United States Patent

Heinricy

[15] **3,654,024**

[45] **Apr. 4, 1972**

[54] AUTOMATIC LABELLING APPARATUS

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[73] Assignee: **Canadian Stackpole Limited**

[22] Filed: **Dec. 1, 1969**

[21] Appl. No.: **881,006**

[52] **U.S. Cl.**.....**156/363,** 156/571, 156/568

[51] **Int. Cl.**.....**B65c 9/10,** B65c 9/42

[58] **Field of Search**.....156/566, 571, 572, 362, 363, 156/364, 567–570; B65c/3/08, 3/14, 3/16, 9/08, 9/10, 9/12, 9/32, 9/30, 9/42

[56] **References Cited**

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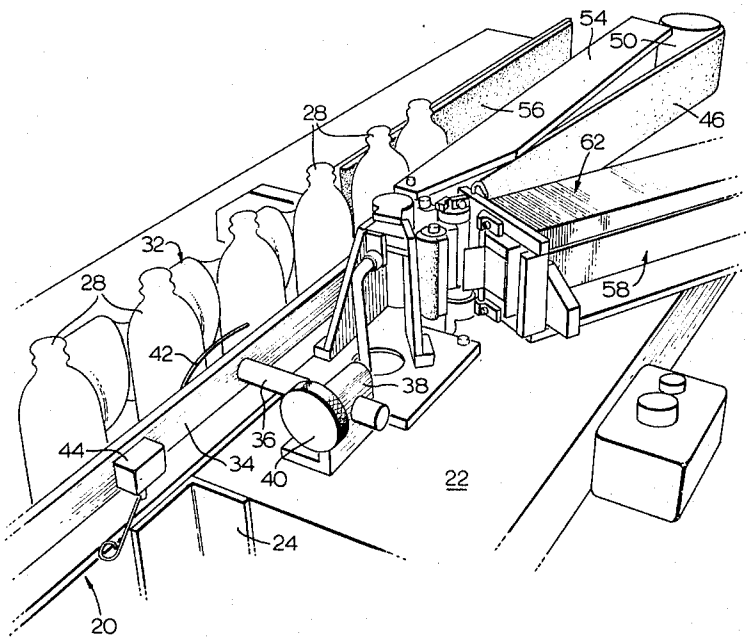
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[57] **ABSTRACT**

An automatic labelling apparatus for labelling containers passing on a conveyor has a sensing arm, connected to a switch, the arm contacting the containers passing on the conveyor; the switch is connected to an energized solenoid which forces up a shaft against a spring. The upper end of the shaft carries a helical gear which in turn meshes with another helical gear attached to the lower end of the spindle on the discharge roller, a finger member being mounted on the spindle. In this position the finger member is withdrawn from the discharge opening of the magazine. When a container hits the sensing arm, the solenoid is de-energized with the result that the shaft is pushed downward by the spring and the interaction of the helical gears rotates the finger member into the position where it enters the discharge opening and extracts a label from the magazine.

