individual packages and containers. These are carefully sealed and labeled to minimize the possibility of mistakes and wastefulness, as previously occurred when medicines were dispensed from common, large containers. The packaged or containerized medicinal doses remain sealed to the time of delivery to the bedside of the patient to avoid possible contamination. The label on the package or container also remains associated with the medicine up to the time it is delivered to the patient to avoid possible errors or mistakes.

For hospitals of average or larger size, from 50 up to several hundred bottles of a particular medicine are needed daily or every few days. To avoid undue delay and costly man hours, a machine for filling the bottles with the medicine, labeling the bottles, and sealing them is a necessity. While machines have heretofore been known to a very limited extent for processing such bottles, such machines have been expensive and large in size, requiring considerable floor space which is often limited in hospitals. Their complexity also resulted in high maintenance costs and required an operator of considerable skill.

The present invention provides a machine for labeling and sealing containers particularly for the above-mentioned application. The new machine is lower in cost and smaller in size than those heretofore known, and its relative simplicity provides utmost reliability with minimal maintenance.

The new machine has a four-station indexing wheel, the first station of which receives the empty bottles which are to be filled, labeled and sealed. The bottles are filled at a second station and caps are placed thereon at a third station. The bottles are sealed and labels are substantially simultaneously applied at a fourth station. Means are provided at the fourth station for rotating the bottle and cap and for crimping or sealing the cap as it rotates. Means are further provided at this station for feeding a label into engagement with the bottle during rotation to cause the label to wrap thereon. The labels are first printed with predetermined indicia adjacent the fourth station.

In a preferred form, the labels are of a pressure-sensitive type supplied longitudinally on a tape. The indicia is printed on the labels when on the tape, after which the tape is fed in a sharply divergent path from the labels to separate the labels and to cause them to continue in a predetermined path into contact with the bottles. The various components of the machine are operated through a relatively simple and low cost, yet reliable, mechanical drive, to be discussed in detail subsequently.

The machine according to the invention can also be modified to fill syringes with medicine, then seal and label them. Similar advantages are achieved as with the individual bottled doses. However, for syringes, the machine must be maintained in a sterile atmosphere.

It is, therefore, a principal object of the invention to provide a machine for labeling and sealing containers, which machine is compact in size and low in cost.

Another object of the invention is to provide a machine which simultaneously seals containers and applies labels thereto.

Still another object of the invention is to provide a machine which prints indicia on labels immediately prior to applying the labels to containers.

A further object of the invention is to provide simplified means for applying printed labels to containers.

Many other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is an overall view in perspective of a machine embodying the invention, including drive means for components of the machine, shown somewhat schematically.

FIG. 2 is an enlarged view in perspective, taken from a lower level, of a supporting and driving unit for rotating the containers and sealing caps thereon;

FIG. 3 is an enlarged, fragmentary view in vertical cross section of a container cap and crimping wheel of the unit of FIG. 2;

FIG. 4 is a view in vertical cross section taken centrally through an electromagnetic clutch of FIG. 2;

FIG. 5 is an enlarged view in perspective, taken from the same angle as FIG. 1, of printing mechanism for applying indicia to labels to be affixed to the containers and of feed mechanism for supplying the labels to the bottles; and

FIG. 6 is a plan view of a portion of the feeding mechanism of FIG. 5.

Referring to the drawings, and particularly to FIG. 1, an overall container-handling machine embodying the invention is indicated at 10 and includes a base 12 containing the drive system and controls. The overall machine is compact, being only about 15 inches wide and 20 inches long. Consequently, space requirements are a minimum. The machine is also relatively light in weight, in the order of 100 pounds, to provide portability, if desired.

The containers handled by the machine 10 are specifically shown as small one-dose bottles 14, being about 1/4 inches in diameter and 2 1/4 inches high. The bottles have caps 16 crimped and sealed thereon with integral opening tabs on the tops thereof which can only be used once. When the bottles are filled and sealed, they remain closed until reaching the bedside of the patient. There is no possibility of the caps being unscrewed and the contents altered or subjected to contamination. Once the contents are dispensed, both bottles and the caps can be disposed of.

The bottles are moved from a suitable source sequentially along a conveyor generally indicated at 18 to a first, receiving station, indicated at 20, of an indexing table or wheel 22. The table 22 is circular with four openings or notches 24 formed at 90° increments along the edges thereof. As the table 22 is rotated in a clockwise direction, it carries the bottles 14 to three additional stations, the bottles being retained in the openings 24 by a circular inner edge 26 of a platform 28.

