Sept. 13, 1960

D. L. ORLOFF

LABELING MACHINE

2,952,376

Filed Jan. 31, 1958

7 Sheets-Sheet 1

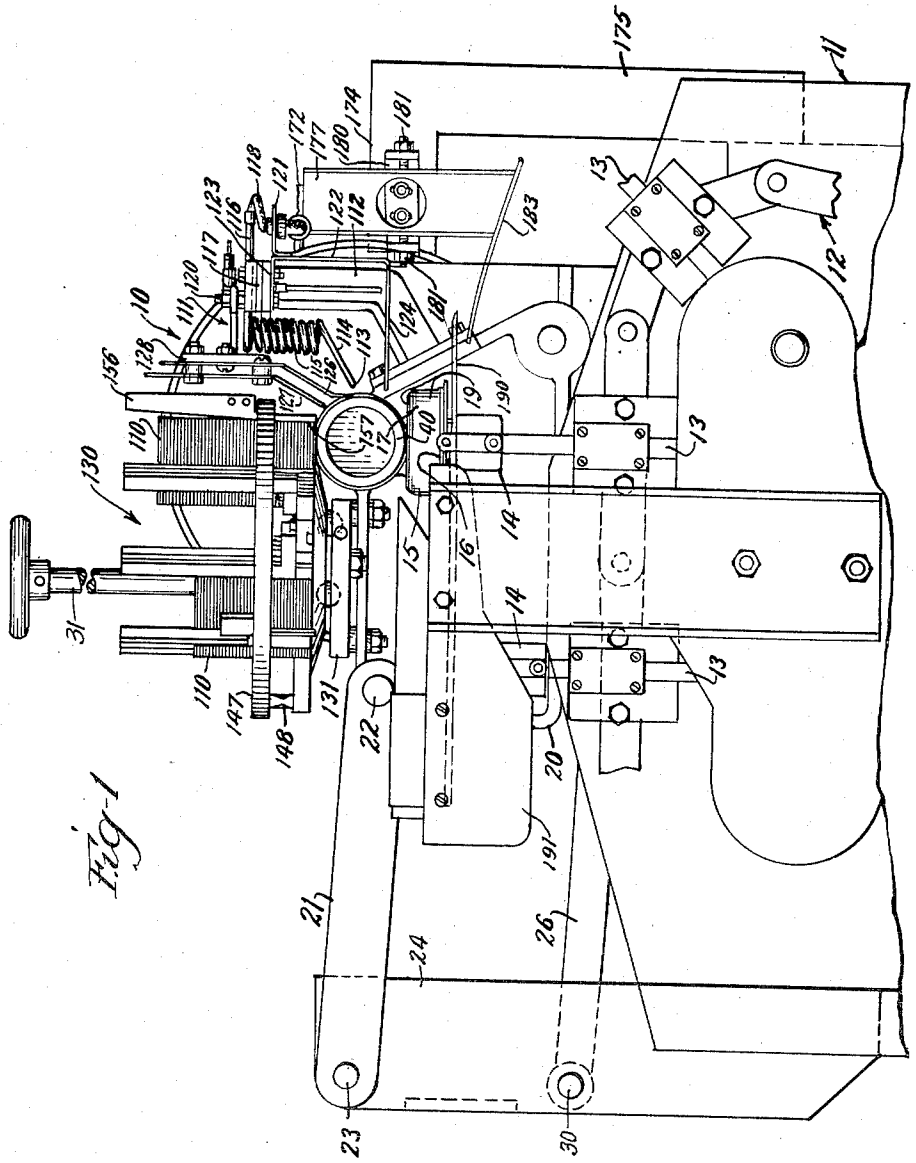

Fig-1

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7 Sheets-Sheet 2

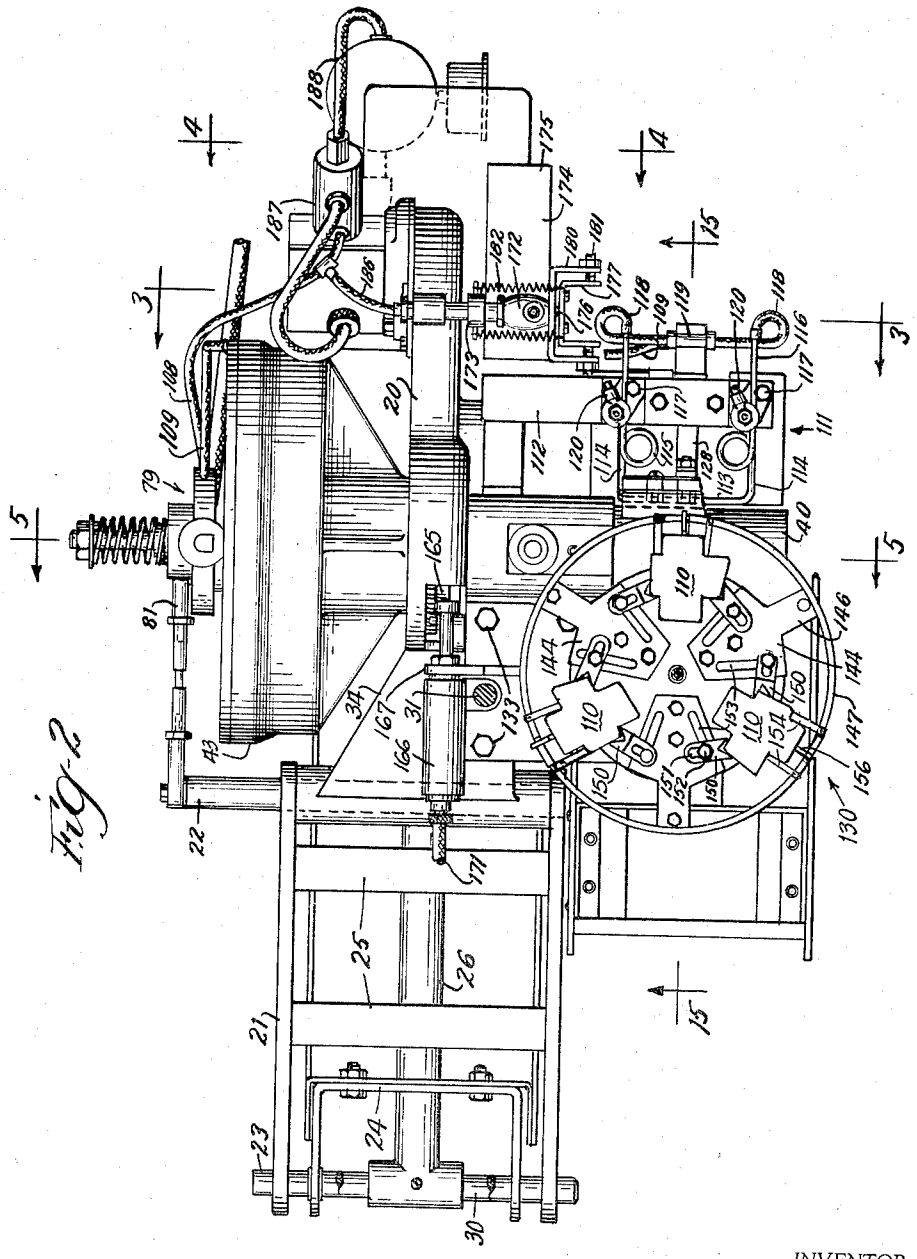

Fig-2

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LABELING MACHINE

Filed Jan. 31, 1958 7 Sheets-Sheet 3