4 Claims, 12 Drawing Figures



Patented April 4, 1972 3,654,024

5 Sheets-Sheet 1

FIG. 1

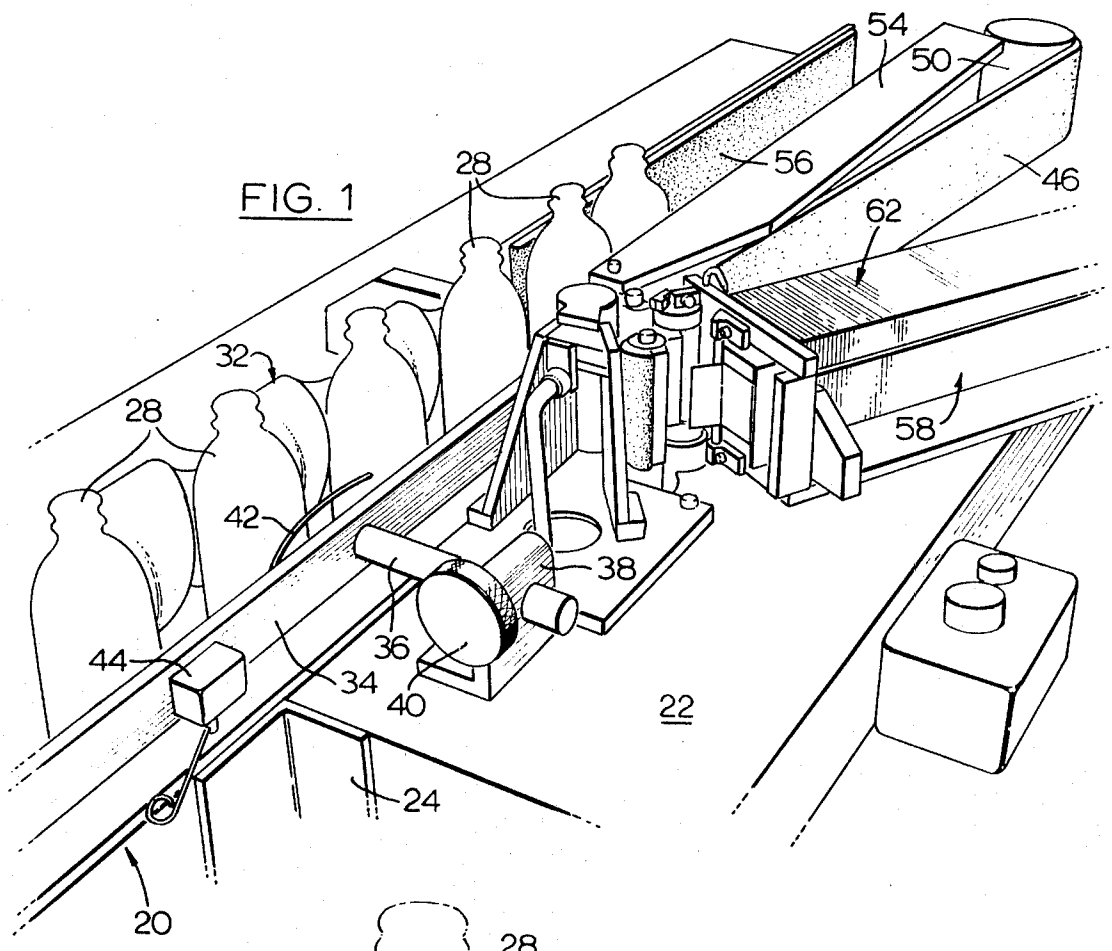
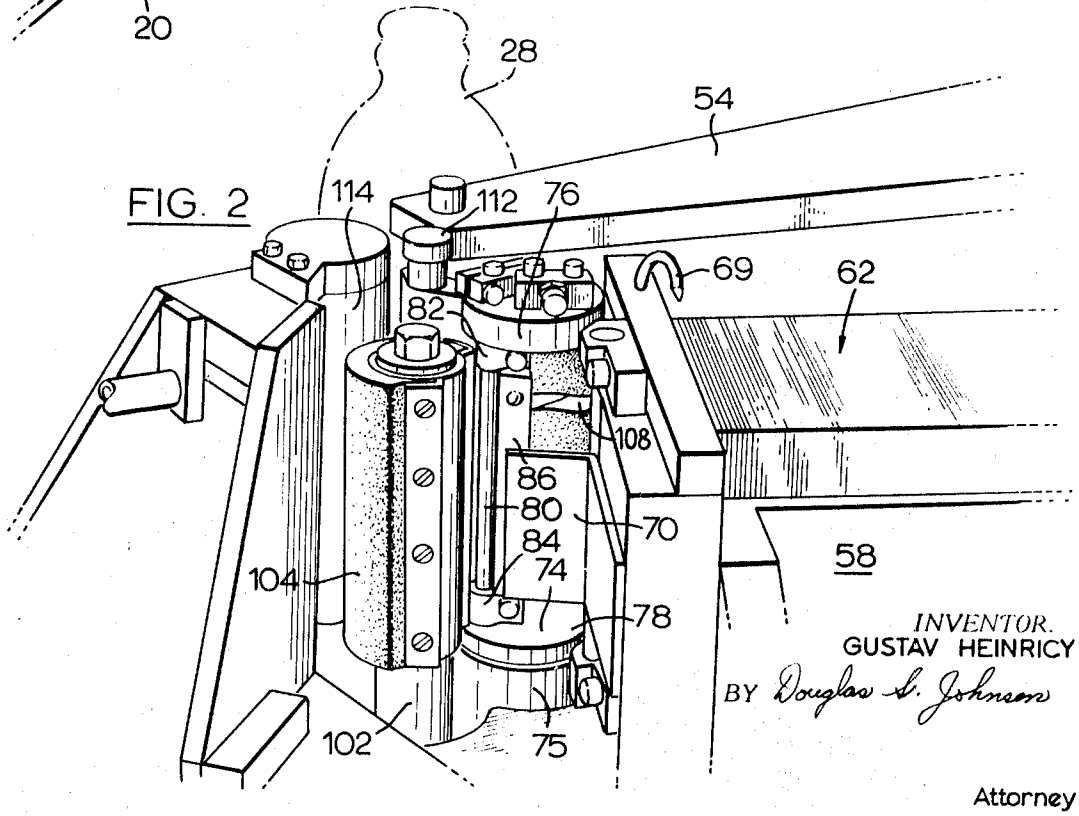


