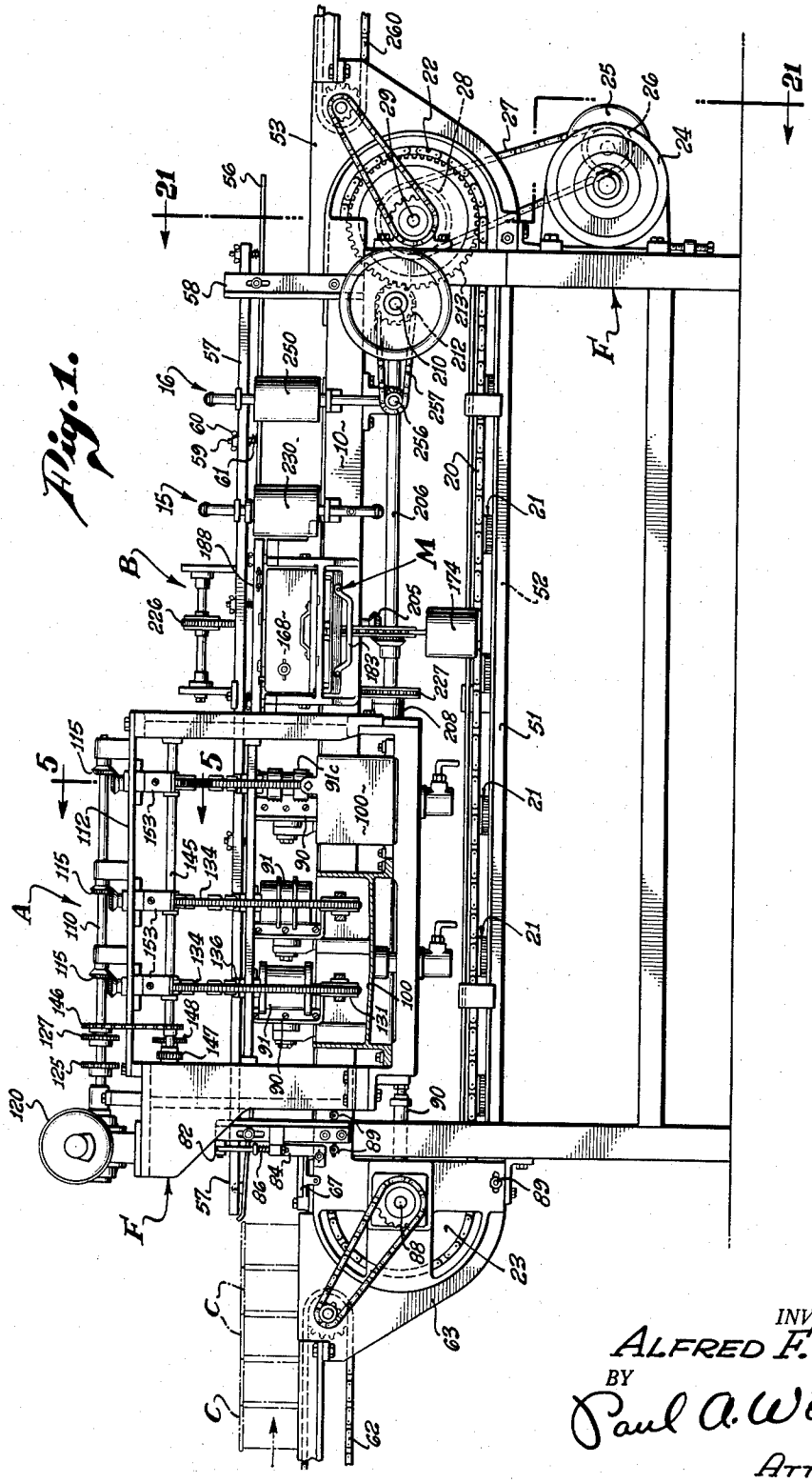
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Fig. 1.



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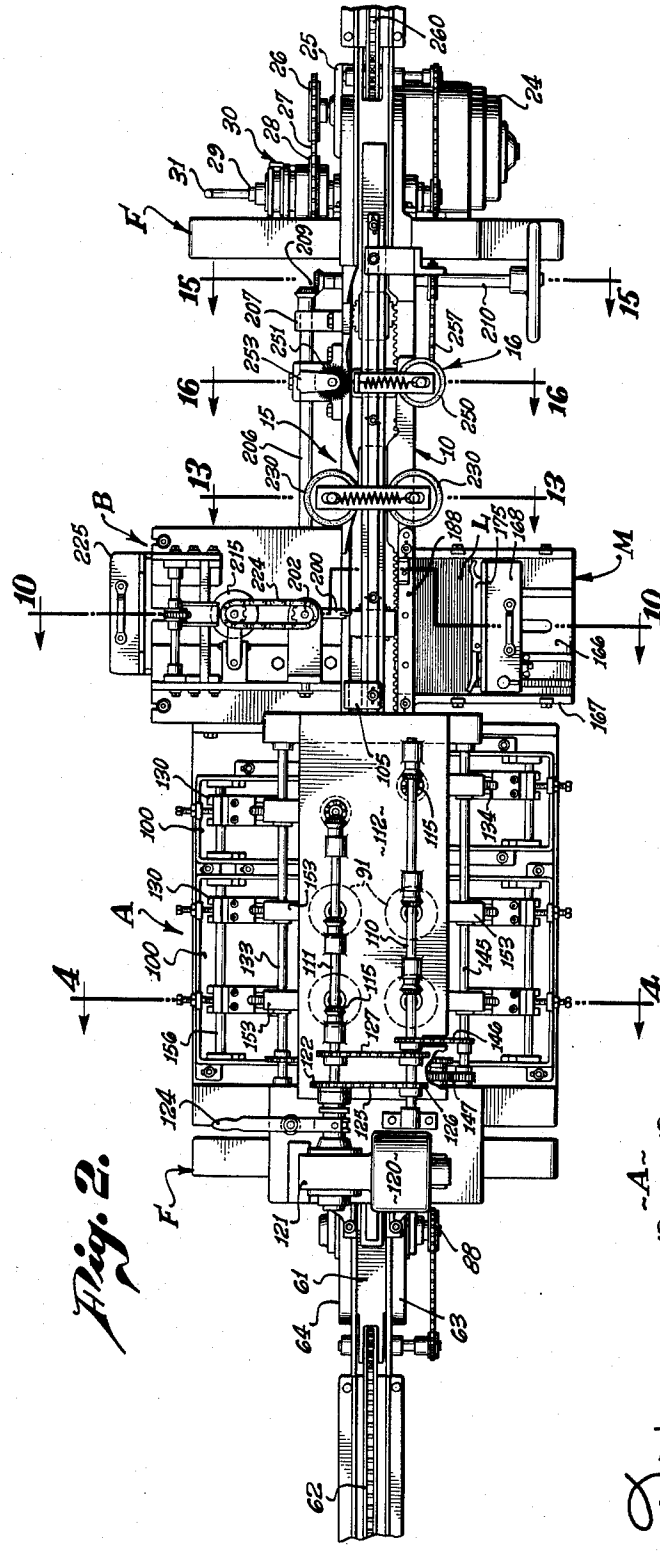


Fig. 2.

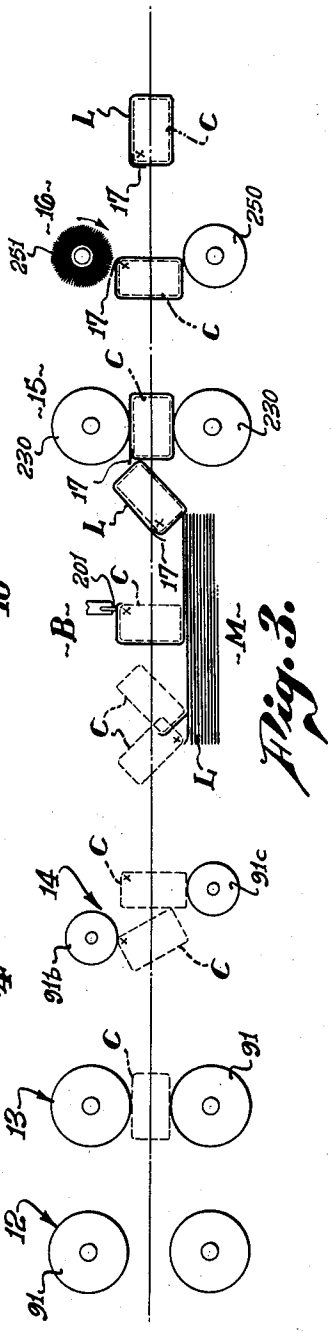


Fig. 3.

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Fig. 4.

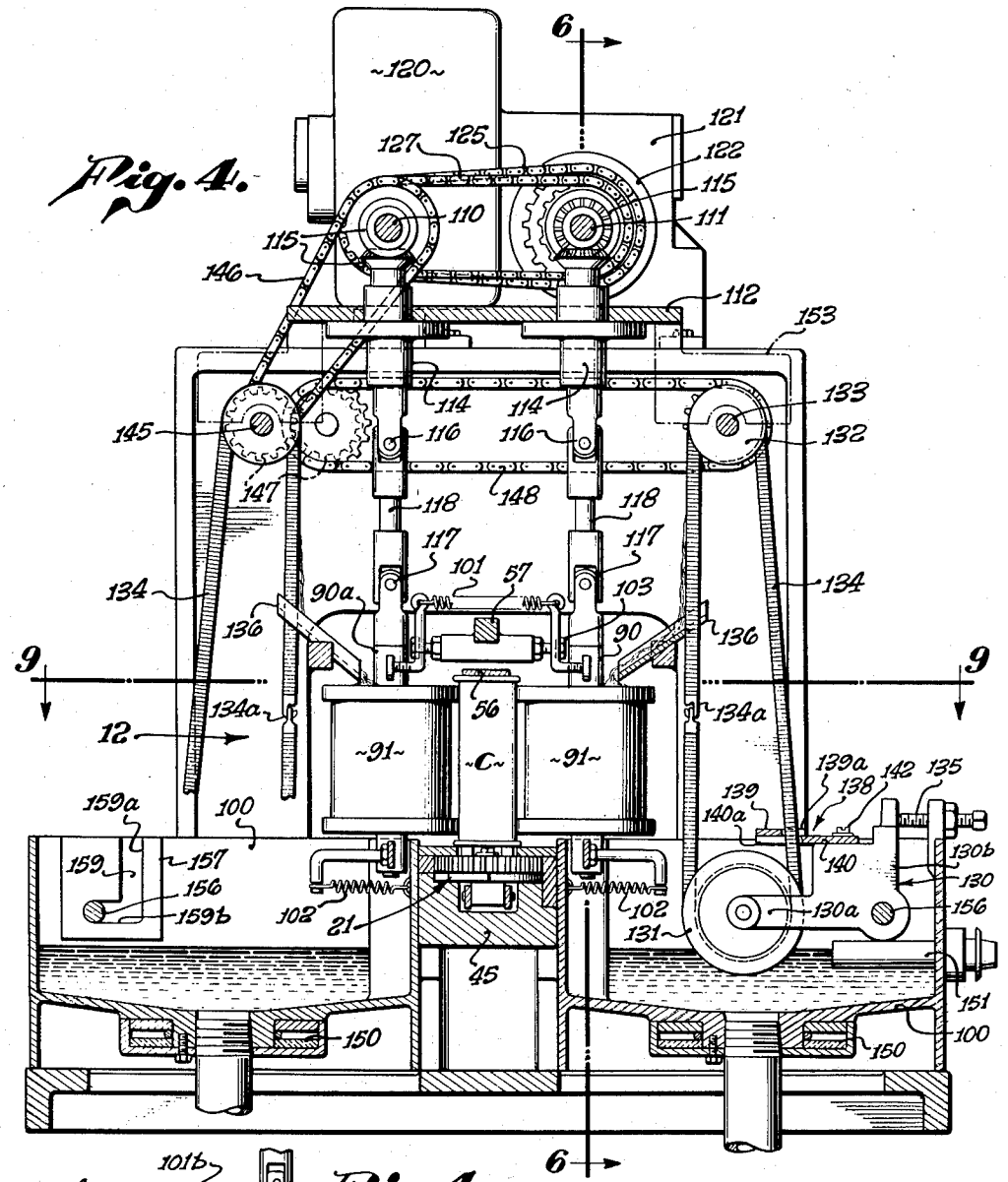


Fig. 4a.