Fig-3

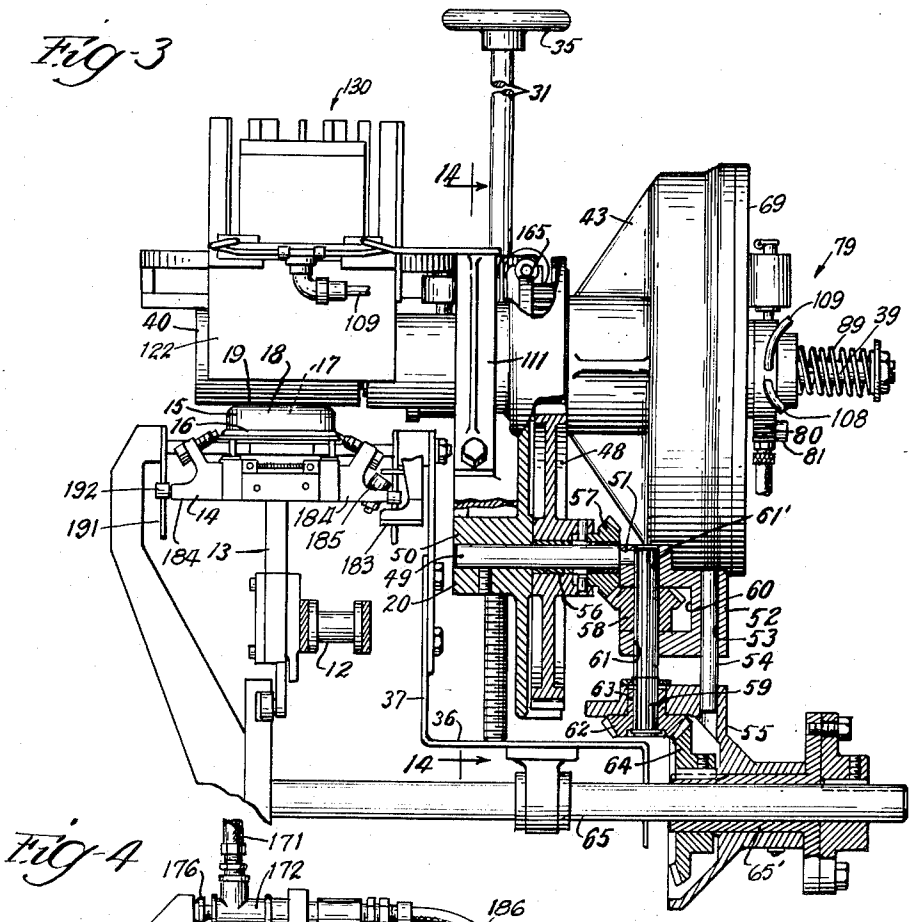
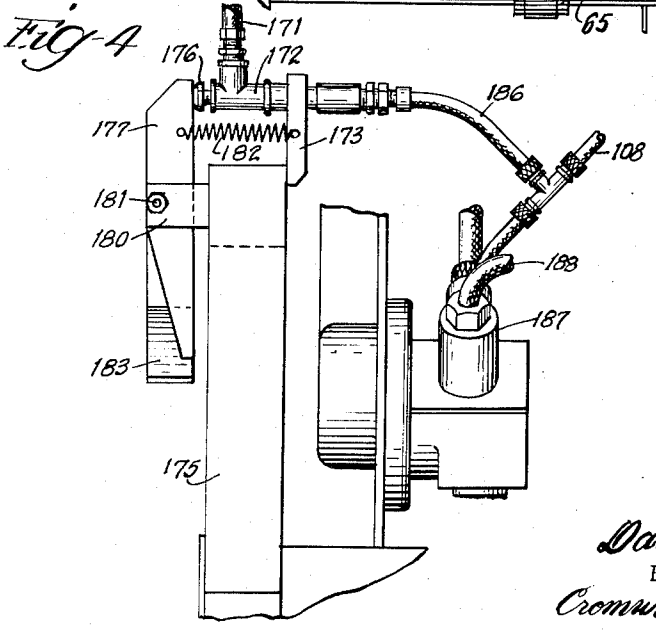


Fig-4



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LABELING MACHINE

Filed Jan. 31, 1958 7 Sheets-Sheet 4

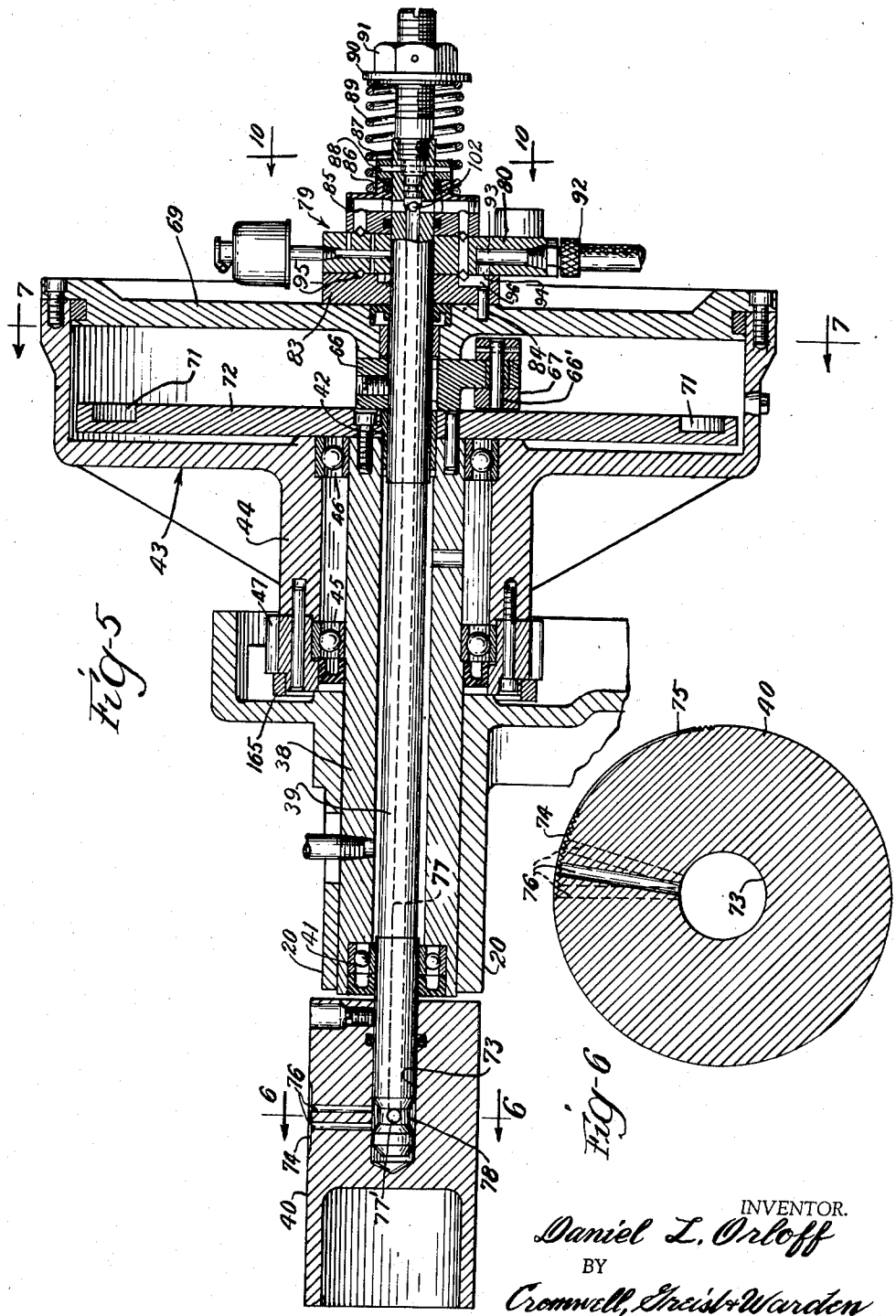

Fig-5

Fig-6

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Sept. 13, 1960 D. L. ORLOFF 2,952,376