At a second station, generally indicated at 30, the bottles receive a predetermined amount of a liquid medicine from a suitable filling machine (not shown) which is commercially available and does not constitute part of the instant invention. The bottles 14 are then transferred to a third station indicated at 32 where the caps 16 are applied by suitable known equipment (not shown) which, again, does not constitute part of the instant invention. Finally, the bottles are carried to a fourth station indicated at 34 where the caps 16 are crimped on the bottles and appropriate labels designating the medicine therein are applied. As the bottles 14 are then carried beyond the fourth station 34, they are transferred to an exit chute 36 where they are pushed into a storage area 38. If desired, trays can be placed in the storage area 38 to directly receive the bottles, with the trays being replaced from time to time as desired or as necessary.

At the fourth station 34, the bottle 14 is supported on a turntable 40 (FIG. 5) which is rotatably supported on the base 12 below the indexing wheel 22, to enable the bottle 14 to turn freely. A cap-engaging head 42 is positioned directly above the turntable 40 and is movable in a vertical path. The head 42 has an O-ring 44 (FIGS. 2 and 3) mounted therein to frictionally engage the cap 16 when the head is moved downwardly into engagement therewith to aid in rotating the cap 16 and the bottle 14.

The cap-engaging head 42 is rotatably carried by a supporting and driving unit 46 and specifically by a shaft 48 extending upwardly through and rotatably carried by a lower support or platform 50 of the unit 46. The shaft 48 also extends up into an upper wall 52 which is held above the platform 50 by back
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3 supports 54. Front and side walls or covers of the unit 46 are removed for illustrative purposes. The unit 46 is supported on gibs 56 above the base 12 and the unit moves up and down by means of a ball nut 58 mounted thereon and engaged with a ball screw 60. When the ball screw 60 is rotated, the ball nut 58 moves up and down relative thereto and carries the unit 46 accordingly. The ball nut and ball screw are commercially available devices and will not be discussed in detail.

Power for the unit 46 is supplied through a drive shaft 62 extending into the base 12 to drive means which will be discussed subsequently. The drive shaft 62 also extends upwardly through the platform 50 and the upper wall 52 and is keyed or splined to a gear hub 63 for slidable but non-rotatable movement with respect thereto and with respect to a spur gear 64 connected therewith and located above the platform 50. The spur gear 64 meshes with a spur gear 66 which is affixed to the shaft 48 of the cap-engaging head 42. The spur gear 66, in turn, meshes with a third spur gear 68 which is connected to a component of an electromagnetic clutch 70 to be discussed subsequently. Another component of the electromagnetic clutch 70 is connected to a shaft 72 extending centrally therethrough which is rotated by the gear 68 when power is supplied to the clutch. The shaft 72 extends downwardly below the platform 50 where it is affixed to an end of a crimping arm 74.

Near the opposite end of the arm 74, spaced from the pivot shaft 76 is a rod or axle 76 (FIG. 3) projecting downwardly from the arm 74 and carrying a crimping member or wheel 78. The wheel is rotatably mounted on the axle 76 and is urged upwardly against a shoulder or stop 80, when not engaging a cap 16, by a coil spring 82 on the lower extremity of the rod 76. The crimping wheel 78 has an outer annular flange 84 which engages a lower edge 86 of the cap 16 and forces it inwardly below the lower edge of a lip or bead 88 of the bottle 14. During this movement, the spring 82 enables the annular flange 84 of the crimping wheel to yield downwardly slightly as it moves the cap edge 86 inwardly, thereby clearing the bottle lip 88. A shoulder 90 of the crimping wheel 78 then engages an intermediate portion of the side of the cap 16 above the lower edge 86 to achieve a sharp bend. This design of the crimping wheel assures that the lower edge 86 of the cap 16 will be tightly and securely bent around the lower edge of the bottle lip 88 and pulls a seal on the under side of the cap 16 tightly against the top of the bottle 14 to seal same. Further, the crimping is achieved quickly with only the one crimping wheel 78 being required.

The force applied by the crimping wheel 78 against the edge of the cap 16 depends upon the power supplied to the electromagnetic clutch 70, which can be regulated by a variable resistor or rheostat R1 located in a control housing 91 in the base 12. The higher the power, the less slipping occurs between the driven spur gear 68 and the shaft 72 and the greater is the torque applied to the arm 74 and the force on the wheel 78. When the power supplied to the electromagnetic clutch 70 is shut off, a return spring 92 moves the crimping wheel 78 away from the cap 16 and out of the path of the bottle 14 when transferring from the fourth station 34 to the discharge chute 36.