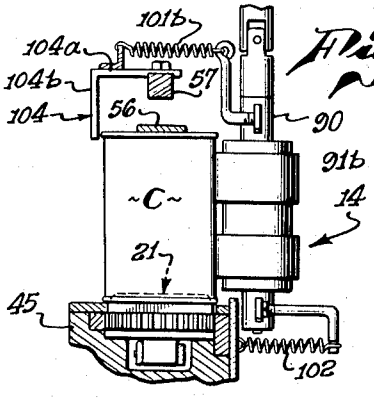
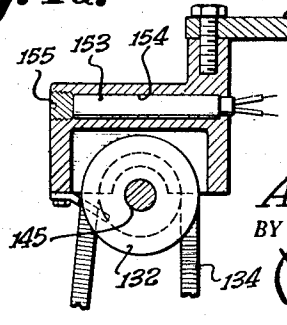


Fig. 5.



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Fig. 6.

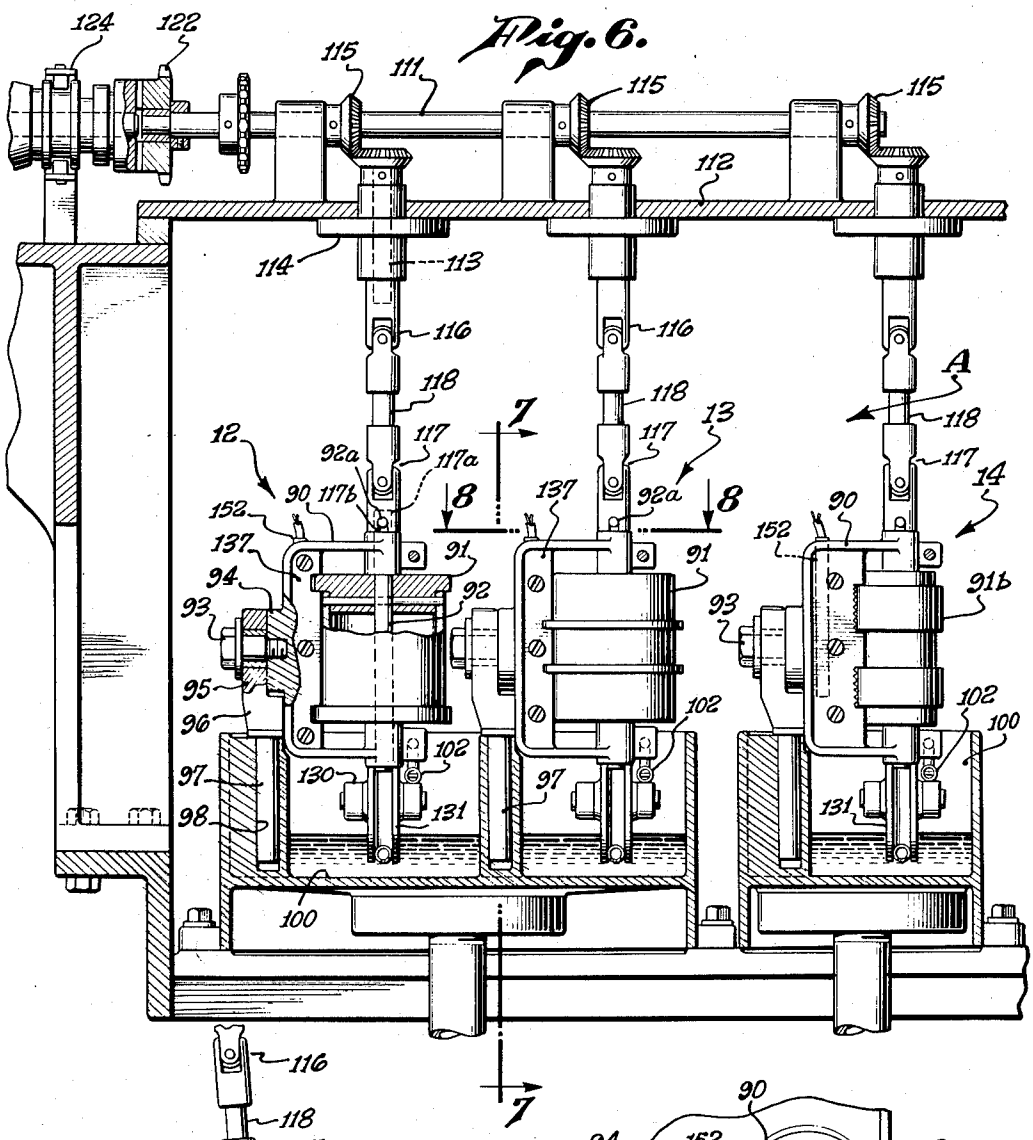


Fig. 7.

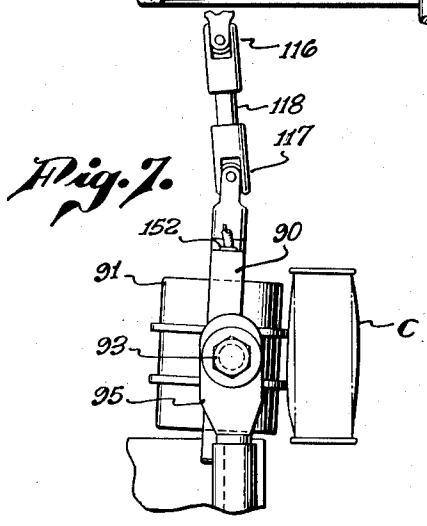
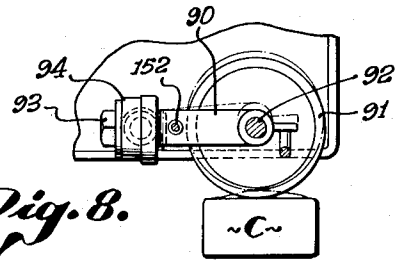


Fig. 8.



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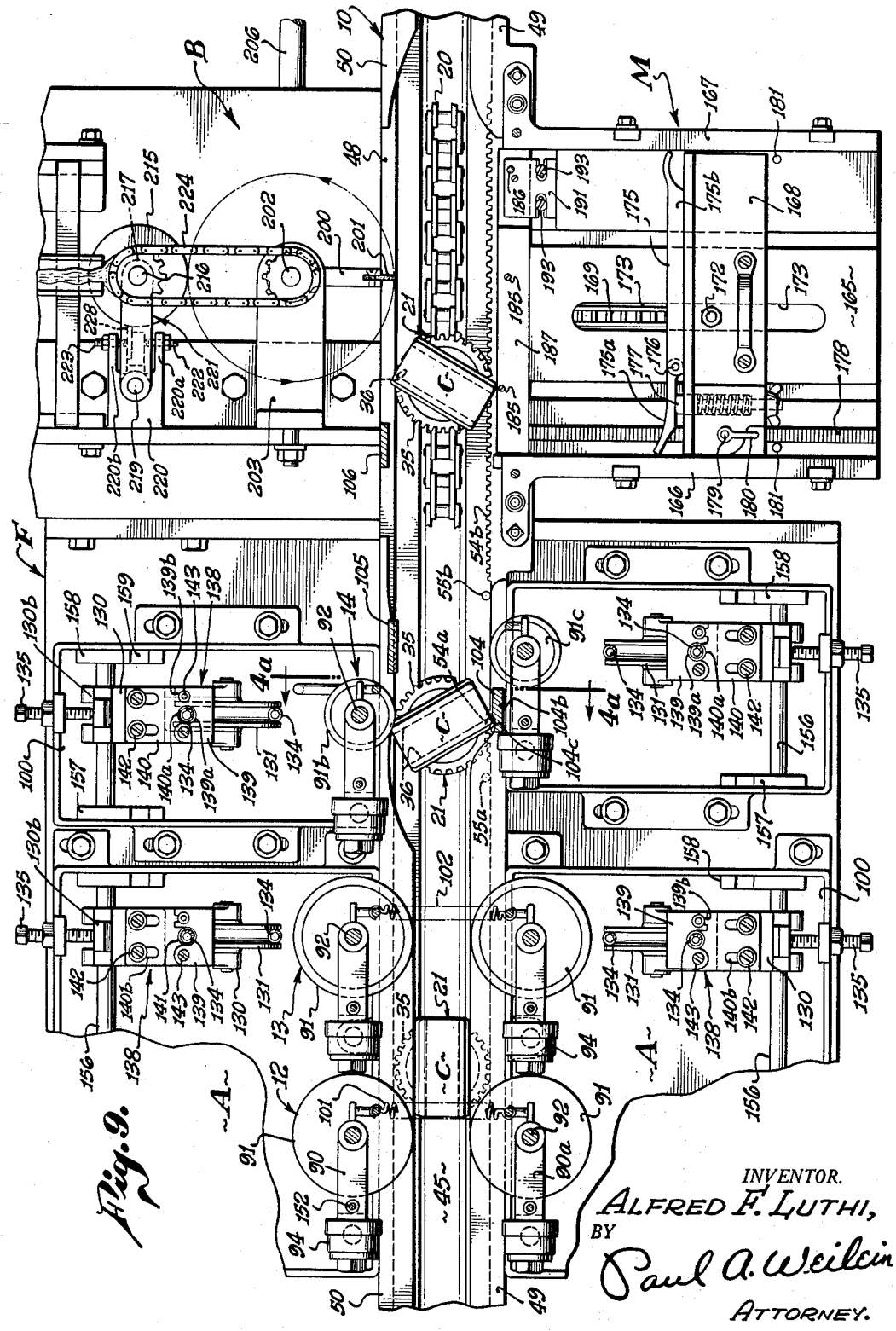


Fig. 9.

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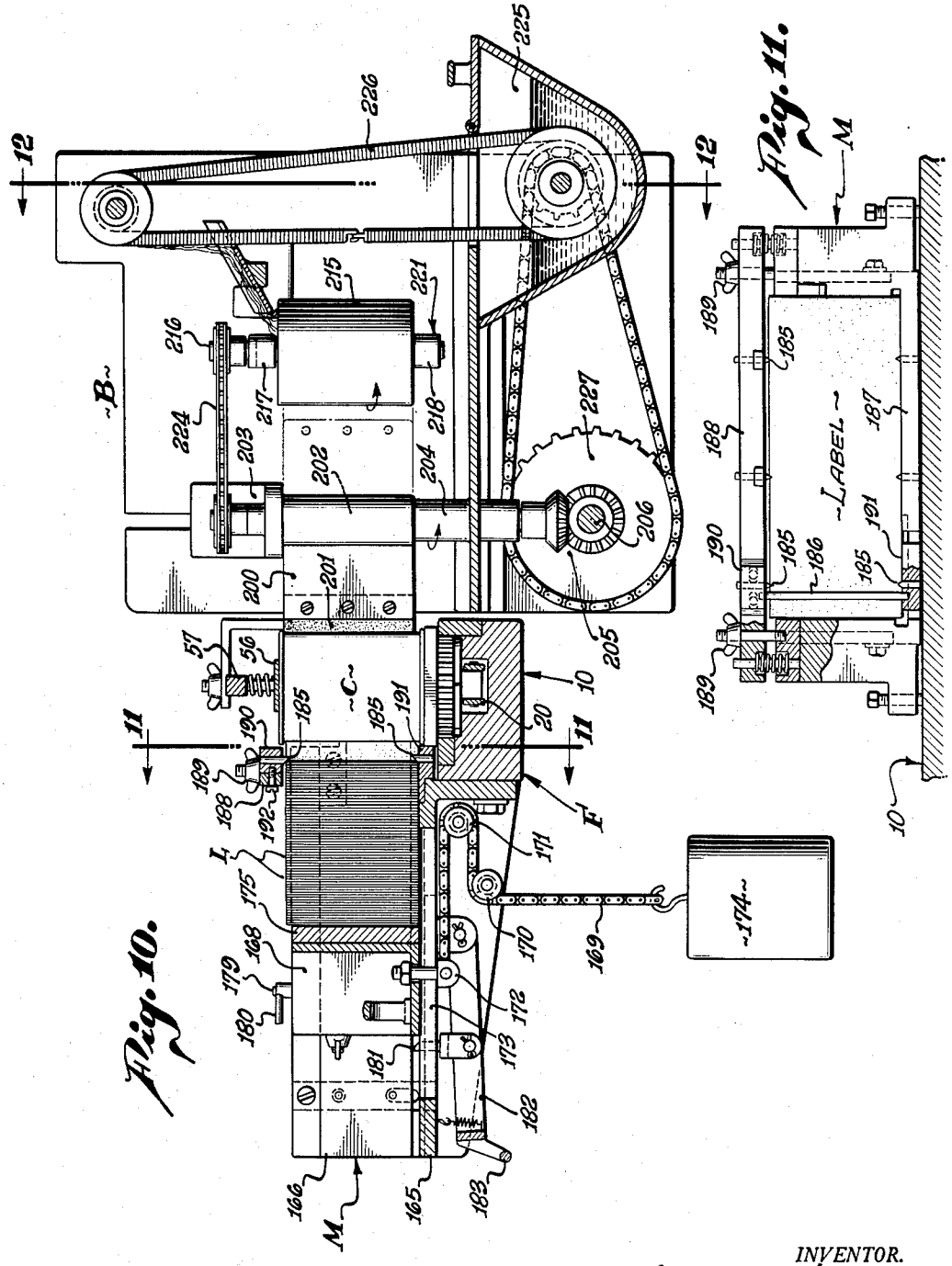


Fig. 10.