FIG. 2



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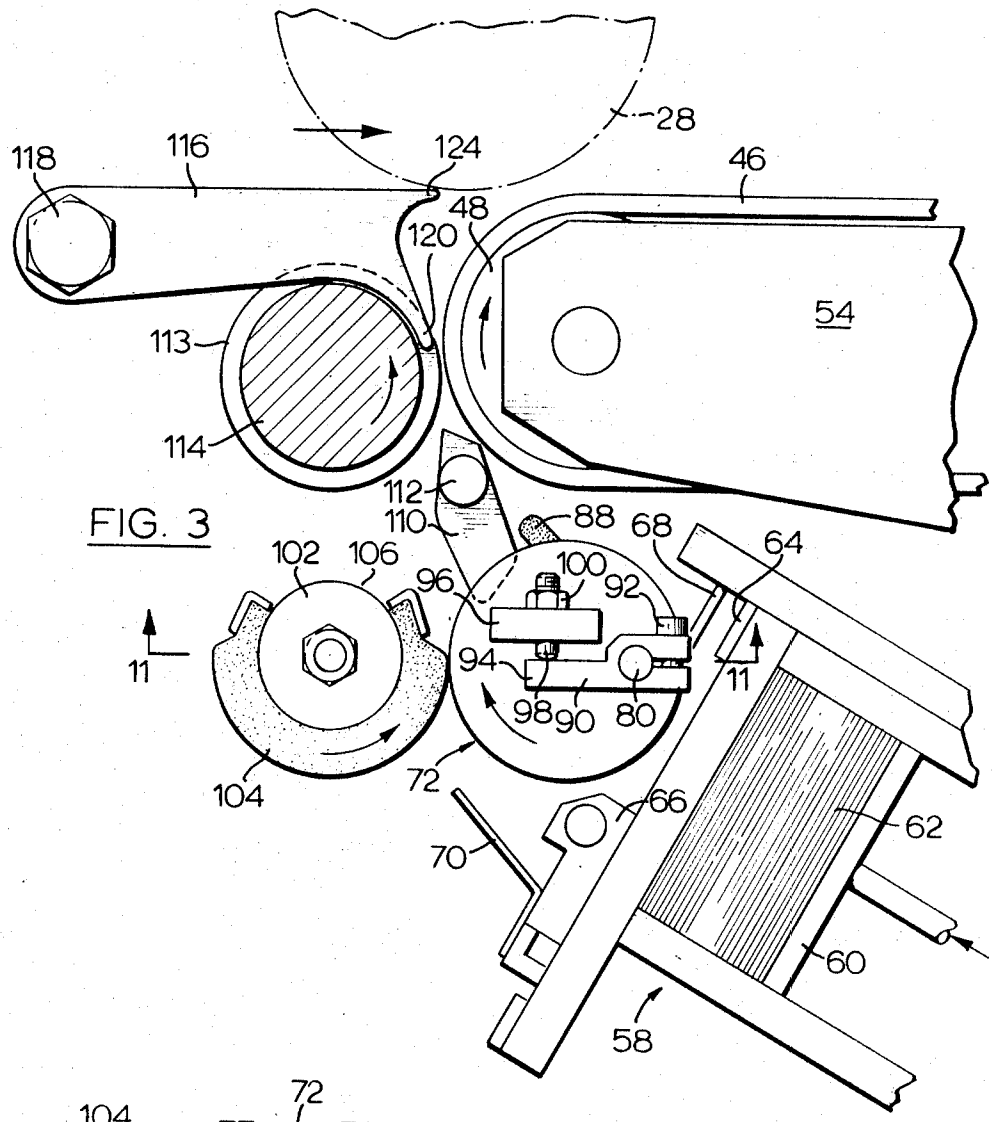


FIG. 3

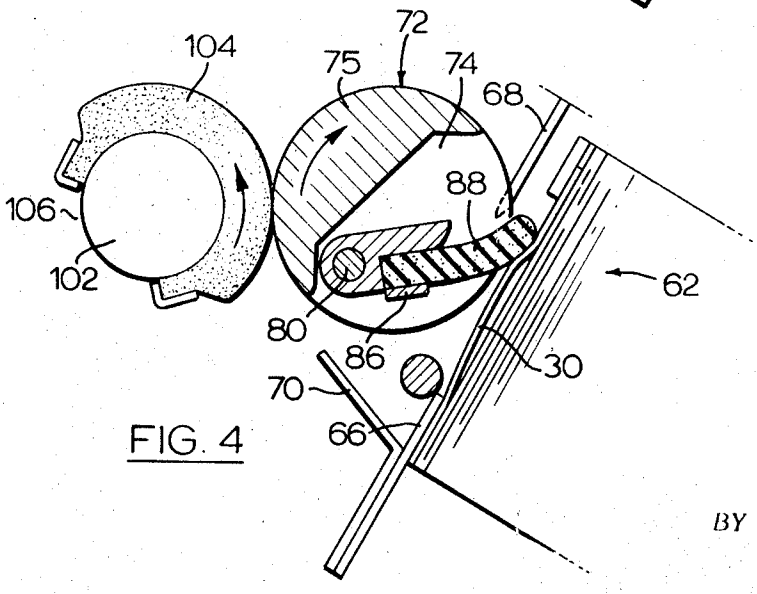


FIG. 4

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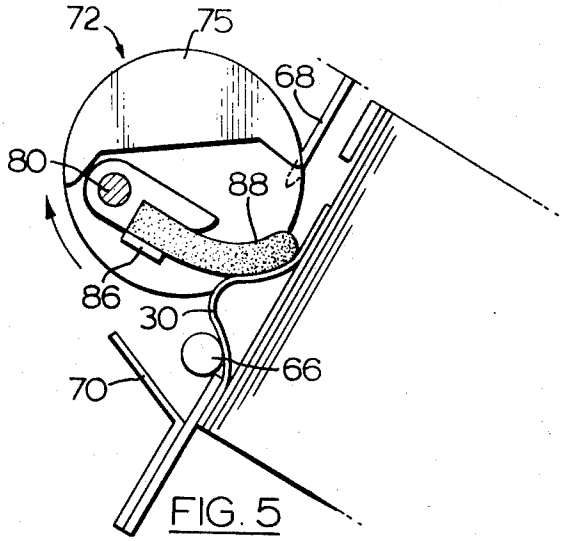