LABELING MACHINE

Filed Jan. 31, 1958 7 Sheets-Sheet 5

Fig-7

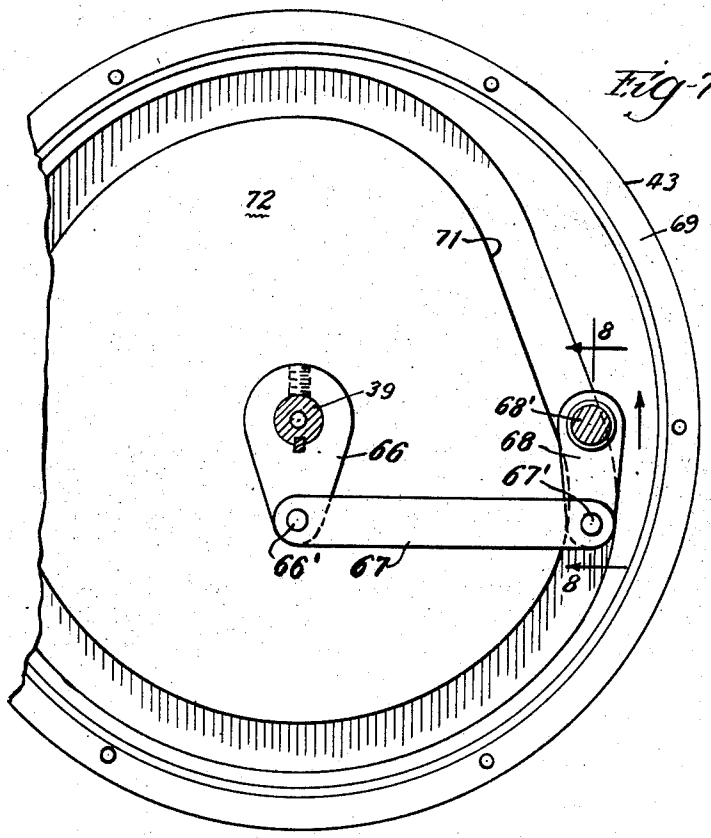


Fig-8

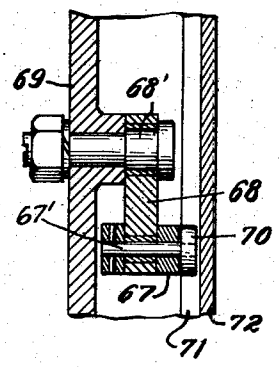
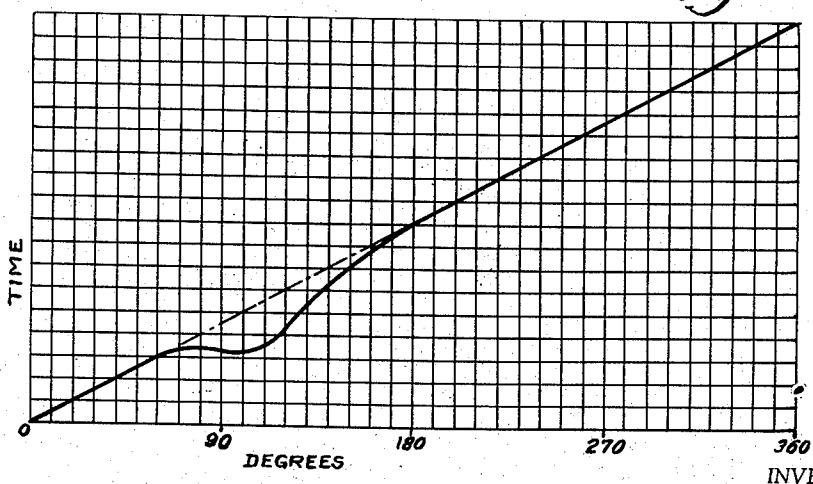


Fig-9



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Sept. 13, 1960 D. L. ORLOFF 2,952,376

LABELING MACHINE

Filed Jan. 31, 1958 7 Sheets-Sheet 6

Fig-15

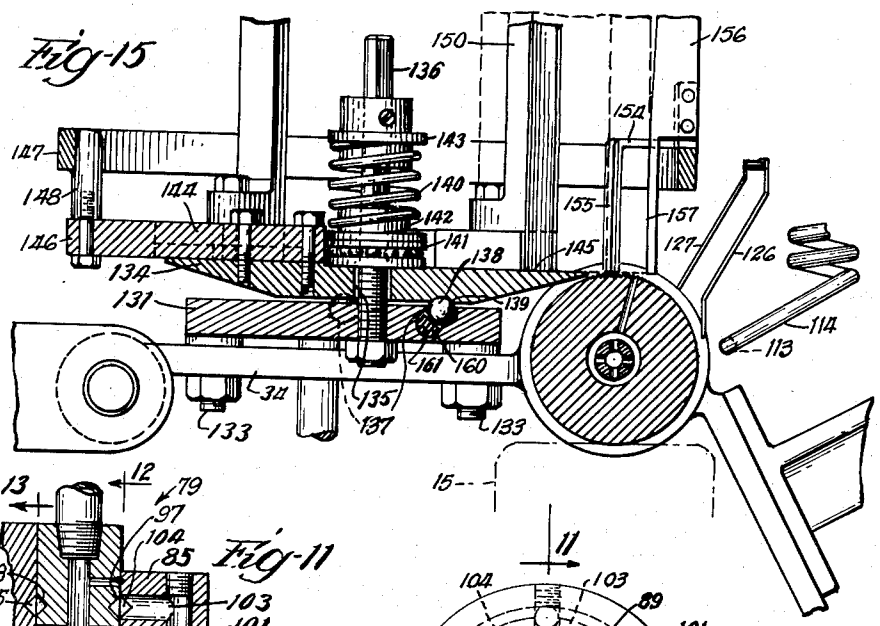


Fig-11

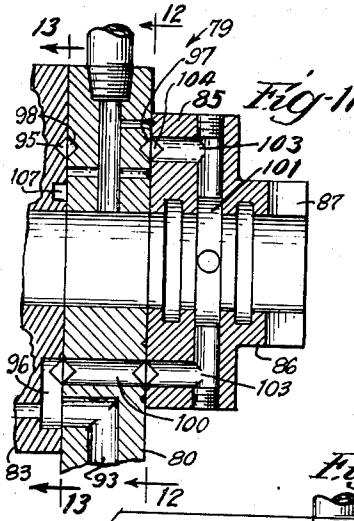


Fig-10

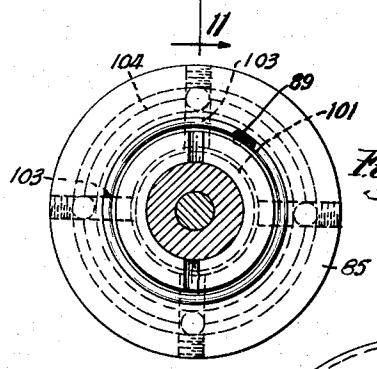


Fig-13

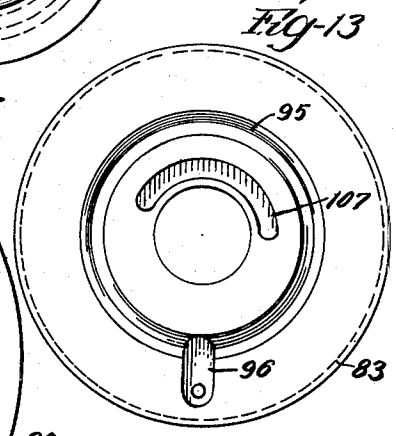
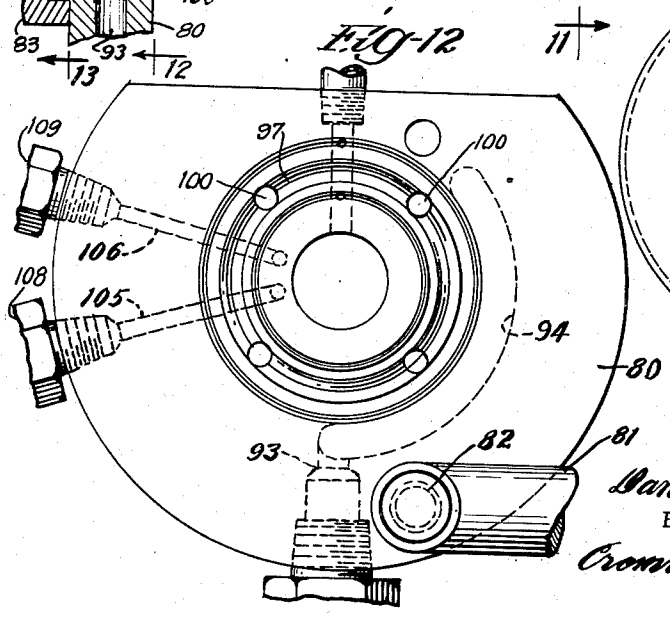