The electromagnetic clutch 70 is shown in more detail in FIG. 4. The spur gear 68 is suitable affixed to an armature hub 94 which has a non-circular upper end extending into an armature disc 96. The armature disc 96 is positioned adjacent a rotor 98 having a hub 100 affixed to the shaft 72 by a collar 102 and set screws 104. A stationary field member 106 has an arm 108 suitably affixed to the upper wall 52 of the unit 46 and rotatably receives the rotor hub 100 and the shaft 72. When the field member 106 is not supplied with power, the spur gear 68, the armature hub 94, and the armature disc 96 rotate as a unit freely about the shaft 72. When power is supplied to the field member 106, the armature disc 96 and the rotor 98 rotate together, causing the hub 100 and the shaft 72 to rotate with the spur gear 68. The arm 74 thereby moves the crimping wheel 78 into engagement with the bottle cap and causes the flange 84 to force the cap lip 86 inwardly under the bottle bead 88. When the crimping wheel 78 reaches the bottle, slipping will occur between the armature disc 96 and the rotor 98, with the force applied by the crimping wheel against the bottle cap depending on the amount of power supplied to the field member 106. When power to the field is shut off, the return spring 92 then moves the crimping wheel 78 and the arm 74 away from the bottle cap 16 and out of the path as the bottle is moved toward the storage area 38. The electromagnetic clutch 70 enables the force applied by the crimping wheel 78 against the bottle cap 16 to be easily adjusted by controlling the power supplied to the field member 106.

Labels 110 (FIG. 5) are applied to the bottles 14 as they are rotated on the turntable 40 by the cap-engaging head. The labels 110 are shown as being of the pressure-sensitive type and are supplied longitudinally on a tape 112 from which they can be readily peeled off. The tape 112 is supplied from a reel 114 located on an outbreak platform 116 (FIG. 1). The reel is mounted on a hub 118 rotatably carried on a spindle 120 having a cap 122 threaded thereon which can be turned to adjust the friction on the hub 118 and, consequently, the amount of tension on the tape 112 as it is pulled from the reel 114.

The tape moves past a pressure plate 124 with the tape located between the plate 124 and the labels 110. The tape then moves past a guide bar 126 of slightly curved configuration, as best shown in FIG. 6. The tape 112 is then pulled around a post 128 having a sharp edge 130. From here, the tape separates from the label which continue on the path toward the bottle on the turntable 40 with the tape fed back around the post 128 between a knurled drive roll 132 (FIG. 6) and a back-up roll 134. The roll 134 comprises a metal cylindrical hub 136 having a plurality of O-rings 138 mounted thereon in contiguous or stacked relationship. This construction provides an effective yet inexpensive back-up roll for the tape. The separated label 110 has a front surface on its predetermined path toward the bottle 14 on the turntable 40 and, specifically, between the bottle and a pressure roll 140 mounted on a lever arm 142 and resiliently urged against the bottle by a spring 144. The pressure roll 140 firmly presses the label 110 against the bottle 14 during clockwise rotation thereof.

Suitable indicia indicating the contents of the bottles or other containers to which the labels are applied is printed on the labels 110 when they are in front of the pressure plate 124. To accomplish this, printing type 146 is set up in a holder 148 to provide the proper indicia. The holder 148 is then clamped in a printing head 150 which is moved back and forth in a linear path, guided by a groove or tracks 152, toward and away from the label 110 to be printed. The printing head 150 is designed to quickly release the holder and enable the type 146 to be set in any suitable pattern so that the type can be readily arranged for each batch of bottles having different contents.

When the printing head 150 is in the retracted position, as shown in FIG. 5, an inking pad assembly 154 is brought down in front of the printing head with an inking pad 156 pressed against the type 146 to apply printers ink thereto. The inking pad 156 is located in a pressure plate 158 which is affixed to a horizontal shaft 160. The shaft 160 is rotatably supported at one end by a bar or column 162 and at the other end by an L-shaped bracket 164 with a pinion gear 166 mounted on the shaft 160 outside of the bracket 164. A gear rack 168 is affixed to the drive and supporting unit 46 and specifically to the back of the platform 50 thereof and is positioned to be continuously in engagement with the pinion gear 166. When the unit 46 is lowered, the gear rack 168 rotates the inking assembly 154 out of the path of the printing head 150 and type 146 when moved forwardly into contact with the label 110. Similarly, when the printing head 150 is in the retracted position once again, and the driving unit 46 is raised, the inking assembly 154 is again moved downwardly to apply ink to the type 146 from the pad 156.