FIG. 5

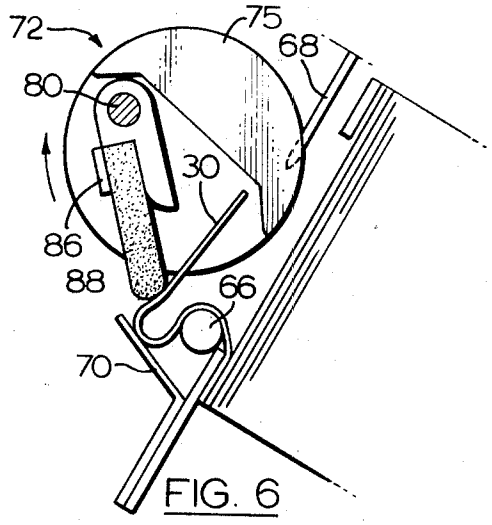


FIG. 6

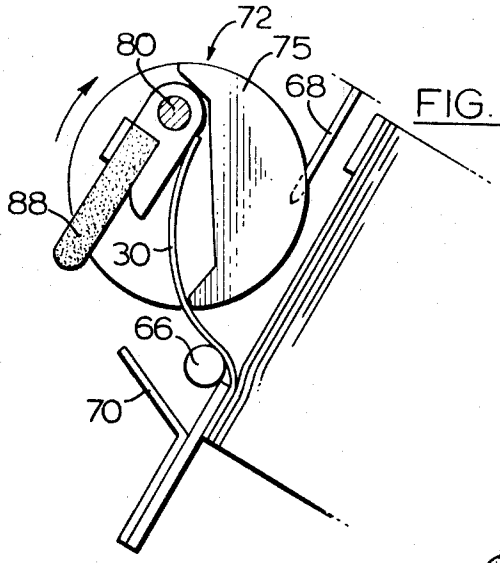


FIG. 7

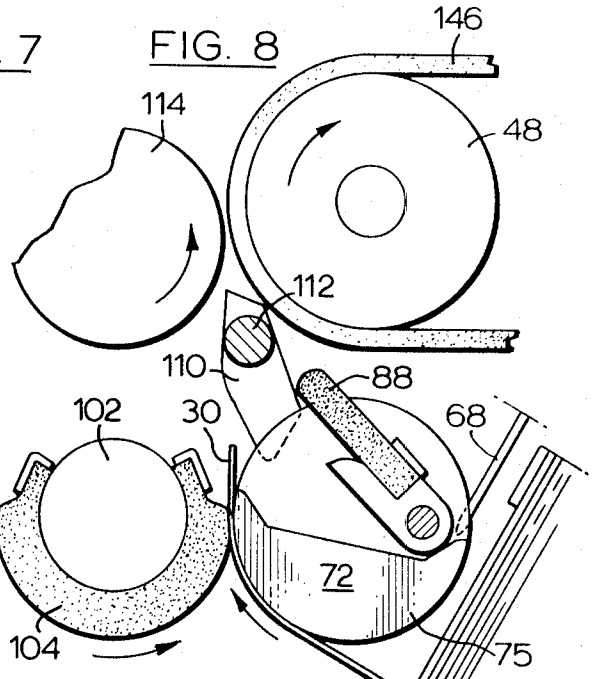


FIG. 8

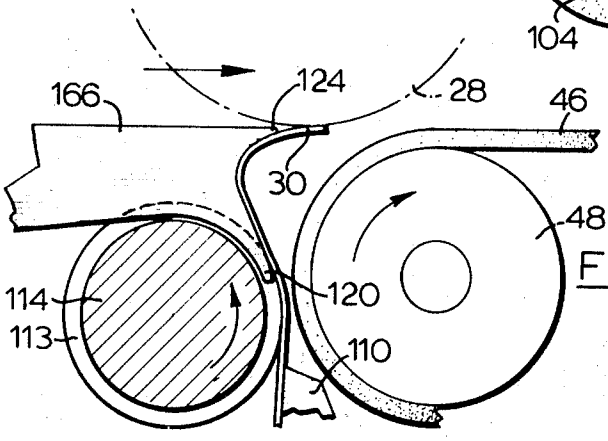