Fig. 11.

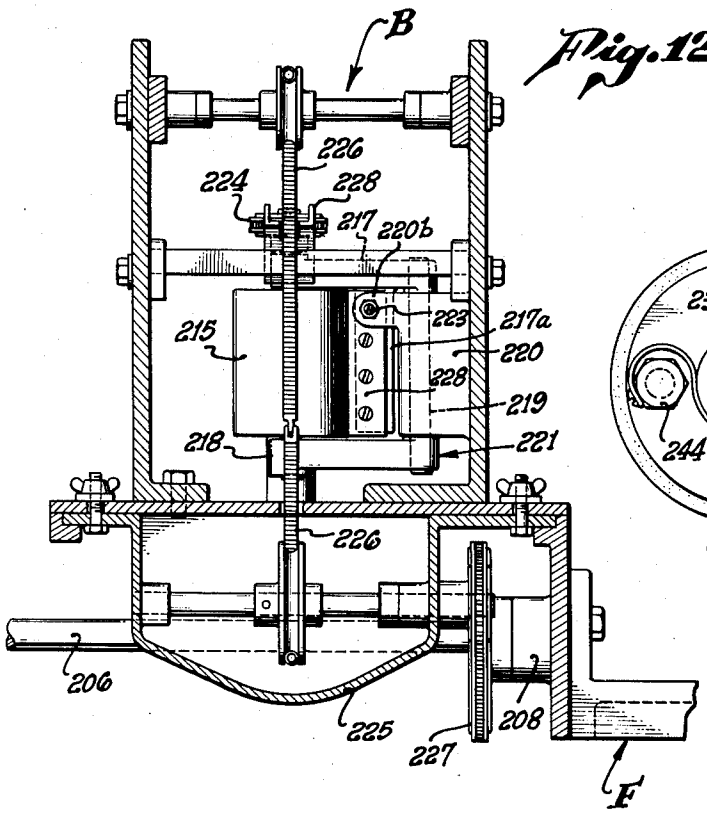
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METHOD AND APPARATUS FOR APPLYING LABELS TO NON-CIRCULAR CONTAINERS

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Fig. 12.



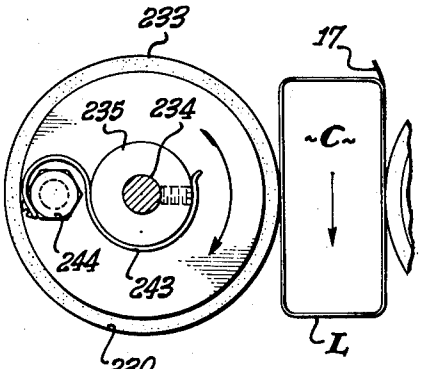


Fig. 14.

Fig. 13.

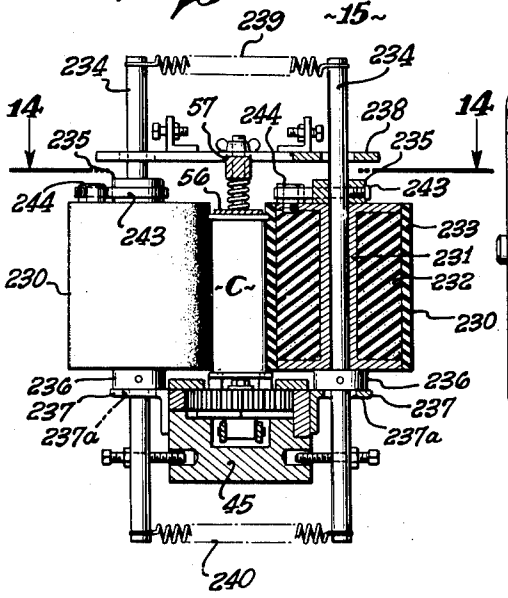
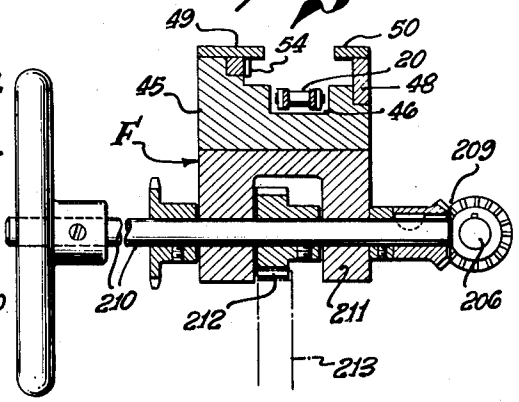


Fig. 15.



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Fig. 17.

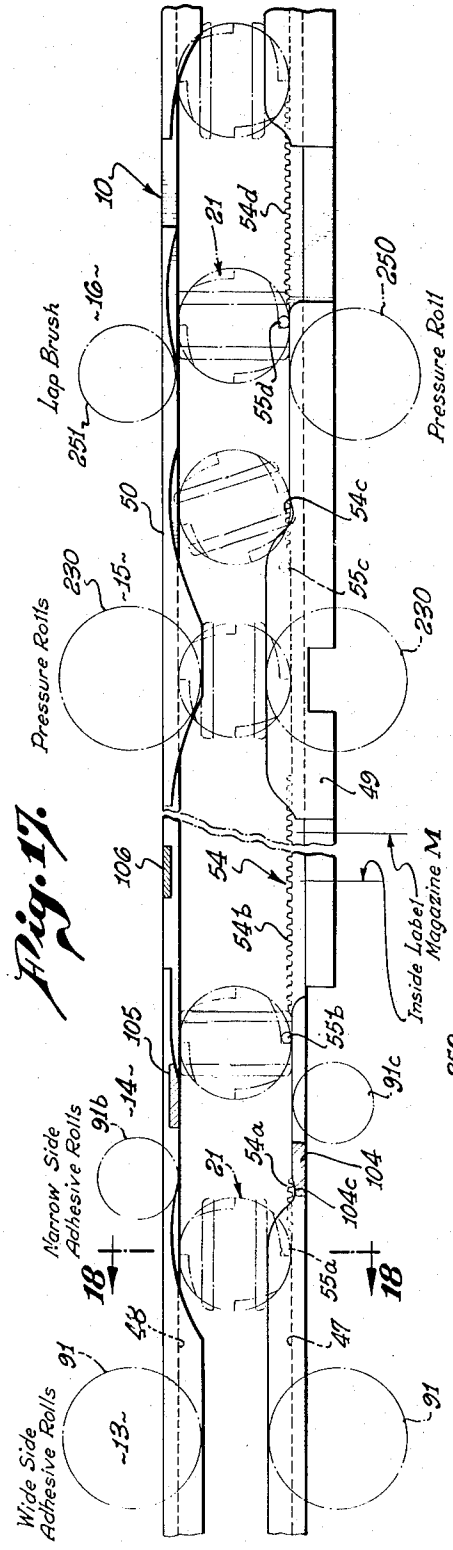


Fig. 18.

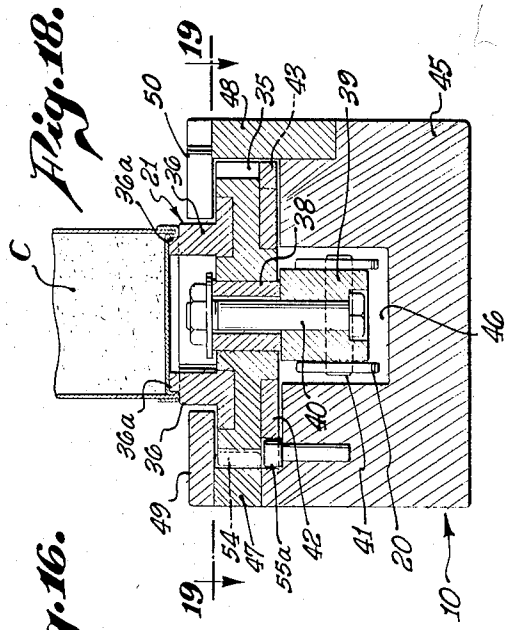
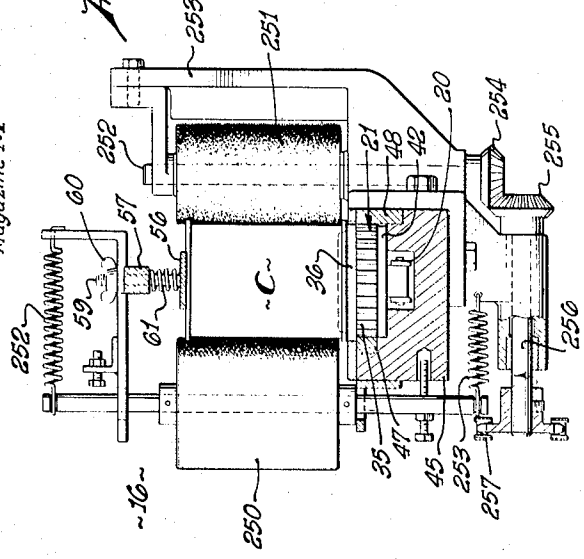


Fig. 16.



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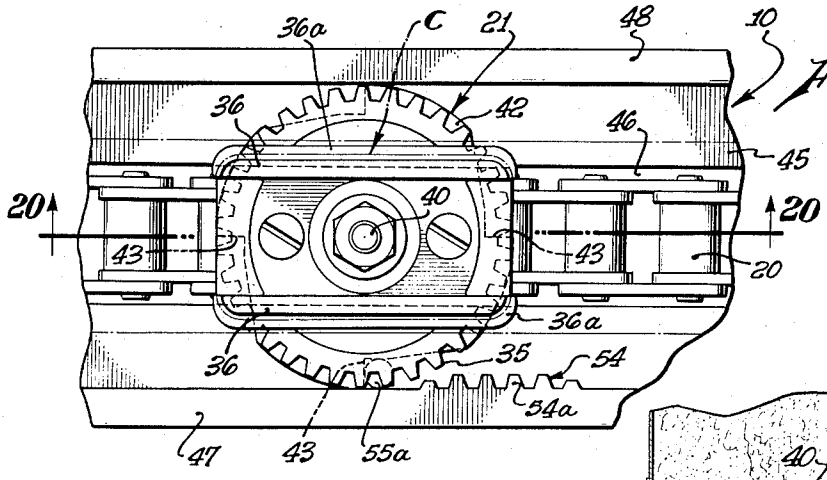


Fig. 19.

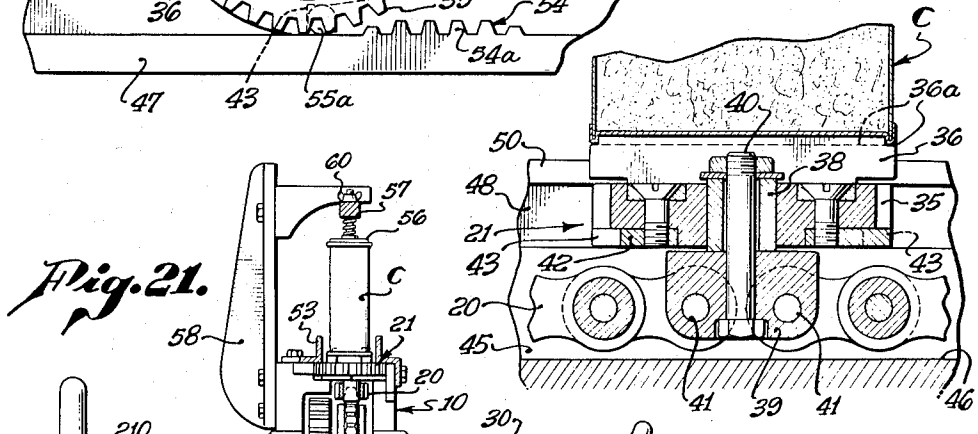


Fig. 20.