Fig-12



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LABELING MACHINE

Filed Jan. 31, 1958 7 Sheets-Sheet 7

Fig-14

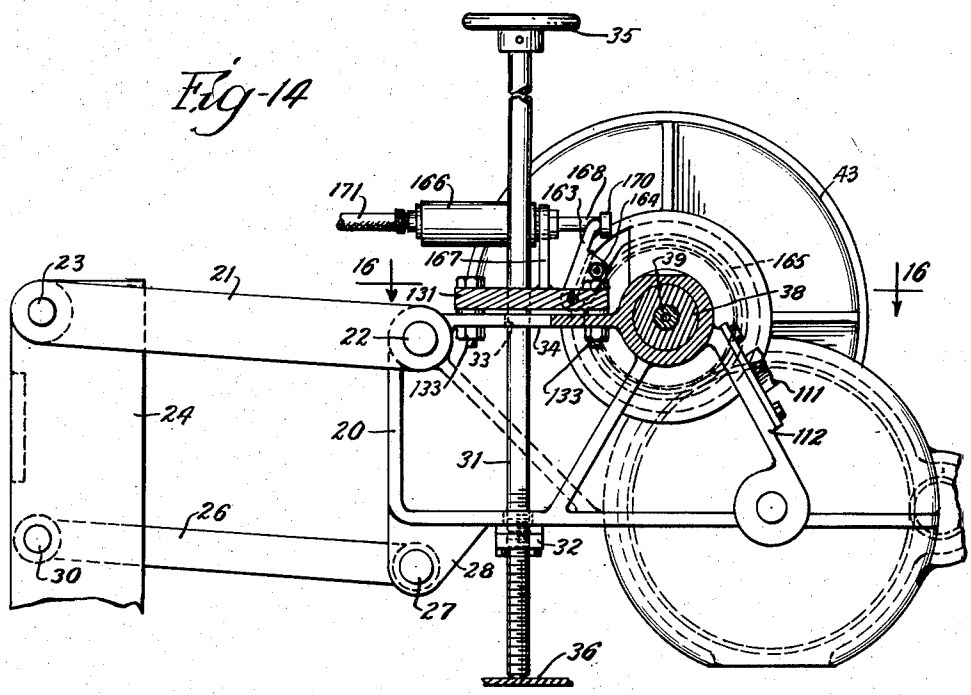


Fig-16

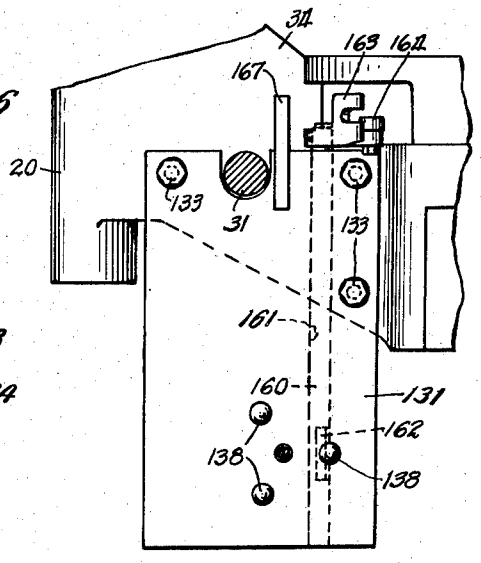
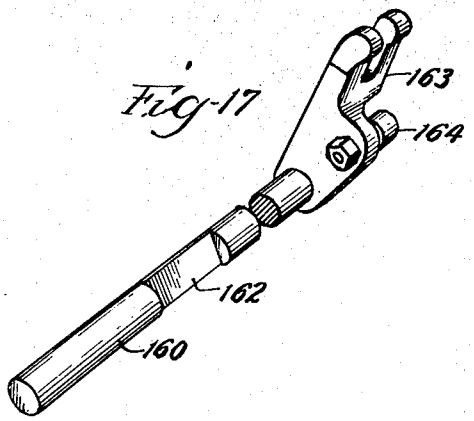


Fig-17



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United States Patent Office 2,952,376 Patented Sept. 13, 1960

2,952,376

LABELING MACHINE

Daniel L. Orloff, Madison, Wis., assignor to Oscar Mayer & Co., Inc., Chicago, Ill., a corporation of Illinois

Filed Jan. 31, 1958, Ser. No. 712,353

11 Claims. (Cl. 216—55)

This invention relates to labeling of packages or other objects and is more particularly concerned with improvements in a machine which is adapted to pick up a label from a stack thereof and carry the label to a position in predetermined registry with a traveling object for application of the label to the surface of the object.

It is a general object of the invention to provide a machine having mechanism which is adapted to pick up a label from a stack, to carry the label through an activation zone where the surface of the label is made adhesive to a position in predetermined registry with a traveling object and to apply the label to the object so that it adheres to the surface of the same.

It is a more specific object of the invention to provide a label applying machine which comprises a rotatably mounted cylinder having a vacuum arrangement for gripping the label and holding the label on the peripheral surface as the cylinder rotates adjacent a label supply magazine, mechanism for rotating the cylinder uniformly at a predetermined portion of its cycle to allow transfer of the label to an object which is substantially flat surfaced and which is advanced uniformly in a plane parallel to its own surface and in a direction perpendicular to the axis of the cylinder so that the surface of the object is engaged by the cylinder for pressing the label thereon and mechanism adjacent the cylinder for activating an adhesive on the label surface or on the surface of the object before the label is applied to the object.

It is a further object of the invention to provide a labeling machine in which the label is adhered to the surface of an applicator drum by a vacuum and carried through an adhesive applying or activating zone to a position where the label is adhered to the surface of an object which is carried in a path adjacent the cylinder so that the surface to which the label is to be applied is engaged with the surface of the drum.

It is another object of the invention to provide a label applying machine which comprises a rotating cylindrical label pick up and transfer member arranged between a label supply magazine from which successive labels are fed and an object transporting mechanism which is operated to engage successive objects with labels carried on the cylindrical member and a mechanism for heating a blast of air and directing the same against the surface of each successive label carried on the cylindrical member so as to activate a thermoplastic coating on the label as it is transferred by the cylindrical member from the supply magazine to the object.

It is a still further object of the invention to provide a labeling machine having a rotating cylinder which picks up a label from a supply magazine, moves the label past an adhesive activating zone and then causes transfer of the label to the surface of an object moved past the same wherein the label supply magazine comprises a tiltably mounted rotatable frame adapted to support in peripherally spaced relation therein a multiplicity of stacks of labels, mechanism for selectively indexing the frame to present a stack of the labels to the pick up cylinder,

and mechanism for tilting the frame to facilitate the feeding of the label from the bottom of a stack to the surface of the cylinder.

It is another object of the invention to provide a labeling machine of the type described wherein provision is made for interrupting the feeding of the labels to the label transfer and applicator member when the mechanism for transporting the objects to be labeled fails to present an object in label receiving relation to the label transfer and applicator member.

These and other objects and advantages of the invention will be apparent from a consideration of the labeling machine which is shown by way of illustration in the accompanying drawings wherein:

Figure 1 is a side elevation of a label applying machine constructed in accordance with the principles of the invention, the machine being mounted on the top frame portion of a package transfer apparatus which transports successive packages past the labeling machine for application of labels to the top surface thereof;

Figure 2 is a plan view of the labeling machine;

Figure 3 is a view partially in end elevation and partially in transverse section and with portions thereof broken away, the view being taken generally on the line 3—3 of Figure 2;

Figure 4 is a partial end elevation, the view being taken on the line 4—4 of Figure 2;

Figure 5 is a partial cross section taken on the line 5—5 of Figure 2, to an enlarged scale;

Figure 6 is a cross section taken on the line 6—6 of Figure 5 to an enlarged scale;

Figure 7 is a cross section taken on the line 7—7 of Figure 5;

Figure 8 is a fragmentary section taken on the line 8—8 of Figure 7, to an enlarged scale;

Figure 9 is a chart illustrating the rotation of the label applying cylinder which results from the operation of the mechanism shown in Figures 5, 7 and 8;

Figure 10 is a cross section taken on the line 10—10 of Figure 5, to a larger scale;

Figure 11 is a cross section taken on the line 11—11 of Figure 10;

Figure 12 is a cross section taken on the line 12—12 of Figure 11;

Figure 13 is a cross section taken on the line 13—13 of Figure 11;

Figure 14 is a partial cross section taken on the line 14—14 of Figure 3;

Figure 15 is a partial cross section taken on the line 15—15 of Figure 2, to an enlarged scale;

Figure 16 is a fragmentary section taken on the line 16—16 of Figure 14; and

Figure 17 is a perspective view of the magazine tipping shaft, to an enlarged scale.