FIG. 9

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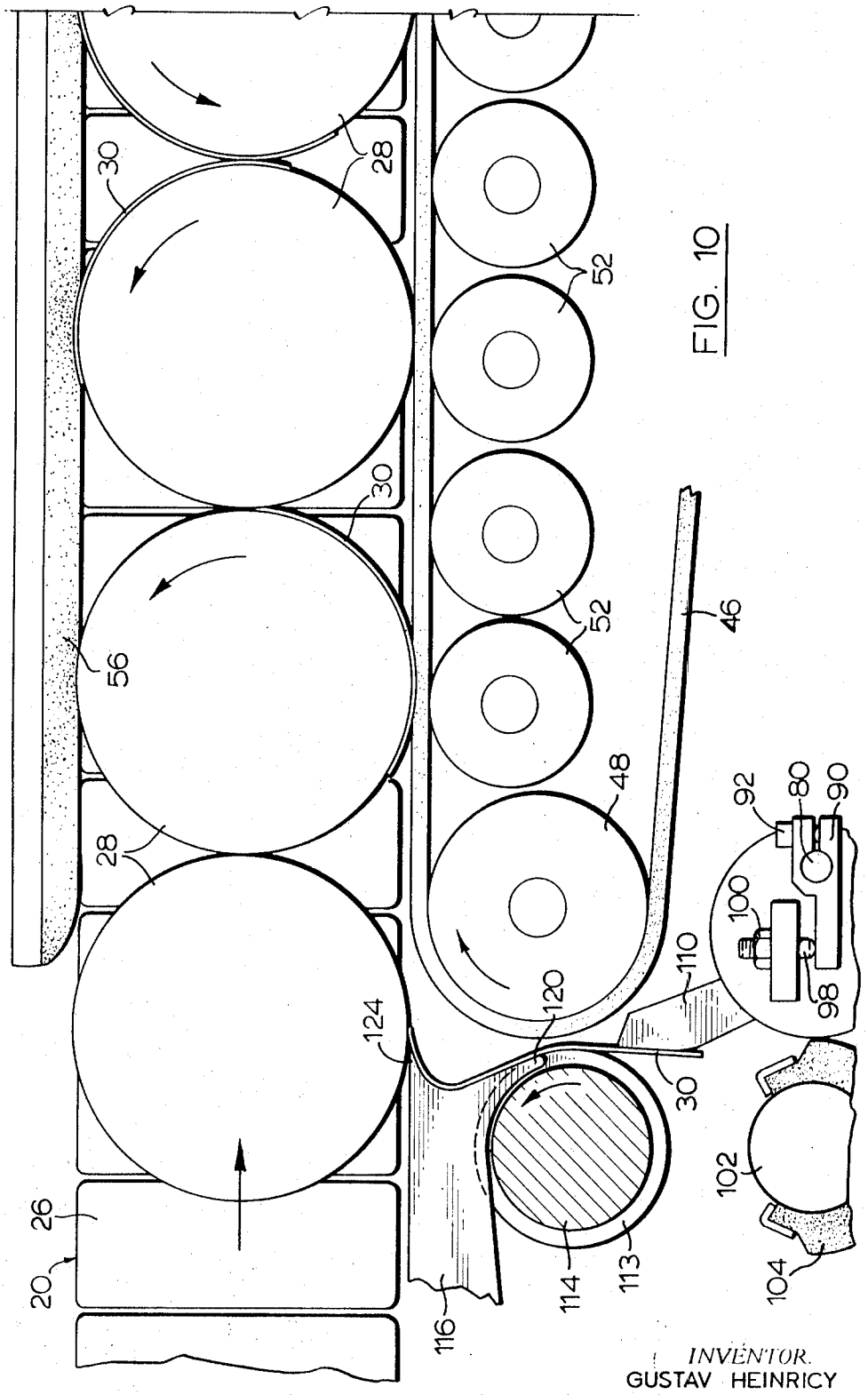


FIG. 10

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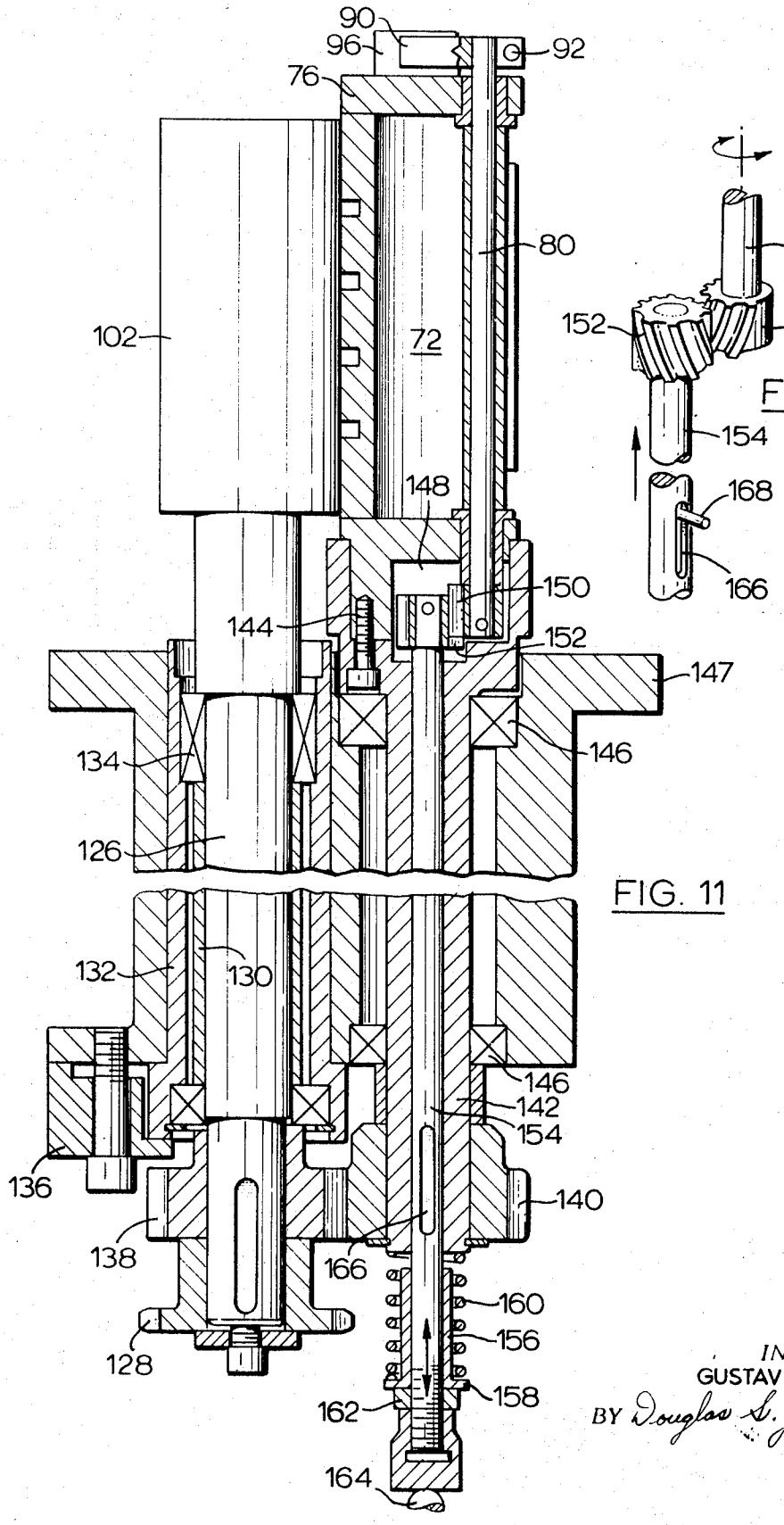