Fig. 21.

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Fig. 22.

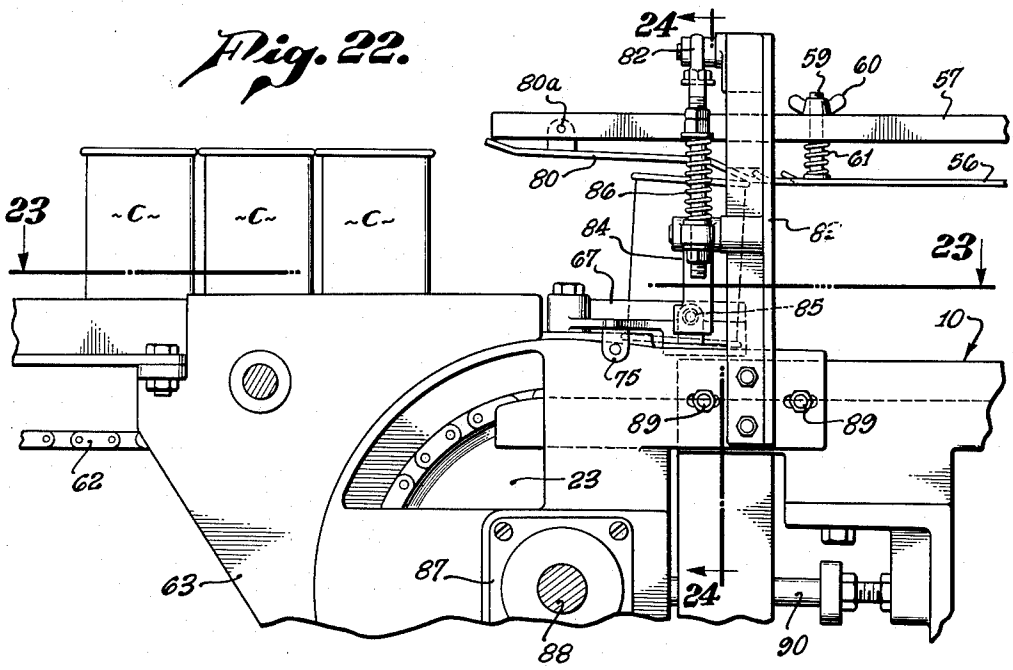


Fig. 23.

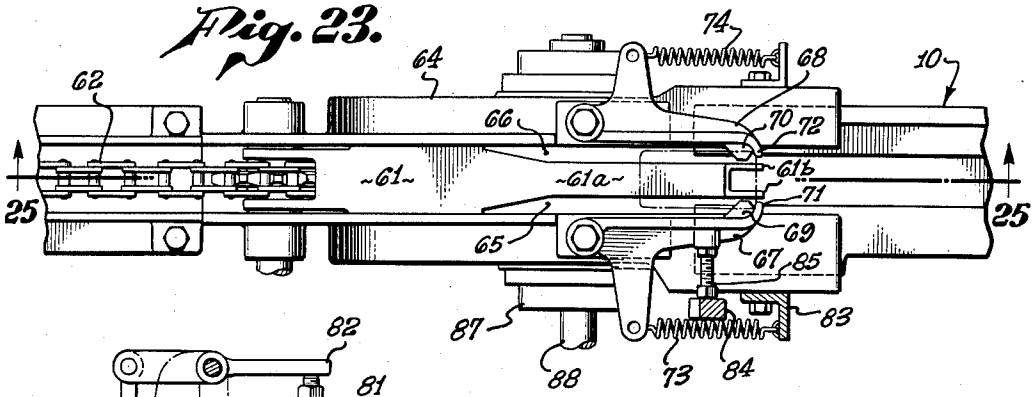
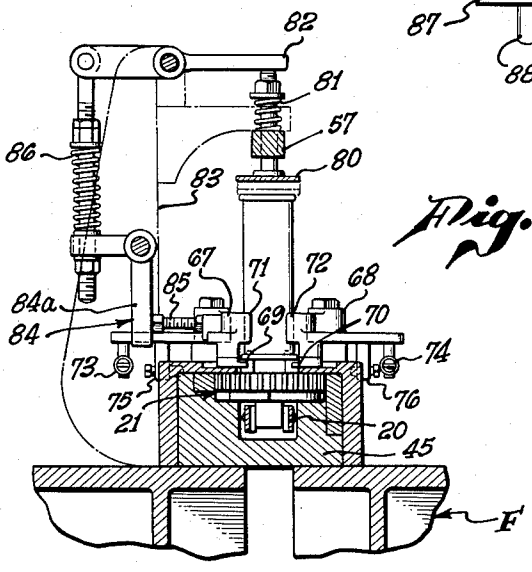


Fig. 24.



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Fig. 25.

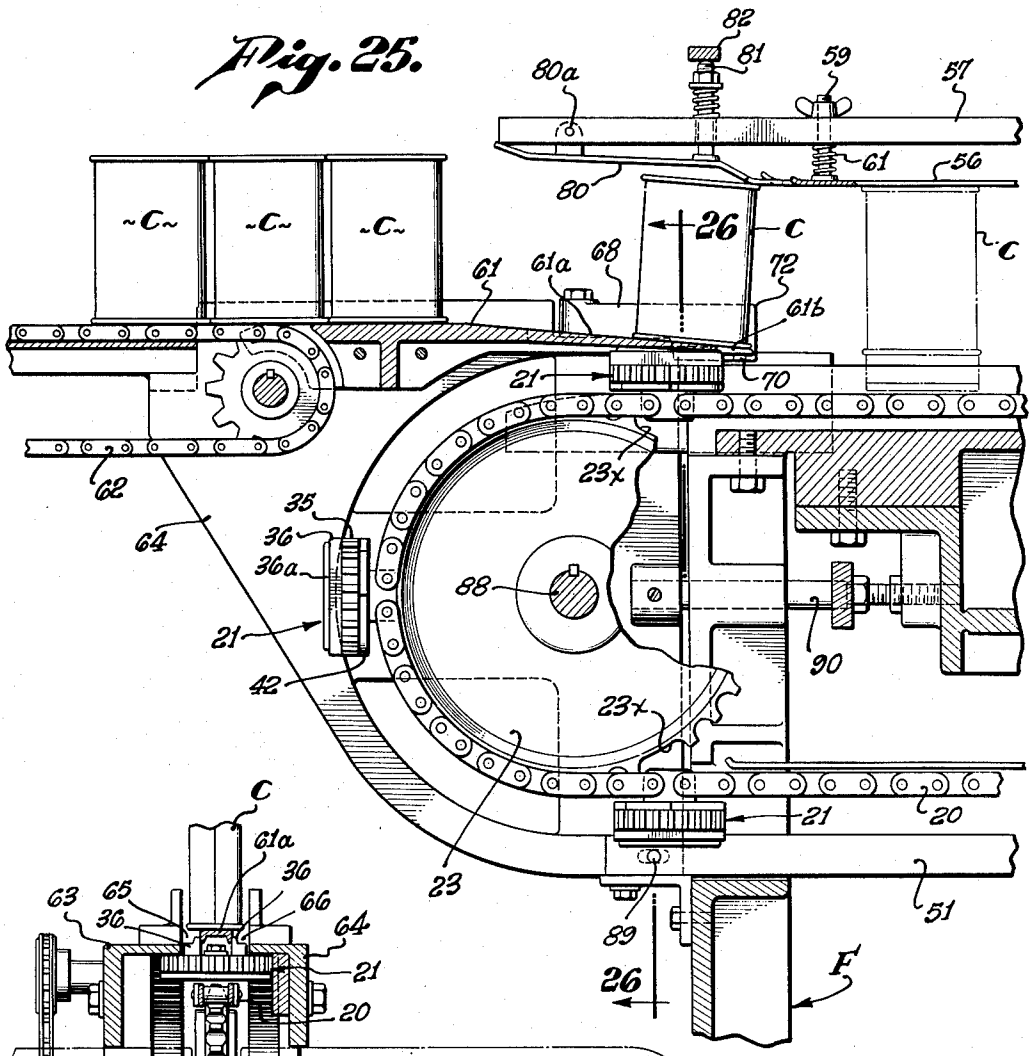
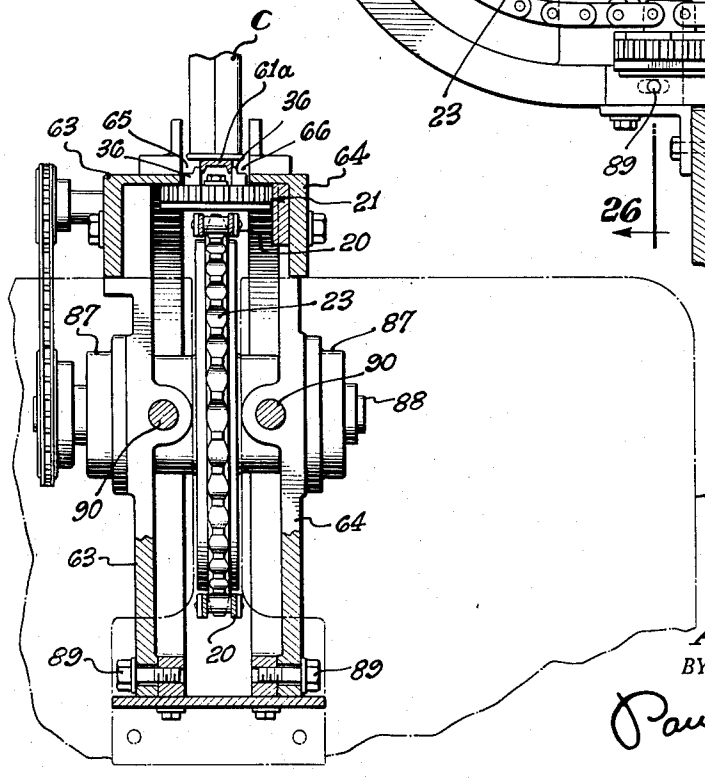


Fig. 26.



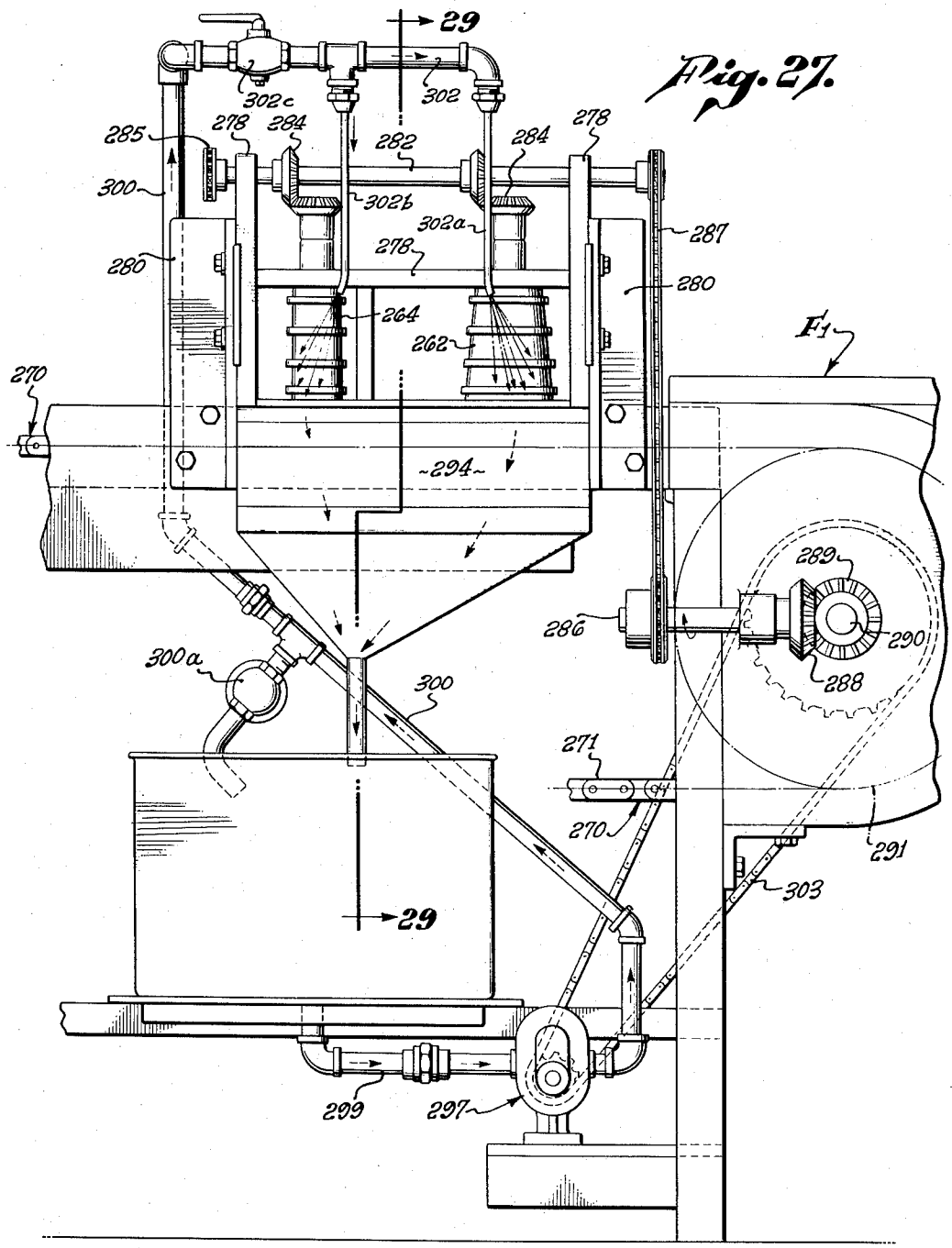
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Fig. 27.