The form of the labeling machine which is illustrated in the drawings (Figures 1, 2 and 3) is particularly adapted for use in a packaging operation in which the completed packages are delivered from the package forming machine on a continuously traveling conveyor and successive packages are removed from the conveyor by a transfer apparatus mounted above the traveling conveyor which delivers the packages to a discharge chute. The labeling machine 10 is mounted on the uppermost portion of the upright supporting frame structure 11 of the package handling or transfer mechanism. The latter includes an endless chain conveyor 12 arranged to travel in a vertical plane and carrying a series of radial arms 13 having gripper assemblies 14 on their outer ends which carry the packages 15.

Each package 15 (Figures 1 and 3) comprises a relatively rigid flat plate-like base member 16 and a mass of a product 17 which is enclosed in a flexible wrapper 18,

with the latter sealed at its peripheral edges to the edges of the base **16** so that the uppermost surface **19** of the package is relatively flat. The chain conveyor **12** and associated mechanisms for carrying the packages **15** are so arranged on the supporting structure **11** that the packages are advanced in a substantially horizontal path as they are carried along the upper run of the conveyor **12** on the gripper assemblies **14**. The labeling machine **10** is supported on the frame structure **11** so that the packages **15** are carried beneath the same for application of the labels to the top surface thereof. Since the details of the package transfer conveyor **12** and its associated mechanisms form no part of the present invention, only those portions of the frame structure **11** and its associated mechanisms which are necessary for an understanding of the operation of the labeling machine **10** will be referred to. The package transfer mechanism is disclosed in the copending application of William R. Kohrs et al., Serial No. 601,210, filed July 31, 1956, now Patent 2,860,763, issued November 18, 1958.

The labeling machine **10** comprises a main support or frame member in the form of a casting **20** (Figures 1, 2, 3, 5 and 14) which is supported for vertical adjustment on the top of the frame structure **11**. An upper rectangular link frame **21** is pivoted at one end on a cross pin **22** to the upper corner of the support frame **20** and at its opposite end to a cross pin **23** mounted in the upper end of an upstanding channel-shaped bracket member **24** which bracket member is bolted or otherwise secured at its lower end to the frame structure **11**, the two parallel side plates of the frame structure **21** being connected by suitable cross braces **25** (Figure 2). A lower parallel link bar **26** is connected at one end by pivot **27** (Figure 14) to a depending bracket member **28** on the lower edge of the frame member **20** and at its other end to the pin **30** on the upright bracket **24** so that the entire labeling mechanism **10** swings on the links **21** and **26** as it is raised and lowered relative to the frame **11**.

The vertical adjustment of the mechanism **10** is accomplished by means of a screw **31** (Figures 3 and 14) which has its lower section threaded and in engagement with a nut forming member **32** on the bottom part of the support frame **20** and which extends through a guide aperture **33** in an upper web portion **34** of the support frame **20** and carries at its upper end an operating wheel **35**. The lower end of the screw **31** engages the shelf **36** formed by an angular bracket **37** (Figure 3) which is attached to the frame structure **11**. Rotation of the screw **31**, of course, adjusts the elevation of the entire labeling mechanism **10** relative to the frame structure **11**.

The support frame **20** includes a transversely extending sleeve or tube forming portion **38** (Figures 5 and 14) in which there is rotatably mounted a cross shaft **39** which carries on its outer end a label transfer and applicator cylinder **40**. The shaft **39** is rotatably mounted in the sleeve portion **38** in suitable bearings **41** and **42** at opposite ends thereof. The sleeve portion **38** extends laterally at the rear side of the frame **20**, as viewed in Figure 2, and carries on its rearward end a housing **43** which has a hub forming portion **44** with a bore of larger dimension than the external diameter of the rear end of the sleeve **38** and which is mounted on the end thereof by means of a pair of spaced bearings **45** and **46** so that the housing **43** is adapted to rotate on the sleeve **38**.

The housing **43** is rotated by a gear **47** secured on the inner end of the hub portion **44** which is in driving engagement with a gear **48** (Figure 3) carried on a supporting shaft **49** which has one end secured in a bore in a hub forming portion **50** of the support frame **20** and extends rearwardly therefrom with its other end reduced in diameter and seated in a short horizontal bore **51** in the upper end of an upper yoke member **52** which is spaced in a lateral direction from the hub portion **50** of the support frame **20** and which is provided with a vertically extending bore **53** at its rear side for receiving an upstanding guiding and supporting pin **54**, the latter being mounted in a lower yoke member **55** which is spaced below the yoke member **52**. The gear **48** is mounted on a bearing sleeve **56** on the shaft **49** which also carries a bevel gear **57** for engagement with a bevel gear **58** which is splined on a vertical shaft **59** and housed in a recess **60** in the upper yoke member **52**. The vertical shaft **59** is rotatably and slidably mounted in vertically aligned bores **61** and **61'** in the yoke member **52** above and below the recess **60**. At its lower end the vertical shaft **59** carries a bevel gear **62** which has a hub portion **63** journaled in a vertically extending bearing aperture in the lower yoke member **55**. The bevel gear **62** engages with a cooperating bevel gear **64** mounted on a cross shaft **65** journaled in suitable bearings on the supporting frame structure **11** and suitably connected to the main drive of the package transfer apparatus. The lower yoke member **55** is mounted on the sleeve bearing member **65'** which is secured to the rear end of the shaft **65** so that the member **55** can pivot on the sleeve **65'** sufficiently to prevent binding of the shaft **59** when the position of the labeling apparatus is adjusted by rotation of the adjusting screw **31**. The sleeve member **65'** also carries the bevel gear **64** in fixed relation thereon. By means of the gear connections described, the housing **43** is driven in timed relation to the movement of the conveyor **12** which transports the packages **15** beneath the label applying cylinder **40**, regardless of the vertical adjustment of the labeling mechanism **10**.

The cross shaft **39** which rotates the cylinder **40** is connected to the housing **43** so that it is rotated nonuniformly. The rear end of the shaft **39** extends through the housing **43** and carries an operating arm **66** (Figures 5, 7 and 8). The arm **66** is pivotally connected at its free end to pin **66'** in the end of a link bar **67**. The link bar **67** has its other end pivotally connected to pin **67'** in the end of a smaller link member **68** which is in turn pivoted at its opposite end on a headed pin **68'** bolted to the cover or cap plate **69**. The cover plate **69** has its peripheral edge bolted to a flange forming edge portion of the housing **43** and rotates therewith. The pivot **67'** connecting the link **67** with the link arm **68** carries a cam roller **70** which is seated in a cam track **71** in a cam plate **72** attached to the end of the fixed sleeve portion **38** of the support frame **20**. Rotation of the housing **43** through the drive mechanism previously described carries the pivot **67'** and the cam roller **70** in a generally circular path about the axis of the shaft **39** and rotates the shaft **39** through the linkage connection **66** and **67**. The arrangement of the cam track **71** results in non-uniform rotation of the label carrying cylinder **40**, a single revolution being illustrated graphically in Figure 9. The cylinder **40** rotates at a uniform speed during approximately three-quarters of each revolution. During the other approximately one-quarter of its cycle the cylinder **40** is slowed down and slightly reversed at the instant it picks up the label to assist in removing the label from the supply magazine, and thereafter brought up to a uniform speed of rotation which corresponds with the linear travel of the package **15** as it is advanced by the chain conveyor **12** beneath the cylinder **40** for application of the label.

The label cylinder or drum **40** (Figure 5) is provided with an axial bore **73** extending inwardly of one end thereof for receiving the end of the shaft **39** and is secured in fixed adjusted relation on the latter by a set screw. The cylinder **40** is provided on the portion of its peripheral surface which is adapted to carry the label with a series of axially extending grooves **74** (Figures 5 and 6) and a circumferentially extending groove **75** forming a pattern for application of vacuum to the label when it is picked from the magazine. The vacuum is applied through a plurality of radially extending passageways **76** which communicate with the central bore **73**. The supporting shaft **39** has an axial bore **77** terminating near its end at radial passageways **77'** which communi-

cate with a circumferential groove 78. The axial bore 77 forms a passageway to the other end of the shaft 39 for connection with a valve assembly 79. The end of the shaft 39 is positioned in the bore 70 so as to align the groove 78 with the radial passageways 76 in the label cylinder 40.