FIG. 11

FIG. 12

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AUTOMATIC LABELLING APPARATUS

FIELD OF THE INVENTION

This invention relates to improvements in apparatus for labelling bottles or containers automatically and in continuous sequence.

PRIOR ART

U.S. Pat. application Ser. No. 770,923 now U.S. Pat. No. 3,572,691 filed on Oct. 28th, 1968 describes a mechanism for withdrawing individual sheets of paper from a stack. The mechanism features a discharge roller positioned adjacent the discharge opening for a stack of labels held in a magazine, the outermost labels being held at its opposed side edges only in the magazine. The roller which is rotatable has an outwardly extending resilient finger which contacts the outermost label and due to friction, removes the label from the leading restrained side edge after which it is carried around to be gripped between the finger roller and a counter roller bearing against the finger roller. The result is that the label is pulled free of the trailing restraining side edge after which it is fed along a guide to pass between a squeezing roller and a glue-applying roller and then to a rotary labelling device. The discharge roller is capable of rotating at high speed and hence the mechanism is capable of supplying labels at a high rate.

A problem is to ensure that the glue roller only receives a label if a container is passing on the conveyor which will receive the label. This involves ensuring that the resilient finger does not make contact with the outermost label in order to remove it from the stack unless there is a container on the conveyor which will receive the label after it has been glued.

Accordingly it is an object of the invention to provide means which will ensure that a label will only be extracted from the stack in the magazine if there is a container on the conveyor which will receive the extracted label after it has been glued.

SUMMARY OF THE INVENTION

The invention consists in providing sensing means which detects the containers passing on the conveyor; the finger which is used to withdraw the label from the magazine is made pivotable between a position where it enters the discharge opening in the magazine to contact a label and a position away from the discharge opening after the label has been withdrawn. The pivotable movement of the finger in order to withdraw the label is dependent on the sensing means detecting a container on the conveyor. A variety of sensing means can be used, but a preferred embodiment utilises a sensing arm connected to a switch, which contacts the containers passing on the conveyor; the switch is connected to an energized solenoid which forces up a shaft against a spring. The upper end of the shaft carries a helical gear which in turn meshes with another helical gear attached to the lower end of the spindle on the discharge roller, the finger member being mounted on the spindle. In this position the finger member is withdrawn from the discharge opening of the magazine. When a container hits the sensing arm, the switch is opened and the solenoid is de-energized with the result that the shaft is pushed downward by the spring and the interaction of the helical gears rotates the finger member into the position where it enters the discharge opening and extracts a label from the magazine.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in relation to the accompanying drawings, in which

FIG. 1 is a perspective view of a preferred embodiment of the labelling apparatus constructed according to the invention;

FIG. 2 is an enlarged perspective view of the magazine, discharge roller, counter roller and glue pot shown in FIG. 1.

FIG. 3 is a top view of the magazine, discharge roller, counter roller, glue pot and the belt adjacent the conveyor carrying the containers;

FIG. 4 is a section taken on the Lines 4—4 of FIG. 3;

FIGS. 5, 6, 7 and 8 illustrate the process of extraction of the label.

FIG. 9 illustrates the label being initially glued to a passing container;

FIG. 10 is a top view illustrating the delivery and attachment of the label on to a passing container;

FIG. 11 is a section taken through the positional control for the finger member.

DESCRIPTION OF A PREFERRED EMBODIMENT

The labelling apparatus of the invention as illustrated generally in FIG. 1 includes a chain belt conveyor generally denoted by the number 20 and an adjacent table 22 carried on suitable supports 24. The conveyor 20 has conventional moving platform elements which form a generally flat table-like surface 26, see FIG. 10, for transporting containers 28 to be labelled.