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Fig. 28.

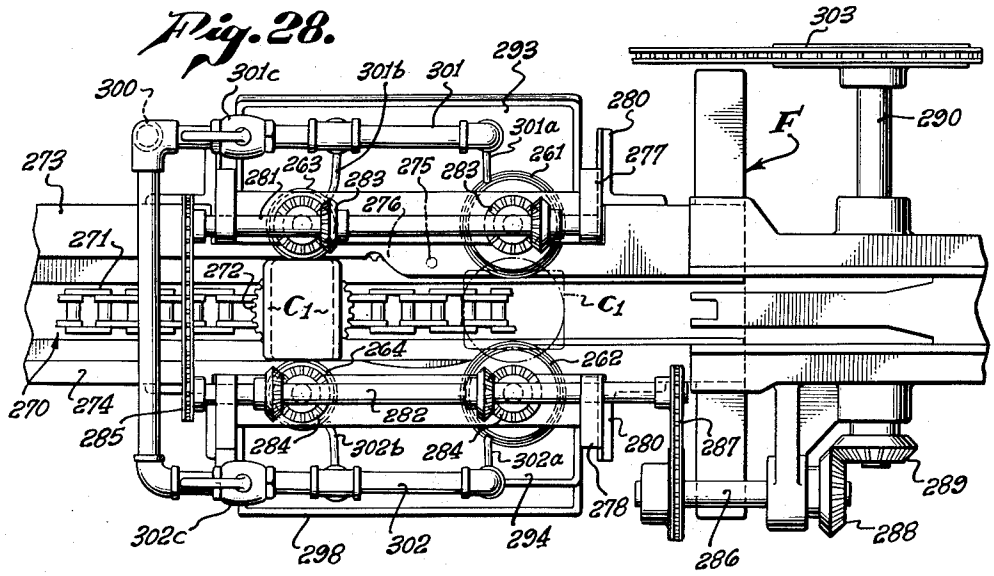


Fig. 29.

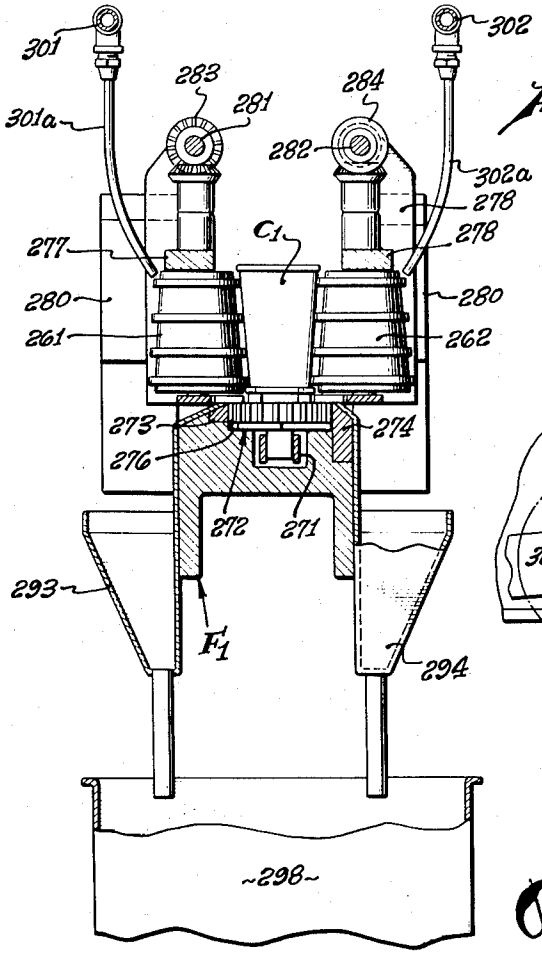
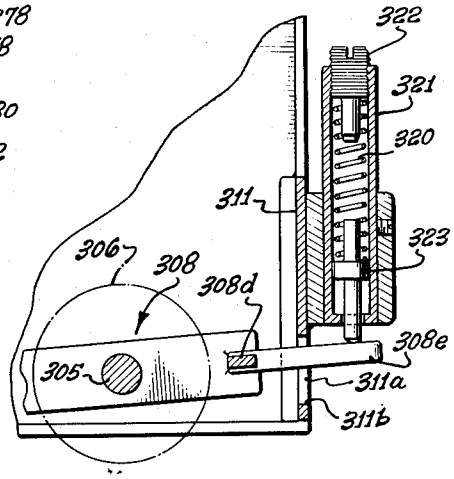


Fig. 33.



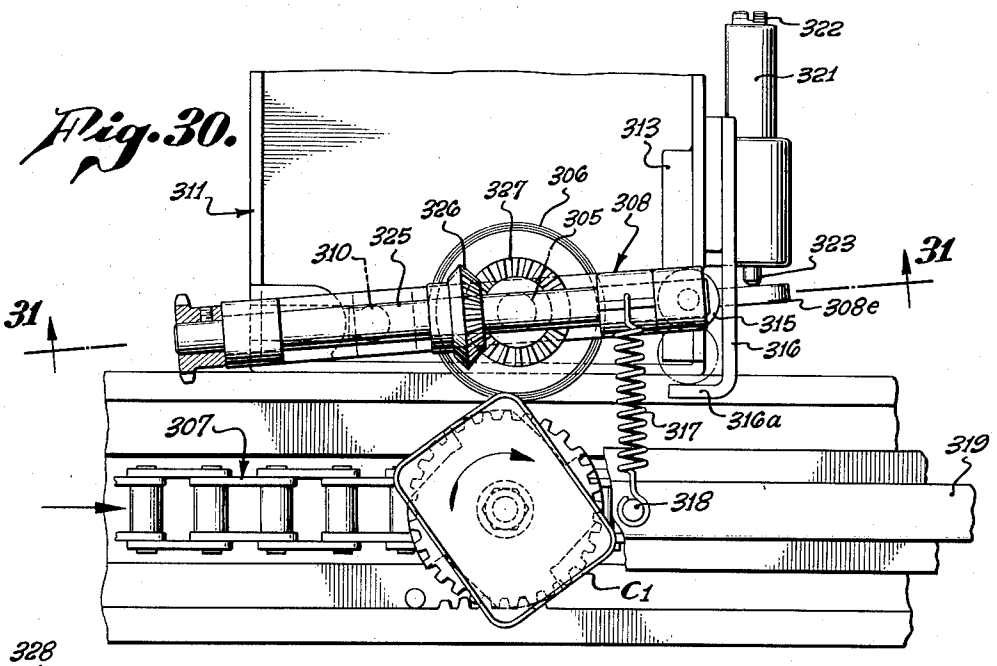
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Fig. 30.



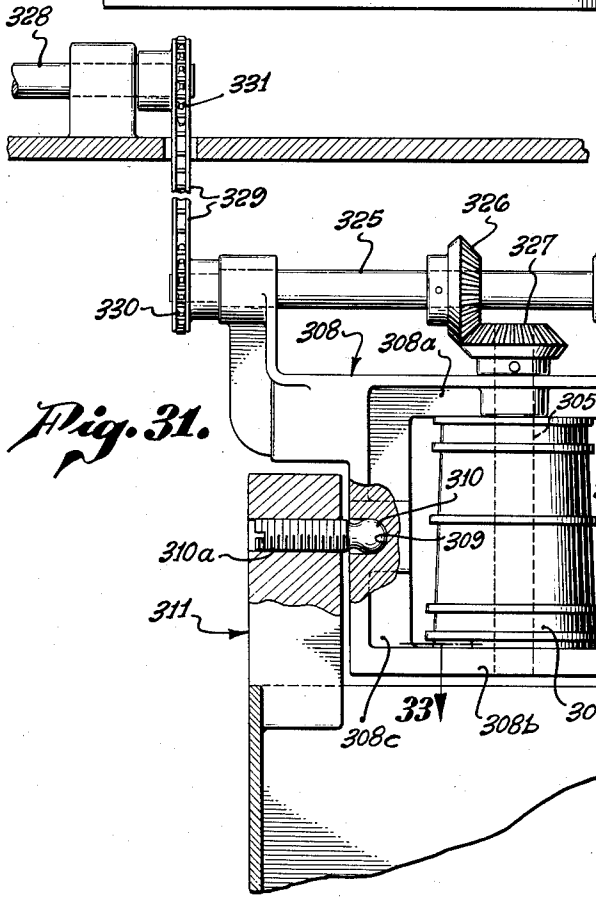


Fig. 31.

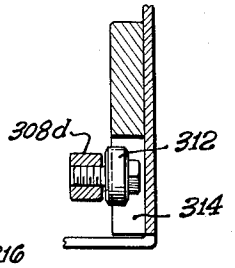


Fig. 32.

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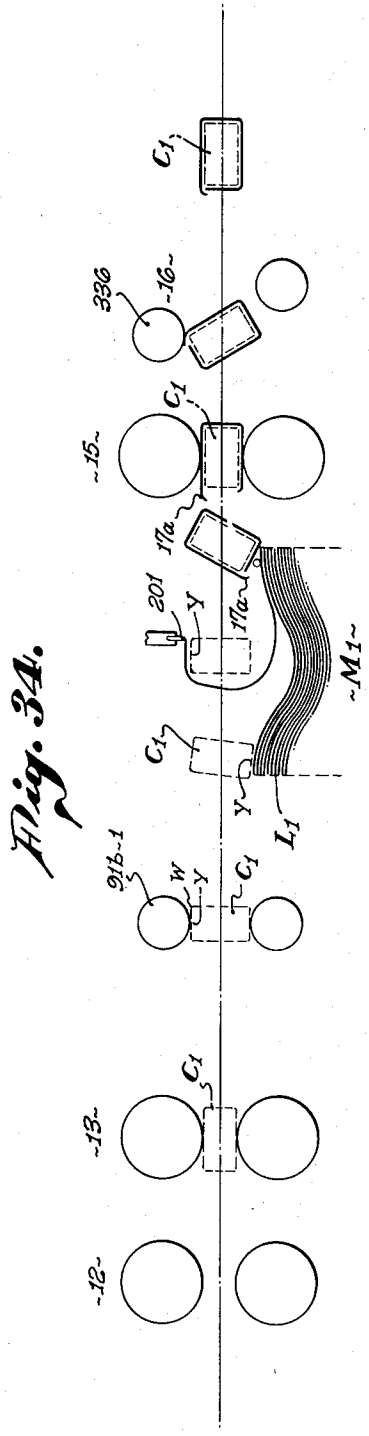


Fig. 34.