A suitable drive arrangement for the machine is shown somewhat schematically in FIG. 1. A power unit including a
motor 170 drives a first shaft 172 which, through a pair of bevel gears 174, rotates a drive pulley 176. This is connected by a belt 178 to drive rolls 180 of the conveyor 18 which drive two long O-rings 182 extending around idler rolls 184. The conveyor operates continuously to always urge the bottles 14 thereon toward the indexing table 22. A second shaft 186 is driven from the first shaft 172 through sprockets 188, 190 and a chain 192. The second shaft 186 rotates the indexing table 22 through two spur gears 194 and an electromagnetic clutch 196 connected, when energized, to third shaft 198 depending from the table 22. A fourth shaft 200 also is driven by the shaft 186 through an electromagnetic clutch 202, sprockets 204, 206, and a chain 208. The fourth shaft 200 is an extension of the shaft 62 which drives the spur gears 64 and 66 which rotates the cap-engaging head 42. The shaft 62 also pivots the crimping arm 74 when the electromagnetic clutch 70 is energized.

The ball screw 60 is rotated through a fifth shaft 210 which rotates in a direction to lower the unit 46 through sprockets 212, 214, a chain 216, and an electromagnetic clutch 218. When the clutch 218 is energized, it connects the sprocket 214 with a sixth shaft 220 which is driven through sprockets 222, 224, and a chain 226 by the first shaft 172. When the unit 46 is to be raised, the shaft 210 is driven in the opposite direction by sprockets 228, 230, and a chain 232, the sprocket 230 being connected to a seventh shaft 234 which is driven through two spur gears 236 when an electromagnetic clutch 238 is energized. The shaft 220 also supplies the power for driving the shaft 210 in the direction to raise the unit 46.

An eighth shaft 240 for operating the printing head 150 is driven through an electromagnetic clutch 242, sprockets 244, 246, and a chain 248 by the shaft 220. The shaft 240 rotates through one revolution to drive a cam 250 (FIG. 5) through one revolution. During this motion, a crank arm or link 252, pivotally connected to the cam 250 by a pin 254 and to the printing head 150 by a pin 256, moves the head 150 through one complete forward and rearward stroke.

The knurled roller 132 for the tape 112 is driven by an electromagnetic clutch 258 (FIG. 1) connecting the roller to a ninth shaft 260 rotated by sprockets 262, 264, and a chain 266, the sprocket 264 being affixed to the shaft 200.

The operation of the machine can be controlled by any suitable means, including manually operated switches, cams mounted on a common shaft and driven by a timer motor, or combinations of timers and limit switches, by way of example. With the specific controls illustrated and employed in the housing 91, a limit switch LS-1 (FIG. 6) is actuated when the indexing table indexes one station and an arm 268 extends into a notch 270 in an edge of a disc 271 mounted on the shaft 198 below the table 22. The limit switch LS-1 de-energizes the clutch 196 to stop indexing and also initiates operation of a first timer which energizes the clutch 214 to move the unit 46 down, energizes the clutch 242 to move the printing head 150 through a forward and reverse stroke, and energizes the electromagnetic clutch 70 to move the crimping arm 74 toward the bottle. The unit 46 moves downward until the bottle 14 is engaged, at which time the electromagnetic clutch 218 slips, maintaining pressure on the cap 16 by the head 42. The amount of pressure varies with the power supplied to the clutch 218, as controlled by a rheostat R2 in the housing 91. When the unit 46 moves down, it actuates a limit switch LS-2 which initiates operation of a second timer which de-energizes the electromagnetic clutch 218 and energizes the electromagnetic clutch 238 to move the unit 46 up. It also de-energizes the clutch 70 to enable the arm 74 to move outward. When the second timer times out, it energizes the clutch 196 and causes the table to index again.

A limit switch LS-3 is closed when the printing head is in the retracted position to de-energize the clutch 242 and stop the printing head 150. This switch also energizes the clutch 258 to feed the label tape 112. The clutch 258 is de-energized when the label moves past a light beam 272 (FIG. 6) from a source 274 and enables a light-sensitive cell 276 to receive the light and de-energize the clutch 258. An electromagnetic brake associated with the shaft for the roller 132 can be energized simultaneously to abruptly and precisely stop the label feed, if desired.