For the purposes of description the conveyor 20 may be divided into an infeed portion leading up to the first application of a label 30, see FIG. 9, to an individual container 28, and an outfeed portion where the individual label is adhered to the individual container, see FIG. 10.

The infeed portion of the conveyor 20 has a helical member 32 positioned along that side of the table-like surface 26 opposed to the table structure 22; the pitch of the helical member 32 is such as to encompass the width of an individual container 28. Opposed to the helical member 32 and adjacent the table 22 is a vertically disposed movable plate 34 carried on a rod 36 slidable engaged in the slot of an abutment 38 fixed to the table 22. The position of the rod 36 is adjusted so as to provide sufficient pressure by the movable plate 34 against the container 28 held in the helical member 32 to ensure the progression of the containers 28 along the infeed portion of the conveyor 20. The requisite position of the rod 36 in the abutment 38 is maintained by a knurled headed screw 40.

One end of a sensing arm 42 made of spring steel extends under the plate 34 into the line of travel of the containers 28. The other end of the sensing arm 42 is connected to a switch 44 mounted on the outside of the plate 34. When a container hits the free end of the sensing arm 42 the switch 44 opens.

The outfeed portion of the conveyor 20 has a vertically disposed drive belt 46 carried by rollers 48 and 50. The belt where it is adjacent to the table-like surface 26 of the conveyor is supported by a multiplicity of back-up rollers 52 journalled along with the rollers 48 and 50 in a bearing plate 54. The roller 48 and the back-up rollers 52 are slightly cambered or convex.

Opposed to the belt 46 is a vertically disposed stationary pad 56 covered with friction material. The belt 46 where supported by the back-up rollers 52 bears against one side of the containers 28 while the pad 56 bears against the other side of the containers 28. The combined effect of the moving belt and the stationary pad 56 is to rotate the containers 28 during their travel on the outfeed portion of the conveyor 28. The somewhat convex configuration of the back-up rollers 52 reduces the tendency of the containers 28 to tilt during their rotation.

The table structure 22 has a magazine generally denoted by the numeral 58, the essentials of which, as described in my above-mentioned U.S. copending application, are a displaceable bottom 60 biased against a stack 62 of labels 30, the foremost of which bear against side member 64 and 66 which limit the width of the discharge opening of the magazine 58. Outward of the side member 64 and spaced from the discharge opening but parallel thereto are spaced apart pins 68, only one of which is shown, see FIG. 3, positioned in the same vertical plane. Secured to side member 66 and extending outwardly therefrom is a guide 70 shaped typically as shown.

The containment of the stack **62** by the side member **64** is slightly less than that effected by the side member **66** in order to provide for a slight separating effect on the forwardmost labels by air jets **69**.

The table structure **22** also has a vertically disposed discharge roller generally denoted by the numeral **72** positioned adjacent the discharge opening of the magazine **58**. A recess **74**, see FIG. **2**, is formed in the periphery of the body **75** of the discharge roller **72**, the body **75** being integral with flange ends **76** and **78**. An arm or spindle **80** is located in the recess **74**, the spindle being journalled in the flanged ends **75** and **78**, see FIGS. **2** and **11**. A pair of flanged collars **82** and **84** are secured to the spindle **90**. The flanges of the collars **82** and **84** provide the requisite backing for a bar **86** which clamps to the flanges of collars **82** and **84** a finger or pick up arm **88** made of elastomeric material such as rubber.

The spindle **80** extends through the top flange **76** of the discharge roller **72**. A bifurcated member **90** secured to the extending portion of the spindle **90** by a screw **92**, see FIG. **3**, the bifurcated member having an extension **94**. A plate **96** is also secured to the top of the end flange **76** and a threaded screw **98** with locating nut **100** passes through the plate **96**, the free end of the screw **98** being in the line of travel of the extension **94** of the bifurcated member **90** when it is rotated by the spindle **90** as described hereunder.

As explained in my above-mentioned United States copending application, the member **88** projecting outward of the recess **72** of the discharge roller **72** provides the means to extract the outermost label **30** from the stack **62**, the operation being illustrated in FIGS. **4**, **5**, **6** and **7** of the attached drawings. In FIG. **8** the release of the label **30** has proceeded to the point where it is caught between the rotating discharge roller **72** and a counter roller **102**, a portion only of which is covered by a frictional cover **104** made of rubber or other suitable material which contacts the label **30**. The cover **104** does not extend around the whole periphery of the counter roller **102** but is terminated short thereof to provide a recess **106** which permits clearance for reception of the label **30** and the finger **88** before the label **30** is caught between the cover **104** and the body **75** of the discharge roller **72**.

The member **88** is provided with slots **108** into which ride the ends of the pins **68**; the latter provide a guide for the control of the movement of the label **30** when it is first contacted by the member **88**.

After the label **30** is gripped between the body **75** of the discharge roller **72** and the cover counter roller **102** it is then propelled along the surface of vertically disposed guide plates **110** adjustably supported on a rod **112** carried by the table **22**.