The application of the vacuum to the label cylinder is controlled by the valve assembly 79 at the end of shaft 39. The valve assembly 79 includes a fixed valve disc 80 mounted on the shaft 39 and held in non-movable, non-rotating relation thereon by an adjustable link bar 81 (Figures 2, 5 and 12) having one end connected at 82 to the valve disc 80 adjacent the periphery of the latter and having the other end connected to an extended rear end portion of the link attaching pivot pin 22 on the support frame 20. The length of the link bar 81 may be varied to adjust the position of the valve disc 80.

A rotatable valve disc 83 (Figures 5, 11 and 13) is secured by the pin 84 in relatively non-rotatable relation on the cover plate 69 of the rotating housing 43 between the fixed valve disc 80 and the housing 43. A gland member 85 in the form of a circular plate is mounted on the end of the shaft 39 on the outside of the fixed valve disc 80. The gland member 85 has a hub portion 86 which is slotted at 87 to receive a cross pin 88 extending radially through the shaft 39 which holds the same against rotation on the shaft 39. The entire valve and gland assembly 79 is resiliently urged against the cover plate 69 of the housing 43 by a compression spring 89 which engages at one end over the hub 86 of the gland member 85 and at the other end against a collar forming washer 90 which is retained in adjusted relation by a nut 91 on the threaded end of the shaft 39.

A vacuum line 92 is connected to the fixed valve disc 80 by a suitable nipple at the end of a radial passageway 93. The radial passageway 93 is connected at its lower end with an annular passageway 94 (Figure 12) which extends approximately 130° on the inner face of the valve disc 80 and which communicates with an annular passageway 95 (Figure 13) in the rotating valve disc 83 through a connecting radial passageway 96. Annular passageways 97 and 98 on opposite faces of the fixed valve disc 80 are connected by four axially extending passageways 100, the latter being spaced 90° apart. The gland member 85 (Figures 10 and 11) is provided with an internal annular passageway 101 which is aligned with radial apertures 102 in the shaft 39, the latter connecting the same with the axial passageway 77 in the shaft 39. The annular passageway 101 in the gland member 85 is connected by four radially and axially extending passageways 103 with an annular groove 104 on the inside face of the gland member 85 and the latter is aligned with the annular groove 97 on the outer face of the fixed valve disc 80. The fixed valve disc 80 has two radially and axially extending internal air passageways 105 and 106 which open at their inner ends on the inside face of the valve disc 80 in alignment with an annular groove 107 (Figure 13) on the rotatable valve disc 83, the groove extending around approximately 145°. The air passageways 105 and 106 are connected at their outer ends by suitable nipples on the periphery of the valve disc 80 with air hose lines 108 and 109 which are connected to a solenoid operated valve in the air supply line and a hot air adhesive activating device, respectively. The operation of the valve assembly 79 and the manner in which it controls the vacuum applied to the cylinder 40 and the air delivered to the adhesive activating device will be hereinafter explained.

The labeling machine 10 as illustrated is adapted to apply to the packages 15 labels 110 (Figures 1, 2 and 15) which are supplied with a heat activatable adhesive on the face thereof which is applied to the package. Successive labels 110 are supplied to the label cylinder 40 with the face which is coated with the adhesive exposed on the cylinder 40 so that the adhesive may be activated immediately prior to its application to the package by a hot air apparatus 111 which is mounted adjacent the cylinder 40 on an angular bracket 112 having a vertical portion extending upwardly of the support frame 20. The angular bracket 112 carries an air heating tube which is bent to provide a perforated section 113 connected at its opposite ends by spaced parallel leg portions 114 with a pair of coiled tube sections 115 which have their upper ends connected to horizontally extending end sections 116, the latter being clamped by suitable clamping plate and bolt assemblies 117 to the top forwardly extending leg of the angular bracket 112. The tube is arranged so that the perforated section 113 extends parallel with the peripheral surface of the label cylinder 40. The end sections 116 of the air heating tube are connected by a pair of hose sections 118 to a T 119 and the latter is connected by a suitable nipple to the air hose 109 from the valve assembly 79 for supplying air to the apparatus. The coiled tube sections 115 of the apparatus are heated electrically and are suitably connected at 120 with a current supply line, the members forming the electrical connections on the tube end sections 116 being properly insulated as required. The T 119 in the air line is mounted on a horizontal tongue 121 at the top of a guard plate 122 which has an upper flange 123 bolted to the top leg of the bracket 112 and a bottom plate section 124 which extends above the path of travel of the packages to adjacent the label cylinder 40. A pair of baffle plates 126 and 127 are provided between the air tube and the magazine or other supply for the labels. The baffle plates 126 and 127 are attached in spaced relation to each other and supported on the upstanding leg of an angular bracket formation 128 which extends from the top leg of the supporting bracket 112. The baffle plates 126 and 127 are bent at their lower ends to extend to adjacent the periphery of the label cylinder 40. Air is supplied to the heating tube by operation of the valve assembly 79 at the proper time relative to the rotation of the label cylinder 40 to deliver hot air through the perforations in the tube section 113 against the surface of the label exposed on the cylinder 40 as it is carried toward a package 15.

The labels 110 are supplied to the label cylinder 40 from a multiple stack supply magazine 130 (Figures 1 to 3 and 14 to 17) which is mounted adjacent the label cylinder 40. The supply magazine 130 is mounted on a rectangular support plate 131 bolted to the top web portion 34 (Figure 14) of the frame support 20 by the attaching bolts indicated at 133. The support plate 131 carries at its end a circular base plate 134 which forms the base for a turret-like magazine for three stacks of labels, in the form illustrated. The turret base plate 134 has a central bore 135 which accommodates the cylindrical lower portion of an upstanding stud member 136 which is secured at its lower end in the support plate 131. The base plate 134 has on its lower face three indentations or socket formations 137 which are adapted to receive projecting portions of indexing and supporting balls 138 housed in socket formations 139 in the upper face of the support plate 131. The balls 138 and the cooperating sockets 137 provide an indexing and positioning means for the turret so as to permit selective positioning of each of the stacks of labels in proper feeding relation to the cylinder 40. The turret base plate 134 is held resiliently against the balls 138 in the support plate 131 by a compression spring 140 which is mounted on the stud member 136 between a thrust bearing 141 having a washer forming portion 142 and a stop washer 143 adjustably secured on the upper portion of the stud member 136.

Each of the three stacks of labels is supported on the turret base plate 134 by identical magazine forming members and only one set of these members will be described, it being understood that the other three sets are identical. The base plate 134 carries a series of spoke plates 144 (Figures 2 and 15) which are attached in circumferentially spaced relation around the top surface 145 of the plate 134 with each having a radially extending arm 146 projecting beyond the periphery of the plate 134

and carrying a ring member **147** on upstanding post members **148** attached to each of the plate arms **146**. The label magazines are formed between the spoke plates **144** and each comprises a pair of spaced inner corner forming L-shaped uprights or posts **150**. The bottom leg of each post **150** has a slot **151** for receiving a bolt **152** which is slidable in the slot **153** at one side of a spoke plate **144**, so that each spoke plate **144** supports a corner post **150** for each of the two adjacent label magazines. Each of the corner posts for each magazine is mounted for adjustment on its supporting spoke plate so as to provide adjustment for different size labels. Angular front guide members **154** are arranged in paired spaced relation on the ring **147** at the outer side of each magazine with the vertical legs **155** thereof in depending relation and each forming a corner of the magazine for holding the labels **110** in stacked relation. An upwardly extending post or center guide plate member **156** is secured on the ring **147** between the spaced front guide members **154** which has a downwardly extending portion **157**. Thus below the ring **147** the labels are retained in vertically stacked relation within the magazine formed by the two pairs of corner guide members **150** and **154** while above the ring the labels are retained by the three guide members **150**, **150** and **156**. The depending portion **157** of the front guide member **156** forms a front stop for the bottom portion of the label magazine, with the bottom end of the stop **157** being preferably slightly lower than the top surface **145** of the support plate **134**.