A safety limit switch LS-4 (FIG. 5) is actuated by the arm 242 if no bottle is at the station 34 after the table 22 indexes. In such an instance, the switch LS-4 prevents the clutch 70 from being energized so that the crimping arm 74 will not move in and also prevents the clutch 258 from being energized so that the labels 110 will not feed. Other suitable interlocks and safety switches can be employed, including at the second and third stations, if desired.

From the above, it will be seen that the container-handling machine according to the invention is compact, reliable, fast-acting, and relatively maintenance free. The machine is also highly versatile, being capable of filling other containers with medicine beside bottles, such as syringes. The machine is also capable of filling containers with other liquids beside medicine, particularly whenever it is desirable to avoid possible contamination of the liquids and where proper labeling of same is also important.

Various modifications of the above described embodiment of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and the tenor of the accompanying claims.

1. Apparatus for filling, closing, and labeling containers comprising an indexing wheel having circumferential openings to hold the containers and to carry them sequentially to additional stations from a first station at which the containers are received, the additional stations including stations at which the containers are filled with liquid, closed, and labeled, means for conveying the containers sequentially to the first station and urging them individually into the indexing wheel opening at the first station, means at the station at which labels are applied for rotating the containers, sealing means at the labeling station for sealing closures during rotation of the containers, and feed means for feeding labels having adhesive surfaces into contact with the containers during rotation of the containers.

2. Apparatus according to claim 1 characterized by means for imprinting indicia on the labels prior to feeding them into contact with the containers.

3. Apparatus according to claim 1 characterized by said sealing means at the labeling station comprising a crimping wheel having a cylindrical portion of substantially uniform diameter with an annular flange extending outwardly below the cylindrical portion, said lower flange being substantially aligned with the lower edge of a lip of the container when in a sealing position, said flange being effective to force inwardly a lower annular edge of the closure with said cylindrical portion engaging an upper portion of the closure above the lower edge thereof and above the lower edge of the lip, and means including resilient means supporting said crimping wheel to enable said wheel to yield in a downward direction when moving the lower edge of the closure inwardly.

4. Apparatus according to claim 3 characterized by said supporting means further comprising an arm, shaft means on said arm for rotatably carrying said crimping wheel and for supporting said resilient means below said wheel.

5. Apparatus according to claim 4 characterized by drive means including an electromagnetic clutch for moving said arm in a direction to move said crimping wheel into contact with the closure, and means for changing the electrical power supplied to said electromagnetic clutch to change the force said crimping wheel applies against the closure.

6. Apparatus for filling, closing, and labeling containers comprising an indexing wheel having circumferential openings to hold the containers and to carry them sequentially to additional stations from a first station at which the containers are received, the additional stations including stations at which the containers are filled with liquid, closed, and labeled,
means for conveying the containers sequentially to the first station and urging them individually into the indexing wheel opening at the first station, means at the station at which labels are applied for rotating the containers, the labels having adhesive surfaces and being sequentially carried by an elongate flexible member, and feed means for feeding the labels into contact with the containers during rotation of the containers, said feed means including means for moving the elongate flexible member in a sharply divergent path from the labels to separate the flexible member from the labels and to enable the labels to continue in a direction toward the containers.

7. Apparatus according to claim 6 characterized further by a light-sensitive cell being located on one side of the path of the labels, a light source directed toward said cell on the other side of the labels, and means controlled by the light-sensitive cell for stopping the feeding means after a label passes between said cell and said light source.

8. Apparatus according to claim 6 characterized by said feed means comprising a pair of rolls, at least one of which is driven, for receiving and pulling said elongate flexible member after the member is separated from the labels.

9. Apparatus for labeling a container to indicate the contents thereof, said apparatus comprising means for supporting the container, a tape carrying a label, means for feeding the tape longitudinally toward the container-supporting means, a pressure plate past which the label and tape are moved with the tape positioned between the label and said pressure plate, a printing head mounted for movement in a linear path between a position in engagement with the label on the tape at said pressure plate and a remote position, means for moving said printing head from the remote position to the engagement position when the tape is stationary to imprint predetermined indicia on the label, an inking plate, means movably supporting said inking plate in the path of said printing head, and means for moving said inking plate out of the path of said printing head prior to said printing head being moved toward said pressure plate.

10. Apparatus for capping a container comprising means for supporting the container, means for rotatably mounting said container-supporting means for rotatably supporting the bottom of the container, a cap-engage head for engaging a cap on the container when moved into engagement therewith, means for rotating said cap-engaging head, a crimping wheel, an arm rotatably carrying said crimping wheel, means pivotally supporting said arm for movement between a position in which said crimping wheel is in engagement with an edge of the cap and a position in which said wheel is remote from the cap, means for urging the arm toward the latter position, means for moving the arm from the remote position toward the cap and the wheel into engagement with the cap, and means for feeding a label into engagement with the container when the container is rotated.