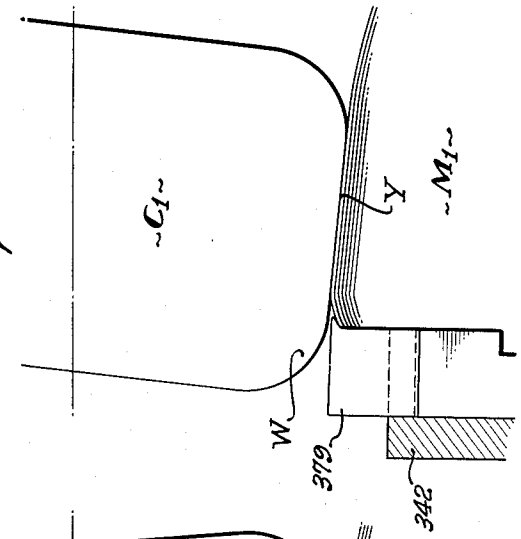


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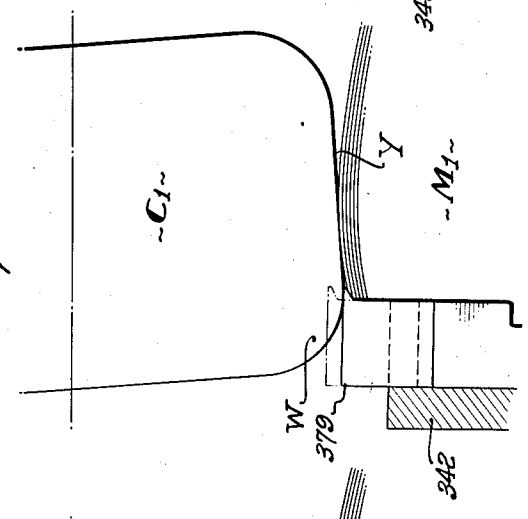


Fig. 44.

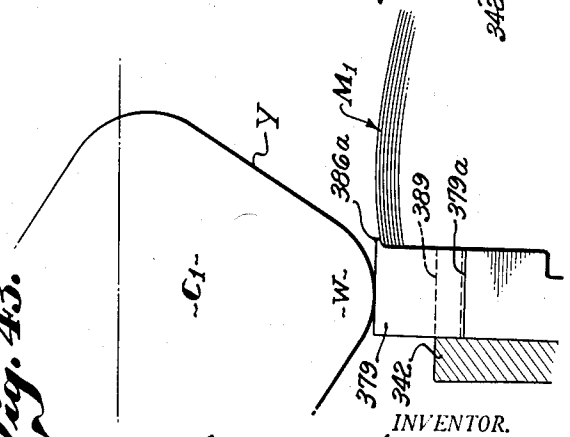


Fig. 43.

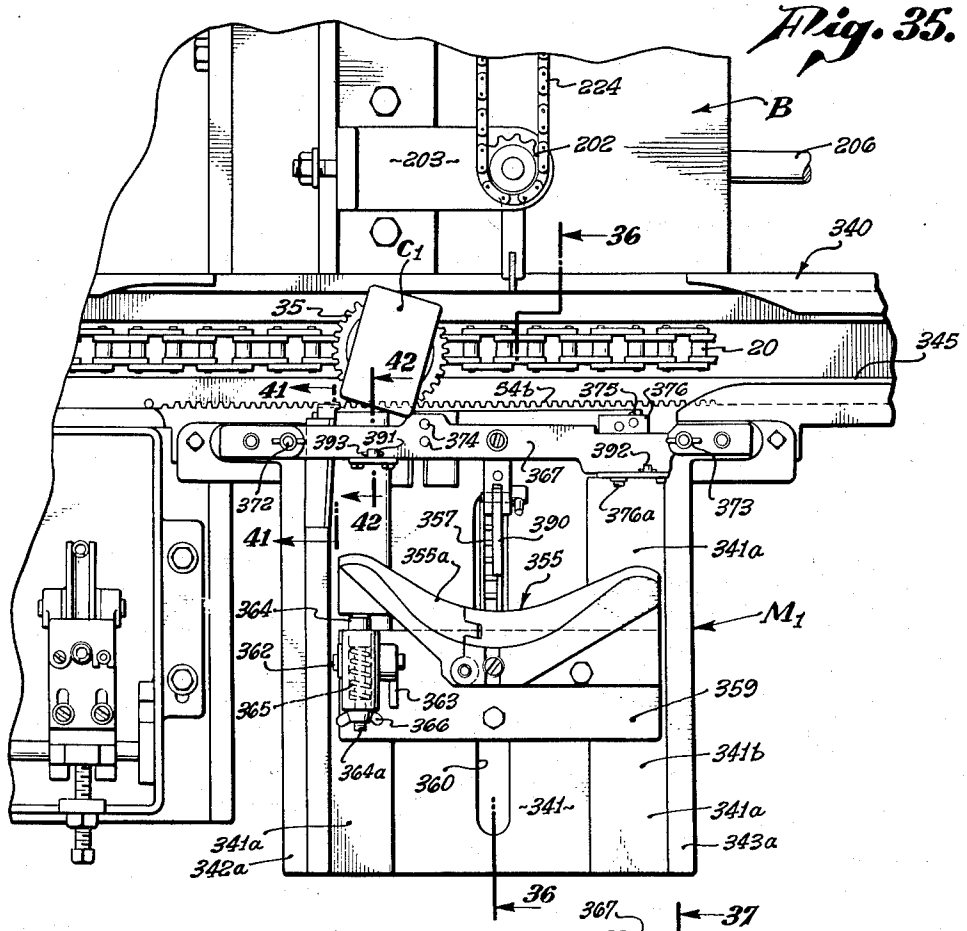
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Fig. 35.



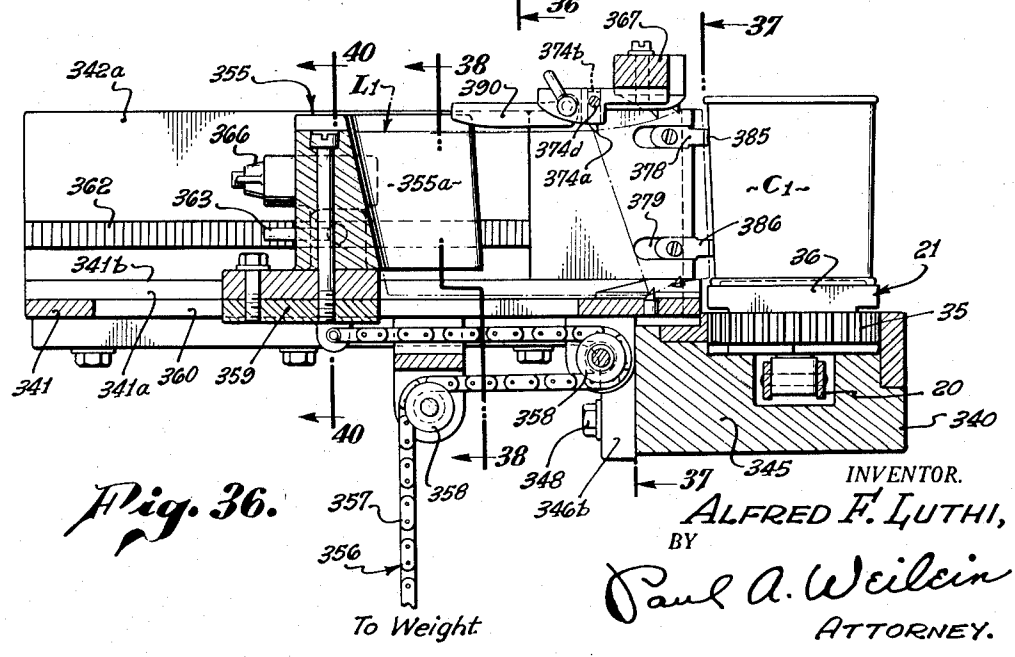


Fig. 36.

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Fig. 37.

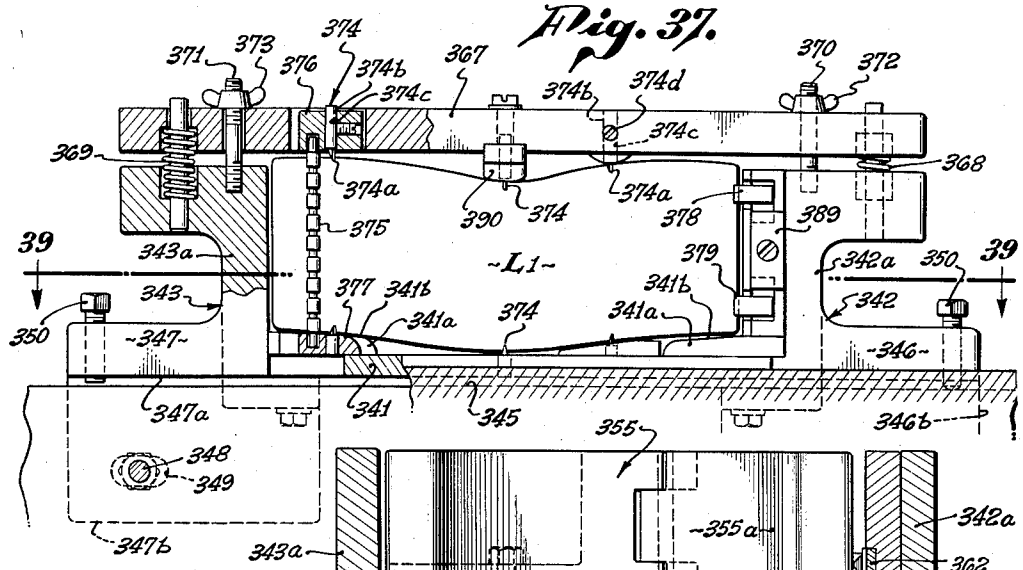


Fig. 38.

Fig. 39.

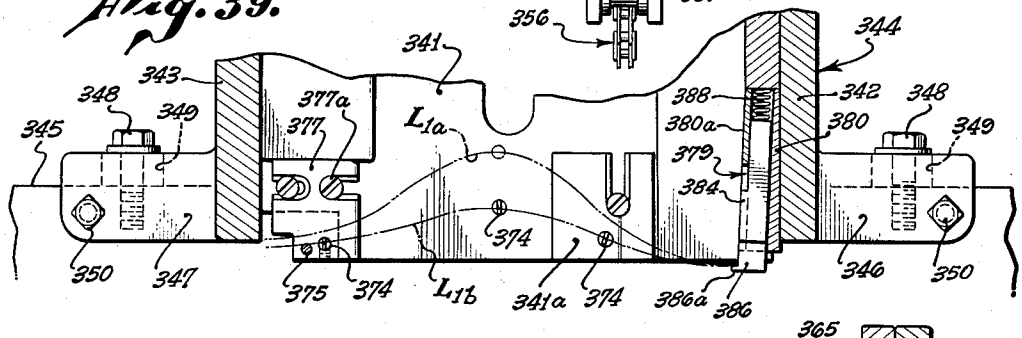


Fig. 46.

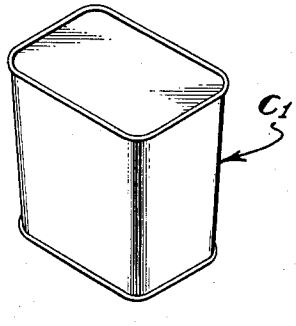
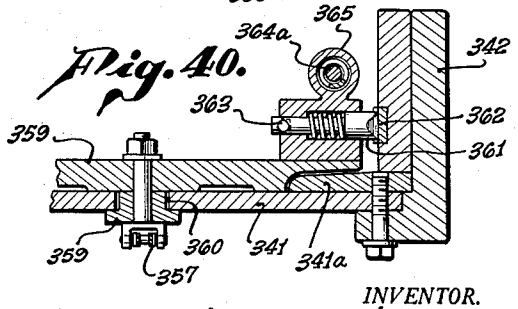


Fig. 40.



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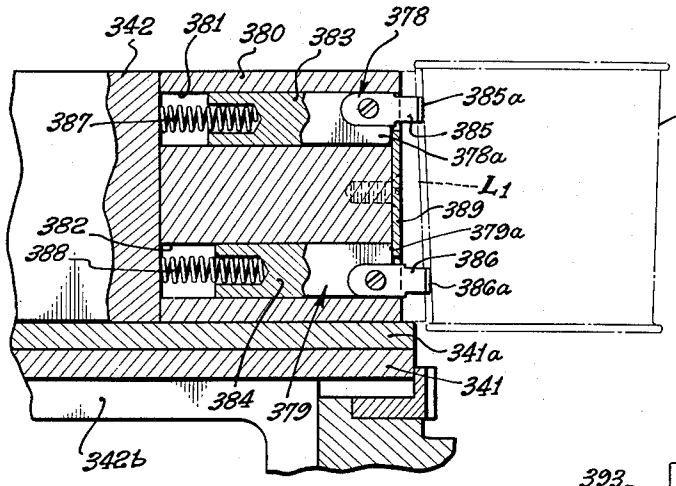


Fig. 41.