The entire label supply turret is tipped so as to lift the stack which is in the feeding position slightly away from the cylinder **40** after the leading edge of the bottom label in the stack is pulled against the surface of the cylinder **40** by the application of the vacuum to the cylinder. This tipping operation is accomplished by a rod **160** which is mounted in a transverse bore **161** in the support plate **131** with the bore **161** being arranged to cut through a lower portion of the ball socket **139** which is adjacent the transfer cylinder **40**. The tipping rod **160** has a segment cut out at **162** which is positioned relative to the ball receiving socket **139** so that when the cut out portion is facing into the socket **139** it does not interfere with the ball **138** but when the rod **160** is turned or rotated 180° about its axis the ball **138** is raised above its normal level and tips the turret base plate **134** so as to raise that side of the plate which is adjacent the cylinder **40** and lift the stack being fed a sufficient distance above the cylinder to position the lowermost label out of engagement with the cylinder. The tipping rod **160** has its end extending beyond the inner end of the support plate **131** and carries thereon a radially extending cam arm **163** (Fig. 14). The cam arm **163** carries a cam roller **164** positioned to engage with a cam plate **165** (Figures 2, 3, 5 and 14) carried on the inner edge of the gear **47** which is secured on the end of the hub portion **44** of the rotating housing **43**. The cam plate **165**, of course, rotates with the housing **43** and tips the magazine in timed relation to the rotation of the transfer cylinder **40**.

The label magazine may also be tipped to hold the bottom label out of engagement with the surface of the transfer cylinder **40** by operation of an air cylinder **166** (Figures 2 and 14) which is supported on an upright bracket **167** on the inner end of the support plate **131**. The piston **168** in the air cylinder **166** is spring urged toward retracted position and has a head **170** on its end which is adapted to engage with the end of the cam arm **163** so that when the piston **168** is retracted the tipping rod **160** rotates and tips the magazine out of label feeding position. The air cylinder **166** is connected by an air hose **171** with an air valve **172** (Figure 4) which is mounted on an upstanding bracket plate **173** on the top leg **174** of an inverted L-shaped supporting bracket **175** which is attached to the frame structure **11** of the package transfer apparatus. The valve **172** has an operating button **176** adapted to be engaged by the upper end of an operating lever arm **177**, the latter being formed of a plate bent into U-shaped cross section and supported on a U-shaped bracket **180** by a pair of pivots **181**, the bracket **180** being mounted on the upper end of the supporting bracket **175**. A pair of tension springs **182** are connected at opposite ends to the fixed bracket member **173** and to the upper end of the operating arm **177** and normally hold the arm **177** against the valve button **176** so that the valve button **176** is normally in depressed or retracted position and the valve is open, allowing air to pass through the valve **172** to the cylinder **166** to hold the piston **168** in extended position. At its lower end the operating arm **177** carries a curved cam plate **183** which is positioned so that when there is a package **15** on the gripper mechanism **14** the latter passes clear of the plate **183**. However, when the gripper mechanism does not carry a package **15** the gripper arms **184** which are pivotally mounted on opposite sides of the gripper mechanism **14** are pivoted upwardly and inwardly towards the top of the gripper mechanism and a cam follower **185** (Figure 3) mounted on the inner arm **184** will engage with the plate **183** and move the operating arm **177** to allow the button **176** to open the valve **172** and cut off the flow of air to the air cylinder **166** permitting the piston **168** to retract and swing the cam arm **163** (Figure 14) in a counter-clockwise direction thereby tipping the label magazine away from the label cylinder **40**. The air valve **172** is connected by a hose **186** with the air line **108** which extends from the fixed valve disc **80** of the valve assembly **79** to the solenoid operated valve **187**, the latter being connected by a hose **188** with a suitable air supply.

In operation, the labeling machine **10** is driven by the shaft **65** which is connected with the drive mechanism for the conveyor **12** so that the label transfer and applicator cylinder **40** rotates in timed relation to the advancing movement of the conveyor **12** with the cylinder **40** being adjusted so as to properly register the label **110** on the top surface **19** of the package **15** as it is rolled thereon. In picking the label from the magazine **130** the cylinder **40** is rotated through the connection of the shaft **39** with the constantly rotating housing **43** so that at the point when the openings for the vacuum passageways **76** on the surface of the drum **40** move beneath the leading edge of the bottom label in the stack the cylinder slows down and is practically stopped when the vacuum is applied through operation of the valve assembly **79** to grip the label against the surface of the cylinder, the cylinder **40** being in the position relative to the stack of labels as shown in Figure 15. As the leading end of the bottom label in the stack is pulled against the surface of the cylinder **40**, the cylinder is moved slightly in the reverse direction in order to pull the label loose from the stack and then rotational movement in the direction for feeding the label is resumed and the cylinder **40** is traveling at a uniform rate, the same speed as the rate of movement of the package **15**, when the label is rolled onto the top of the package **15**. As the label is pulled loose by the movement of the cylinder **40**, the magazine **130** is tipped by operation of the cam **165** and the tipping rod **160**. The reversal of direction of movement of the cylinder **40** and the simultaneous tipping of the magazine **130** away from the cylinder **40** is effective to loosen the bottom label and allow it to be advanced by the cylinder **40**. As the cylinder rotates and advances the label toward the oncoming package **15**, the valve assembly **79** operates to deliver a blast of air through the heated coils **115** to the perforated cross piece **113** of the heating tube which directs the hot air against the exposed surface of the label and activates the adhesive on the same so that the adhesive is tacky when the label is rolled onto the package by continued rotation of the cylinder **40**.

The pressure applied by the cylinder **40** to the surface of the package **15**, when the label is rolled thereon, is adjusted by rotation of the adjusting shaft **31**. The package **15** is supported beneath the applicator cylinder **40**

on a horizontal supporting plate **190** (Figure 1) fixed on the frame **11** while it is carried along by the gripper assembly **14**. After the label is applied to the top of the package the gripper arms **184** are pivoted to the package release position by the cam plates **191** which engage the cam rollers **192** on the pivoted arms **184** and the package **15** is released from the gripper assembly **14** and discharged across the plate **190**.

If the gripper assembly **14** on a package carrying arm **13** does not carry a package **15** the inner gripper arm **184** swings inwardly so that it is in a position where the cam roller **185** will engage with the plate **183** which operates the valve **172** to cut off the air to the cylinder **166** allowing the piston **168** to be retracted. This rotates the tipping shaft **116** and tips the stacks of labels which is being fed away from the cylinder **40** sufficiently to prevent the feed of the bottom label.

If the conveyor **12** is stopped, the solenoid valve **187** is operated electrically to cut off the air supply so that no air is supplied to the valve **172** nor to the adhesive heating mechanism **111**. This, of course, results in the tipping of the label magazine away from the cylinder **40** so that the labels are not in feeding position.

While specific materials and particular details of construction have been referred to in describing the illustrated form of the machine, it will be understood that other materials and equivalent details of construction may be resorted to within the spirit of the invention.

I claim:

1. In a machine for withdrawing individual labels from a stack thereof and applying the same to a succession of traveling objects, a label transferring and applying cylinder having an axial bore and communicating radial passageways opening on the surface thereof, a supply magazine arranged adjacent said cylinder and having means for positioning a stack of labels with the lowermost label adjacent the surface of said cylinder in the path of said passageway openings, a supporting shaft for said cylinder having one end seated in the bore in the cylinder, said shaft having an axial bore, and means connecting said bore with the radial passageways in the cylinder, means to rotatably support said shaft, a valve assembly mounted on the other end of said shaft, said valve assembly comprising a non-rotatable valve disc and a rotatable valve disc, said valve discs having passageways adapted to be in communication with each other and with the axial bore in said shaft upon predetermined rotation of said rotatable valve disc, vacuum applying means connected to the passageways in the non-rotatable valve disc, means connected to said rotatable valve disc for rotating the same relative to the non-rotatable valve disc at a uniform rate of speed, and means connecting said shaft to said rotating means for rotating said shaft with uniform speed during a predetermined portion of each revolution thereof and for thereafter reducing the speed of rotation and reversing the direction of rotation for a short period while the openings for the radial passageways in said cylinder are covered by the bottom label in said stack and vacuum is applied by operation of said valve assembly to grip the label.

2. In a machine for feeding individual labels from a stack thereof and applying the same to a succession of traveling objects, a label transferring and applying cylinder having passageways in communication with a vacuum applying means, a supporting shaft for said cylinder, means to rotatably support said shaft, said shaft having a valve assembly mounted thereon for controlling the application of the vacuum in accordance with the rotation thereof, a label magazine mounted adjacent said cylinder for supporting a stack of labels with the endmost label in position to be drawn away from the stack and against the surface of said cylinder upon application of the vacuum, means for tipping the magazine to move the endmost label in the stack away from the surface of said cylinder, said tipping means comprising an operating cam arm and a cam on said shaft and means for rotating said shaft with uniform speed during a predetermined portion of each revolution thereof and for thereafter reducing the speed of rotation and then reversing the direction of rotation for a short period, said valve assembly being operative to apply the vacuum just prior to the reversing of the direction of rotation of said shaft and said tipping cam being operative to tip the label magazine as the direction of rotation of the shaft is reversed.