11. Apparatus according to claim 10 characterized by means for imprinting indicia on the label prior to feeding the label toward the container.

12. Apparatus for capping a container comprising means for supporting the container, a cap-engaging head for engaging a cap on the container when moved into engagement therewith, means for rotating said cap-engaging head, a crimping wheel, an arm rotatably carrying said crimping wheel, means pivotally supporting said arm for movement between a position in which said crimping wheel is in engagement with an edge of the cap and a position in which said wheel is remote from the cap, means urging the arm toward the latter position, means for moving the arm from the remote position toward the cap and the wheel into engagement with the cap, a multiplicity of pressure-sensitive labels carried on a tape, pressure-supporting means adjacent the container and adapted to be in pressure contact with the container, means for feeding the tape longitudinally toward the pressure-applying means and the container-supporting means, and means for abruptly changing direction of the tape away from the labels to cause the labels and tape to separate and the labels to continue in a path toward said pressure-applying means to move between the pressure-applying means and the container when said supporting means.

13. Apparatus according to claim 12 characterized by a pressure plate past which said labels and tape are moved with the tape positioned between said labels and said pressure plate, a printing head mounted for movement in a linear path, means for moving said printing head in the linear path between a position in engagement with the labels on said tape at said pressure plate and a remote position, an inking plate, means pivotally supporting said inking plate in the linear path of said printing head, and means for pivotally moving said inking plate out of the path of said printing head prior to said printing head being moved toward said pressure plate.

14. Apparatus according to claim 13 characterized by a support for said cap-engaging head, means for moving said support up and down to move said head up and down, a gear rack associated with said support and movable therewith, said pivot means for said inking plate including a shaft, and said means for pivotally moving said inking plate out of the path of said printing plate comprises a pinion gear on said shaft and engaged with said gear rack.

15. Apparatus according to claim 12 characterized by said means for feeding the tape comprises a pair of rolls, at least one of which is driven, said rolls being positioned to receive the tape therebetween after the tape moves past the direction-changing means.

16. Apparatus according to claim 15 characterized by at least one of said rolls having a plurality of O-rings mounted thereon in planes perpendicular to the axis of rotation of the associated roll.

17. Apparatus according to claim 12 characterized further by a light-sensitive cell located on one side of the path of movement of the labels, means on the other side of the label path for directing a beam of light toward said cell, and means responsive to said cell for stopping movement of the tape-feeding means after a label moves beyond the beam of light.

18. Apparatus for capping a container comprising means for supporting the container, a cap-engaging head for engaging a cap on the container when moved into engagement therewith, means for rotating said cap-engaging head, a crimping wheel, an arm rotatably carrying said crimping wheel, means pivotally supporting said arm for movement between a position in which said crimping wheel is in engagement with an edge of the cap and a position in which said wheel is remote from the cap, means urging the arm toward the latter position, means for moving the arm from the remote position toward the cap and the wheel into engagement with the cap, said arm moving means including an electromagnetclutch, and means for changing the electrical power supplied to said electromagnetclutch to change the amount of pressure the crimping wheel applies against the cap.

19. Apparatus according to claim 18 characterized further by a support for said cap-engaging head, and means for moving said support up and down to move said head up and down relative to the cap.

20. Apparatus for crimping a cap on a bottle comprising means for supporting the bottle, a cap-engaging head for engaging the cap on the bottle when moved into engagement therewith, means for rotating said cap-engaging head, a crimping wheel, said crimping wheel having an annular outwardly extending flange to move an edge of the cap inwardly under a lip of the bottle and having a cylindrical shoulder of smaller diameter than the flange to engage an intermediate portion of the side of the cap and achieve a sharp bend between the side of the cap and the edge, an arm rotatably carrying said crimping wheel, means pivotally supporting said arm for movement between a position in which said crimping wheel is in engagement with the cap and a position in which said wheel is remote from the cap, spring means urging the arm toward the remote position, and means for moving the arm from the remote position toward the cap and the crimping wheel into engagement therewith.
21. Apparatus according to claim 20 characterized by said means for rotating said cap-engaging head and said means for moving said arm include common drive means.

22. Apparatus according to claim 20 characterized by means for rotatably mounting said bottle-supporting means for rotatably supporting the bottom of the bottle.