The label **30** is then passed along the fins **113** of the glue roller **114** in order to pick up adhesive after which the label passes along the surface of a vertically disposed guide **116** adjustably secured to an arm **110**. The free end of the guide member **116** has first spaced apart portions **120** of the same configuration each of which extend into an individual space between the fins **113** of glue roller **114**. The guide **116** has second spaced apart portions **124** each of the same configuration and extending towards the containers **28** in their direction of travel. Each portion **124** and its individual attached portion **120** form a concave surface along which the label **30** travels with the leading edge of the latter projected towards and moving in the direction of travel of the containers **28**. On contact with a container **28** this leading edge of an individual label **30** adheres to the container **28** and the latter is then picked up between the belt **46** and the pad **56**. As a result the container **28** is rotated counter-clockwise see FIG. **11**, and the label **30** is then rolled on to the container simply through this rotating action.

The counter roller is driven through a shaft **126** which extends downward through the table **22** to terminate at its lower end in a drive sprocket **128**. The shaft **126** has a surrounding spacer **130** outward of which is an eccentric housing **132**, the shaft **126** being carried on bearings **134** which contact the housing **132** and the spacer **130**. Manual rotation of the eccentric housing **132** permits adjustment of the nip of an extracted label **30** between the frictional cover **104** of counter roller **102** and the periphery **75** of the discharge roller **72**; a clamp **136** is provided which maintains the housing **132** in the desired position.

The discharge roller **72** rotates with the counter roller **102** in a constant relationship so that the extracted label **30** always enters the recess **106** in the counter roller **102** before the frictional cover **104** contacts the periphery **75** of the discharge roller **72**. The rotation of the discharge roller is accomplished by providing a spur gear **138** on the counter roller shaft **126** above the drive sprocket **128**, which meshes with another spur gear **140** on a tubular drive shaft **142**, which extends upwardly through the table **22**, and secured to the discharge roller **72** by means of dowels **144**. The drive shaft **142** is carried on bearings **144** supported by a bearing block **146**.

FIG. **11** also shows the mechanism whereby the finger member **88** only extracts a label **30** if there is a container **28** on the conveyor **20**, which will accept the label **30**. The tubular drive shaft **142** for the discharge roller **72** is recessed adjacent its junction with the discharge roller to provide a cavity **148** in which are located a pair of meshing helical gears **150** and **152**, the teeth of which are disposed to each other as shown in FIG. **12**. The helical gear **150** is attached to the lower end of the spindle **80** carrying the finger member **88** while the other helical gear **152** is secured to the upper end of a push shaft which extends downwards through the tubular drive shaft **142** for the discharge roller **72**.

The lower end of the push shaft **154** extends beyond the lower end of the tubular shaft and enters into a flanged sleeve **156**. Surrounding the sleeve **156** and bearing against the flange **158** thereof is a spring **160**, the upper end of which bears against the lower end of the tubular drive shaft **142**. The tension on the spring **100** is adjustable by means of a nut **162** which bears against the underside of the flange **158** of the sleeve **156**. An energized solenoid **164** connected to the switch **44**, contacts the lower end of the push shaft **154**. Intermediate of its ends the push shaft **154** has a slot **166** with a key **168**.

The energized solenoid **164** urges the push shaft **154** upwards against the spring **160** with the result that the helical gear **152** on the push shaft **154** rotates the helical gear **150** and the spindle **80** pivots in a direction opposed to the direction of rotation of the discharge roller **72**. Because the free edge of the member trails behind the spindle **80** in relation to the direction of rotation of the discharge roller **72**, the member **88** is thus withdrawn towards the recess **74** of the discharge roller **72** and hence away from the discharge opening of the magazine **58**.

However, when the sensing arm **42** contacts a container **28** the switch is opened and the solenoid is de-energized with the result that the spring urges the push shaft downwards. The movement of the helical gears rotates the spindle in the opposite direction, i.e., same as that of the discharge roller and the free end member emerges from the recess in the discharge roller and effects contact with the outermost label. The movement outwards of the free edge of the finger member is controlled by the adjustable stop on top of the discharge roller, the stop being in the line of travel of the extension of the bifurcated member. A further control is exercised by the slot and key in the push shaft, which controls the extent of movement of the push shaft.

I claim:

1. In an automatic labelling apparatus, conveyor means for transporting containers to be labelled, means for sensing the passage of each of said containers on said conveyor, a magazine having a discharge opening with a pair of opposed side edges, a stack of labels in said magazine each having a width greater than the distance apart between said pair of opposed side edges of said discharge opening, a movable finger adjacent to said discharge opening and means responsive to said sensing means for moving said movable finger into said discharge opening to contact one of said stack of labels for

withdrawal of the same from said magazine; said movable finger being carried on a rotatable driven discharge roller extending substantially parallel to said pair of side edges of said discharge opening.

2. An automatic labelling apparatus according to claim 1 wherein said discharge roller has a pivotable spindle, said finger being secured to said spindle, a first helical gear secured to said spindle, a shaft substantially parallel to said spindle, a second helical gear on said shaft, said second helical gear meshing with said first helical gear and opposed spring and solenoid means acting on said shaft through said helical gears to rotate said spindle between the position where the finger contacts a label in said discharge opening and a position away from said discharge opening after said label has been withdrawn.

3. An automatic labelling apparatus according to claim 2 wherein said sensing means comprises an arm, a portion of which extends into the direction of the passage of each of said containers on said conveyor, and a switch connected to said arm, said solenoid being connected to said switch.

4. Automatic labelling apparatus according to claim 3 wherein said switch is closed and the movement of said arm opens said switch to de-energize said solenoid.

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