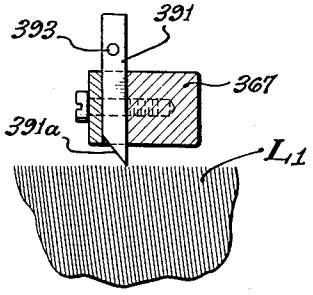


Fig. 42.

Fig. 47.

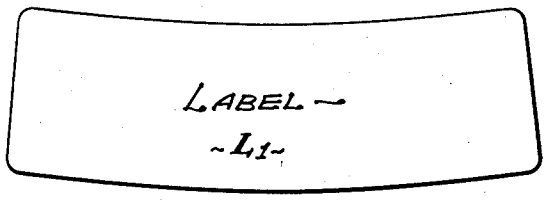


Fig. 48.

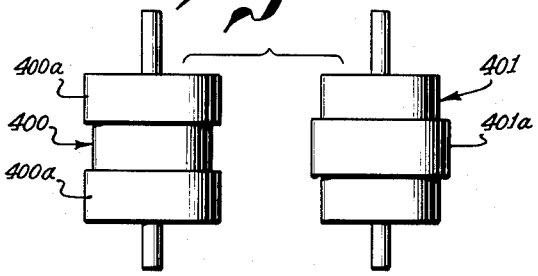
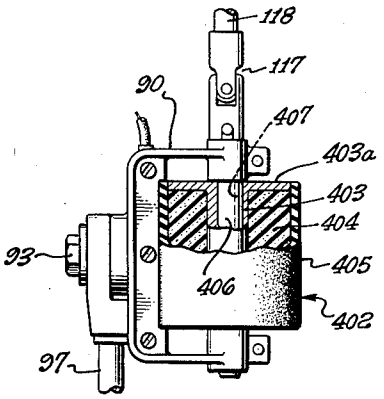


Fig. 49.



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United States Patent Office 2,727,647 Patented Dec. 20, 1955

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METHOD AND APPARATUS FOR APPLYING LABELS TO NON-CIRCULAR CONTAINERS

Alfred F. Luthi, Los Angeles, Calif., assignor to Luthi Machinery & Engineering Co. Inc., Gardena, Calif., a corporation of California

Application May 17, 1949, Serial No. 93,768

17 Claims. (Cl. 216—44)

This invention relates to the application of labels to containers, cans, and the like, such as used for packing food; more particularly, it relates to a method and apparatus for adhering labels to such containers which are non-circular.

It is an object of this invention to provide improved apparatus of this type.

It is another object of this invention to provide apparatus which will operate satisfactorily to apply labels to non-circular containers which may have become distorted from their true shape.

It is another object of this invention to provide apparatus adapted to apply labels to containers, cans and the like having a tapered configuration.

It is another object of this invention to provide apparatus for applying labels to non-circular containers or the like which applies an adhesive layer extending substantially entirely about the perimeter of the container.

It is another object of this invention to provide container labeling apparatus having novel means for feeding the adhesive to the applicator rolls.

It is another object of this invention to provide a novel mounting for the adhesive applicator rolls to enable application of adhesive to containers distorted as by bulged sides or otherwise from their true shape.

It is another object of this invention to provide a novel drive mechanism for such applicator rolls which will accommodate universal movement thereof.

In machinery for applying labels to non-circular containers and the like, it is known to provide conveyor means for advancing the containers in spaced relation and appropriately positioned, past an adhesive applicator, usually a roller, which applies a suitable paste or glue to a desired area on the container. Continued advance of the container brings it adjacent the label stack, the container being so moved as to cause the glue or paste thereon to engage one end portion of the outermost label, which is thus adhered to the container. The container is then caused to roll past the label stack, so that the label is wrapped around the container, the other end portion or lap being adhered to the container, as by additional adhesive or "lap" glue, suitable means being provided for pressing the lap against the container.

It is another object of this invention to provide improved mechanism for advancing the containers past the adhesive applicator rolls, label magazine, etc.

It is another object of this invention to provide an improved arrangement for applying the "pickup" glue, paste, or the like to the containers.

It is another object of this invention to provide improved means for applying the "lap" paste or other adhesive to the container.

It is another object of this invention to provide adhesive applicator means particularly adapted for use with hot glue, paste, or the like.

It is another object of this invention to provide a novel form of label magazine for labels adapted for use on containers having a tapering configuration.

It is another object of this invention to provide an improved method of applying labels to food containers, cans, and the like.

Frozen foods are now in extensive use and are commonly packed for sale in non-circular packages or containers formed of fibrous sheets, suitably treated to be moisture proof as by impregnation with paraffin wax, or the like. After packing, the containers usually are maintained at a low temperature so that the contents are frozen until used by the consumer. It has been proposed to lithograph or otherwise impress the label and/or other identifying insignia on the sheet material prior to forming the container, but this is not always practical due to insufficient advance information as to the number of containers required for a given product, the brand names, etc. This makes it very desirable to apply appropriate labels after the containers have been packed. Accordingly, it is another object of this invention to provide a method and apparatus for applying labels to fiber food containers, either while the contents are frozen or wholly or partly thawed.

Containers of the type under discussion are usually formed with flat sides, which due to the character of the material of which they are formed, thawing of the contents or other causes, frequently become bulged or distorted from their true shape. It is thus another object of this invention to provide a method and apparatus for applying a label to containers presenting an irregular or uneven surface.

Furthermore, containers formed of fibrous sheet material are structurally weak as compared with conventional metal containers and thus are less capable of resisting strains tending to distort them, incidental to the label application. It is accordingly another object of this invention to provide a method and apparatus for applying labels to fiber containers without distortion or injury thereof.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown several forms in the drawings accompanying and forming part of the present specification. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

In the accompanying drawings:

Figure 1 is a side elevation, partly in section, showing a machine incorporating features of the invention;

Figure 2 is a top plan view of the machine of Figure 1;

Figure 3 is a schematic plan view showing various steps in the application of a label by the machine of Figure 1;

Figure 4 is a transverse section on an enlarged scale, taken substantially as indicated by line 4—4 of Figure 2;

Figure 4–*a* is a fragmentary transverse section, taken substantially as indicated by line 4*a*—4*a* of Figure 9;

Figure 5 is a detail section taken substantially as indicated by line 5—5 of Figure 1;

Figure 6 is a fragmentary longitudinal section taken substantially as indicated by line 6—6 of Figure 4, showing the manner of mounting the adhesive applicator rolls;

Figures 7 and 8 are detail sections taken substantially as indicated by the correspondingly numbered lines of Figure 6, but showing a different operating position of the parts;

Figure 9 is a fragmentary cross section taken substantially as indicated by line 9—9 of Figure 4;

Figure 10 is a transverse section on an enlarged scale, taken substantially as indicated by line 10—10 of Figure 2;

Figure 11 is a longitudinal section taken substantially as indicated by line **11—11** of Figure 10, showing the label magazine;

Figure 12 is a longitudinal section, taken substantially as indicated by line **12—12** of Figure 10;

Figure 13 is a transverse section on an enlarged scale, taken substantially as indicated by line **13—13** of Figure 2;

Figure 14 is a fragmentary cross section on a further enlarged scale, taken substantially as indicated by line **14—14** of Figure 13;

Figures 15 and 16 are transverse sections on an enlarged scale, taken substantially as indicated by the correspondingly numbered lines of Figure 2;

Figure 17 is a fragmentary plan view showing the means for positioning the containers as they advance through the machine;

Figure 18 is a transverse section on an enlarged scale, taken substantially as indicated by line **18—18** of Figure 17;

Figure 19 is a fragmentary plan view, taken substantially as indicated by line **19—19** of Figure 18;

Figure 20 is a longitudinal section, taken substantially as indicated by line **20—20** of Figure 19;

Figure 21 is an elevation of the right hand end of the machine, partly in section as indicated by line **21—21** of Figure 1, and an on enlarged scale;

Figure 22 is a side elevation on an enlarged scale of a portion of the left hand end of the machine, referring to Figure 1, showing the container receiving mechanism;

Figure 23 is a cross section, taken substantially as indicated by line **23—23** of Figure 22, certain parts being omitted for clarity;

Figure 24 is a transverse section taken substantially as indicated by line **24—24** of Figure 22;

Figure 25 is a longitudinal section, taken substantially as indicated by line **25—25** of Figure 23;

Figure 26 is a transverse section, taken substantially as indicated by line **26—26** of Figure 25;

Figure 27 is a side elevation of a portion of a labeling machine, showing a modified form of adhesive applying means in connection with a different type of container;

Figure 28 is a plan view of the structure illustrated in Figure 27;

Figure 29 is a cross section taken substantially as indicated by line **29—29** of Figure 27;

Figure 30 is a plan view showing a further modified form of adhesive applicator;

Figure 31 is a longitudinal section, taken substantially as indicated by line **31—31** of Figure 30;

Figures 32 and 33 are fragmentary cross sections, taken substantially as indicated by the correspondingly numbered lines of Figure 31;

Figure 34 is a schematic plan view of a modified form of machine, and showing various steps in the application of a label thereby;

Figure 35 is a plan view showing a modified form of label magazine employed in the machine of Figure 34;

Figure 36 is a transverse section on an enlarged scale, taken substantially as indicated by line **36—36** of Figure 35;

Figures 37 and 38 are longitudinal sections taken substantially as indicated by the correspondingly numbered lines of Figure 36;

Figure 39 is a cross section, taken substantially as indicated by line **39—39** of Figure 37;

Figure 40 is a fragmentary longitudinal section, taken substantially as indicated by line **40—40** of Figure 36;

Figures 41 and 42 are detail transverse sections taken substantially as indicated by the correspondingly numbered lines of Figure 35;

Figures 43, 44 and 45 are diagrams showing in detail one step in the operation of the machine of Figure 34;

Figure 46 is a perspective view of a different type of container;

Figure 47 is a development of a label suitable for use on the container illustrated in Figure 46;

Figure 48 is an elevation showing modified forms of cooperating adhesive applicator rolls; and

Figure 49 is an elevation partly in section showing another modified form of adhesive applicator roll.

Referring generally to the method and to one form of machine or apparatus by the aid of which it may be carried forward conveniently, means **10** are provided, including a conveyor for advancing the containers C in an upright position along a definite path and in various predetermined angular positions about their vertical axes in accordance with their positions along the path. As shown by way of example the containers C are of oblong rectangular cross section having opposed pairs of wide sides and narrow sides joined by rounded corners. In such a container, there will be opposite zones of limited area on the container surfaces respectively spaced the long way of the container by the maximum dimension of the cross section. For example, such zones might comprise the corners of the container, or if one or both pairs of sides were rounded, the zones might be at an intermediate point on the rounded sides. These areas may be conveniently termed "salient zones" or "prominences," since as the container is rotated they will extend beyond the width or length defined by the wide or narrow sides. In that form of the invention which will be described first, the opposite sides of the container are in substantially parallel planes so that the container cross section is uniform, while in a later described modification the opposite sides converge so that the cross section varies from one end of the container to the other.

During the initial part of their advance (see particularly Figures 3, 9 and 17) the containers C pass in the direction of the wide sides between one or more pairs of opposed rolls as **12** and **13** of the adhesive applicator mechanism A for receiving a coating of adhesive therefrom. The container C is then rotated a quarter turn clockwise past one roll of a pair **14** of staggered rolls which applies adhesive to the advancing corner or salient zone of the container C, indicated by X in Figure 3, as well as to the adjacent narrow side, that adhesive on the corner constituting the "pick-up glue" for initially attaching one end of the label to the container. After completing the quarter turn, the container C is advanced past the other roll of the staggered pair **14**, applies adhesive to the other narrow side.

The container C is then moved to cause the zone X carrying the "pick up glue" to contact the leading end of the outermost label L of a stack of labels in the magazine M, continued rotation and advance of the container past the magazine removing the label L from the magazine M and wrapping it about the container C.

As shown, the label L is intended to extend entirely about the container C and accordingly is arranged to overlap the end of the label initially attached. For adhering the overlapping end or lap **17** of the label L, mechanism generally indicated by B is provided for applying adhesive to the exterior of the previously attached end of the label as the container moves past the magazine M.