3. In a labeling machine having a label feeding cylinder on a rotatably mounted shaft and means to apply a vacuum to the surface of the cylinder in predetermined relation to the rotation thereof, a support for a stack of labels arranged in superimposed relation with the bottom label adjacent the surface of the cylinder for application of the vacuum thereto, said stack support comprising a fixed support plate having an edge thereof adjacent the surface of the label feeding cylinder, a turret having a base plate and means for supporting thereon in superimposed stacked relation a plurality of labels with the leading edge thereof extending over the edge of the fixed support plate and adjacent the surface of the cylinder, said support plate and said base plate having aligned sockets in their confronting faces, a ball in said sockets normally holding said plates in predetermined spaced relation, a rod rotatably mounted in a bore in said support plate which cuts through the socket therein for said ball, said rod having a camming portion which is arranged to engage the ball and lift the same when said rod is rotated to a predetermined position, and means to rotate said rod in timed relation to the rotation of said label feeding cylinder whereby to elevate the stack of labels after each successive bottom label is drawn against the surface of the label cylinder by the application of the vacuum thereto.

4. In a machine for withdrawing individual labels from a stack thereof and applying the same to a succession of traveling objects, a label transferring and applying cylinder having means to apply a vacuum to a predetermined portion of the surface thereof, a supporting shaft for said cylinder, means to rotatably support said shaft, said shaft having a valve assembly mounted on the other end thereof and arranged to control the vacuum applying means in accordance with the rotation of the shaft, means for supporting a stack of labels adjacent one side of said cylinder with the endmost label adapted to be drawn onto the cylinder by the vacuum, and means on the other side of said cylinder for heating the exposed surface of successive labels carried on said cylinder, said label heating means comprising a tube having end sections thereof arranged in coiled relation and connected by a section extending along the surface of said cylinder which has perforations in the wall thereof facing the surface of the cylinder, means to heat the coiled sections of said tube, and means controlled by said valve assembly to deliver air to said tube.

5. A heating device for a labeling machine which is characterized by a revolving cylinder and means for holding on the surface thereof labels having a heat activatable coating thereon, said heating device being mounted adjacent said cylinder and comprising a hollow tube of relatively small cross section, said tube having a pair of coiled sections and a perforated section extending between said coiled sections, said perforated section being positioned along the surface of said cylinder with the perforations therein arranged to direct the air toward the surface of said cylinder, means for electrically heating said coiled sections, and means for delivering air to said coiled sections for discharge through said perforated section.

6. A labeling machine comprising a support member, a pair of parallel links connecting the support member to a supporting structure above an object transporting conveyor which is adapted to carry successive objects through the machine for application of a label to the

uppermost surface thereof, a lifting device for adjusting the height of said support member relative to said supporting structure, a cross shaft journaled in said support member and carrying on one end thereof a label transferring and applying cylinder, a magazine for a supply of labels supported above said cylinder, said cylinder having vacuum means for gripping successive labels on the bottom of said magazine, for withdrawing the labels from the magazine and for holding the same on the surface of said cylinder, means connected to the cross shaft to rotate the same, means to control the cross shaft rotating means so that rotation of the cylinder is reversed for a short period when the label is picked up, a hot air heater mounted beyond the label magazine adjacent the cylinder, and means to supply air to the heater in timed relation to the rotation of the cross shaft, said heater having means to direct the heated air onto the surface of a label carried on the cylinder just prior to its application to an object by the cylinder engaging the label with the object.

7. In a labeling machine having a supporting frame and a label cylinder carried on the end of a horizontal shaft which is rotatably mounted on said frame, means to support a stack of labels in upright position with the bottom label in a horizontal plane extending approximately tangential to the surface of the cylinder for feeding thereto by means of a vacuum applied through the cylinder in predetermined relation to the rotation thereof, said label support means comprising a base plate, upright magazine forming guide members mounted thereon for receiving a plurality of labels in superimposed vertically stacked relation, a fixed supporting member beneath said base plate, a vertically extending pin on said fixed supporting member, said base plate being apertured to receive said vertically extending pin, spring means urging said base plate toward said fixed supporting member, said fixed supporting member having a recess and a vertically movable member therein for engaging with said base plate, a rotatably mounted member engaging with said vertically movable member which is operable to cam the same upwardly, and means for operating said rotatably mounted member to elevate said vertically movable member and for rotating said cylinder carrying shaft in timed relation thereto whereby said stack supporting means is lifted upwardly as each successive bottom label is picked from the magazine by application of vacuum to said cylinder.

8. In a labeling machine as recited in claim 7 and said means for operating said rotatably mounted member comprising a rotatable cam rod having an operating arm on the end thereof, a cam on said cylinder carrying shaft engageable with said operating arm to rotate said cam rod and tilt the magazine in timed relation to the rotation of said cylinder carrying shaft, and means for swinging said operating arm to rotate said cam rod and tilt said magazine independently of the rotation of said cylinder carrying shaft.

9. Mechanism for feeding labels to a cylindrical label carrying member which is mounted on a horizontal shaft comprising a horizontally disposed base plate having upright guide members arranged in radial and circumferential spaced relation about the vertical center thereof and forming a plurality of magazines for stacks of labels with the lowermost label of each stack extending beyond the periphery of the base plate, a horizontal support plate beneath said base plate, a shaft extending vertically above said support plate, said base plate being rotatably mounted on said vertical shaft with its uppermost label supporting face in a plane extending generally tangential to the peripheral surface of said label carrying member, an indexing ball mounted in a socket in said support plate and projecting above the same, said base plate having spaced recesses in its bottom face cooperating with said indexing ball whereby a selected magazine may be held so that the portion of the lowermost label of the stack which is in label feeding position extends over the periphery of said transfer member and means for lifting said indexing ball to tip the base plate upwardly relative to the supporting plate thereby moving the portion of the bottom label in the stack which is in feeding position upwardly away from the transfer member.

10. In a labeling machine, a supporting frame, a transverse shaft rotatably mounted on said frame, a label applying cylinder secured on the end of said shaft, means for rotating the shaft to turn the label applying cylinder, said label applying cylinder and said shaft having communicating passageways which terminate at openings on the surface of the label applying cylinder, means to support a stack of labels with the bottom label adjacent the surface of the label applying cylinder and in the path of said openings, means to apply a vacuum through the label applying cylinder in predetermined relation to the rotation thereof to grip successive bottom labels in the stack and draw the same against the surface of the label applying cylinder, means operable in timed relation to the rotation of the label applying cylinder to move the label support away from the surface of the label applying cylinder when a label is drawn against said surface so as to cause the label to be withdrawn from the stack, means to move successive objects in a path below the label applying cylinder so that rotation thereof presses a label on the surface of each successive object, a pair of parallel links connecting the supporting frame to a fixed support which is positioned laterally of the path of movement of the objects, and means for adjusting the height of said supporting frame relative to said fixed support thereby to enable the position of the label applying cylinder to be varied relative to the path of movement of the object so as to adjust the pressure between the label applying cylinder and the object during the application of the label.

11. In a machine for feeding individual labels from a stack thereof and applying the same to a succession of traveling objects, a label transferring and applying cylinder having passageways in communication with a vacuum means and terminating at the surface thereof, a supporting shaft for said cylinder, means associated with said shaft for controlling the application of the vacuum in timed relation to the rotation of said shaft, a label magazine mounted adjacent said cylinder for supporting a stack of labels with the endmost label in position to be drawn away from the stack and against the surface of said cylinder upon application of the vacuum, means for tilting the magazine in a direction to move the endmost label in the stack away from the surface of said cylinder, said magazine tilting means comprising a cam arm and a cooperating cam on said shaft, and means for rotating said shaft with uniform speed during a predetermined portion of each revolution thereof and for thereafter reducing the speed of rotation and then reversing the direction of rotation for a short period, said vacuum controlling means being operated to apply the vacuum just prior to the reversing of the direction of the rotation of said shaft and said magazine tilting cam being operative to tilt the magazine as the direction of rotation of the shaft is reversed.

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