After the label has been wrapped around the container, the container is rotated additionally and advanced between pairs of pressure rolls **15** and **16** which smooth and flatten the label L and the lap **17** against the container C.

The conveyor **10** is shown as comprising a generally conventional roller chain **20** with chucks or carrier means **21** at spaced intervals for mounting containers C, extending horizontally between sprocket wheels **22** and **23** rotatably supported respectively at opposite ends of the machine frame F. The sprocket wheel **22** toward which the upper run of the conveyor chain **20** moves is driven by the aid of a motor **24** mounted on the frame F, the

other sprocket wheel 23 being adjustably supported to maintain the chain 20 appropriately tensioned.

The motor 24 is shown as incorporating a speed reducer 25, the load driving shaft of which has a sprocket 26 secured thereon and connected as by a chain 27 with a sprocket 28 on the shaft 29 to which is fixed the sprocket wheel 22. The sprocket 28 preferably is in driving relation with the shaft 29 through a torque limiting device 30 (Figure 21). Thus, if anything goes wrong tending to stall the conveyor chain 20, such as a container C becoming jammed, the sprocket 28 will slip and allow the conveyor chain 20 to remain stationary, thus avoiding damage to the machine as well as possible injury to the personnel.

As shown by way of example, the sprocket 28 is adapted to be connected in driving relation with the shaft 29 by means of a torque limiting device 30 commercially available under the trade name of "maxitorq." This device includes a clutch optionally operable to engage and disengage by means of the manual control lever 31. If the load on the device requires torque in excess of the predetermined amount, the clutch is automatically disengaged.

The chucks or container carriers 21 (see Figures 18, 19 and 20) each comprise a gear wheel 35 with a pair of parallel spaced upstanding ribs 36 secured thereon, and rabbetted along their outside edges and ends as at 36–*a* to fit closely within the recessed bottoms of the containers C. The gear wheel 35 is attached to the chain 20 for rotation about an axis normal to the direction of travel of the chain by means of a bushing 38 clamped to a block 39 by a bolt 40. The block 39 is secured in the chain 20 by a pair of chain pintles 41, taking the place of a pair of chain links. Spaces are provided in the sprocket wheels 22 and 23 to accommodate the blocks 39, by omitting appropriate teeth, as indicated by 23–*x*, Figure 25. As shown by way of example, the carriers 21 are inserted in the chain 20 at every twelfth link. The sprockets 22 and 23 must accordingly have a number of teeth divisable by twelve, such as thirty-six, with the first, thirteenth and twenty-fifth tooth omitted. A plate 42 having ratchet teeth 43 therein is attached to the under side of the gear wheel 35.

The upper reach of the chain 20 is accommodated in a channel 46 provided in a guide member 45 extending between the sprocket wheels 22 and 23 and supported by the frame F. The upper face of the member 45 supports the chucks 21 by slidably engaging the bottom of plate 42 and has side walls 47 and 48 contacting opposite sides of the periphery of the gear 35 with overhanging inward extensions or guides 49 and 50 engaging the outer face of the gear 35 as well as the outside of the ribs 36.

A pair of rail members 51 and 52 extending longitudinally of the frame F serve to support the chucks 21 and the lower reach of chain 20 by engaging the outer faces of the gears 35 and maintains the chucks against rotation by engaging the outer sides of the ribs 36 (see Figures 1, 21, 23, 25 and 26). A pair of members, one of which is shown at 53 in Figure 1, provides spaced guiding surfaces extending respectively between guides 49 and 50 and rails 51 and 52 partly about the sprocket 22, for similarly maintaining the chucks 21 properly positioned when passing about the sprocket. Means to be discussed more fully hereinafter serve to guide the chucks in proper position about the sprocket 23. The guides 49 and 50 by respectively engaging the sides of ribs 36 maintain the chuck 21 against turning, and with the ribs 36 extending in the direction of chain travel. At those places where the chuck is to be rotated, one or both of the guides are reduced in width and appropriately shaped to provide adequate clearance, and a discontinuous rack 54 with sections 54–*a*, 54–*b*, etc., of suitable length to give the desired angular rotation to the chuck is provided on the side wall 47 to engage the gear 35. Furthermore, where the chuck is to be advanced after a turn of 90° with the ribs 36 extending transversely of the direction of advance the guides 49 and 50 are so spaced as to slidingly engage the ends of the ribs 36 to maintain the chuck against turning. Starting pins 55–*a*, 55–*b*, etc., are provided adjacent the beginning of each section of the rack 54 to engage one of the ratchet teeth 43 to initiate rotation of the chuck and proper engagement of the gear 35 and the rack 54.

The containers C are maintained in the chucks 21 during their advance by the conveyor chain 20 by a resiliently urged strip or bar 56 extending longitudinally above the conveyor chain 20. This strip 56 is resiliently suspended below a fixed bar or top rail 57 extending lengthwise of the frame F and supported in fixed relation above the chain 20 as by brackets 58. For this purpose, a plurality of upwardly projecting studs 59 are secured to the strip 56 and extend slidingly through suitable apertures in the bar 57 with wing nuts 60 at their upper ends. A light compression spring 61 is provided about each stud 59 between the strip 56 and the bar 57 resiliently urging the strip 56 downwardly, the nuts 60 serving to limit such downward movement.

The means for feeding the container C to the chucks 21 comprises a short stationary platform 61 on which the containers are adapted to rest, and to which the containers C may be supplied in any suitable manner, as by a conventional chain conveyor 62 (see Figures 22, 23 and 25). The platform 61 is secured to the frame F by the aid of side members 63 and 64, which provide side walls or flanges adapted to engage the wide sides of the containers C. The rear end portion of the platform 61 comprising a downwardly inclined tongue 61–*a* extending over the sprocket 23 terminating in spaced fingers 61–*b* and spaced from the side walls 63 and 64 to provide slots 65 and 66 for accommodating the ribs 36 of the chuck 21.

A pair of jaw members 67 and 68 are pivoted respectively to the members 63 and 64 at their forward ends, the rear ends being provided with horizontal cam forming portions 69 and 70, as well as inturned flanges 71 and 72 for releasably engaging a container C and temporarily maintaining it on the tongue 61–*a* and fingers 61–*b*. The member 67 and 68 are urged together about their pivots as by springs 73 and 74, stop means 75 and 76 being provided (Figure 24) to limit such movement so that a container may pass freely between the members but will be retainer by the flanges. The tongue 61–*a* and fingers 61–*b* are so arranged that a container will be so supported that the leading edge of the recessed container bottom is in position to be engaged by the leading ends of the rib 36 of a chuck advancing beneath the container, the container being held against forward movement by the flanges 71 and 72 (see Figure 25). As the chuck 21 reaches the proper position to receive the container, the ribs 36 engage the inner edges of the cam portions 69 and 70, and urge the jaw members 67 and 68 apart against the force of the springs 73 and 74 respectively. This releases the containers for forward movement with the chuck.

To insure engagement of the forward end of the container with the chuck, a resilient blade 80 is provided, having a downwardly inclined forward end for engaging the leading edge of the container when supported by the tongue 61–*a* and fingers 61–*b*. The blade 80 is pivotally mounted at 80–*a* on the top rail 57 and is arranged to be urged downwardly when the jaws separate to exert a downward force on the container. For this purpose a tappet 81 engaging the top of the blade 80 is slidingly mounted in the bar 57, the upper end being engaged by one end of a lever 82 pivotally mounted on a bracket 83. A bell crank 84 is also pivoted on the bracket 83, the vertical arm 84–*a* thereof being engaged by a push rod 85 compriisng a cap screw adjustably mounted in the adjacent jaw 67. Operation of the bell crank arm 84–*a* in response to opening movement of the jaw 67 is transmitted to lever 82 through the adjustable compression spring 86 and urges the blade 80 downwardly against the container.

To adjust the chain **20** for wear, etc., sprocket wheel **23** is mounted on the frame F for adjustment toward and away from the sprocket wheel **22**. For this purpose, each of the side members **63** and **64** is provided with a bearing **87** cooperating to rotatably support the shaft **88** which carries the sprocket **23**. The members **63** and **64** are adjustably secured to the frame F by bolts **89** engaging slotted holes, and a pair of threaded strut rods **90**. An important feature of this arrangement is that the jaw members **67**, **68** and the mechanism for operating the blade **80** are all mounted on the members **63** and **64**, and thus are in proper relationship with the sprocket **23** for all adjusted positions thereof.

The adhesive applying mechanism A will now be described (see particularly Figures 1, 2, 4, 6 and 9). This mechanism is shown as comprising pairs of directly opposed applicator rolls **12** and **13** on opposite sides of the conveyor. As clearly shown in Figures 1 and 6, the rolls of the different pairs are arranged to cooperate to apply bands of adhesive in staggered relation extending entirely about the container C. Thus, the first pair of rolls **12** have narrow cylindrical bands adapted to contact simultaneously the wide sides of the container near their top and bottom, while the rolls of the next pair **13** have similar bands adapted to contact these surfaces at an intermediate zone. Similarly, the rolls of the staggered pair **14** are adapted to apply somewhat wider bands to the narrow sides of the container.

Each of these rolls is supported by a frame or yoke for rotation about a vertical axis, the frame being mounted for swivelling movement in different directions to enable the roll to adapt its position as required by distortion or deviation of the container from its true shape. The reduction of the area of contact between the rolls and the container due to the narrow bands facilitates proper contact between the roll and an irregular container, as shown in Figure 7.

To further improve the application of adhesive to the containers, the rolls are positively driven, either in a dition such that the surface of the roll travels with the container surface, or in the opposite direction. Since the mounting and driving mechanism is substantially identical for each roll, only that for one roll will be described.

Thus, a C-shaped frame or yoke **90** is provided which embraces the applicator roll **91** and supports it by rotatably engaging the opposite end portions of the shaft **92** on which the roll **91** is secured. The frame **90** is mounted for angular movement about a horizontal axis by a shoulder stud **93** threaded into a boss **94** on the frame and rotatably engaging the head **95** of an elongated member **96**. This member **96** is supported for angular movement about a vertical axis by the aid of a reduced shank **97** rotatably engaging a socket **98** which may be conveniently provided in the wall of the adhesive container **100**.

A pair of tension springs **101** and **102** are connected to the frame **90** respectively above and below the pivot stud **93** for urging the roll **91** inwardly against the container, adjustable stop means **103** being provided for appropriately limiting such inward movement. Where there are a pair of opposed rolls as in the pairs of applicators **12** and **13**, the upper spring **101** is connected between the frame **90** and the frame **90**–*a* of the opposed roll, the lower spring **102** being anchored to the adjacent side of the glue pot, to be presently described (see Figure 4). When the rolls are staggered as in the pair of applicators **14**, the upper springs as **101**–*b* are anchored to the top rail **57** by the aid of backing members **104** and **105** (see Figures 2, 4–*a* and 9). As clearly shown in Figure 4–*a*, the backing member **104** comprises an L-shaped piece with the horizontal leg **104**–*a* secured to the top rail **57** and the vertical leg **104**–*b* depending on the opposite side of the conveyor from the roll **91**–*b* and by engagement with the upper edge of the container C, cooperating with the chuck **21** to maintain the container against the roll. A similar backing member **105** is provided opposite the other roll **91**–*c* of the staggered pair **14**.

The rolls **91** are driven by the aid of a pair of parallel shafts **110** and **111** extending horizontally above the respective axes of the pairs of rolls and rotatably supported above the rolls on a platform **112**. A short vertical shaft **113** extends downwardly through the platform **112** in such axial alignment with the roll shaft **92** and is rotatably supported by a bearing **114**. A pair of mitre gears **115** respectively on shaft **111** and the upper end of shaft **113** connect the shafts **111** and **113** in driving relation. A pair of universal joints **116** and **117** connected by a short shaft **118**, and respectively on the lower end of shaft **113** and the upper end of shaft **92** connect shafts **92** and **113** in driving relation, at the same time permitting substantial misalignment of the shafts incident to movement of the roll **91**.

To accommodate variations in the required shaft length due to such misalignment as well as to facilitate removal of the roll, the lower universal joint **117** has a socket **117**–*a* for accommodating the upper end of shaft **92** as well as slot **117**–*b* for accommodating a driving pin **92**–*a* in the shaft **92** (see Figure 6).

As clearly shown in Figure 2, the mitre gears on shaft **110** face oppositely to those on shaft **111** so that the rolls **91** on opposite sides of the conveyor **10** will rotate in opposite directions with the shafts **110** and **111** rotating in the same direction.

Means are provided for driving the adhesive applicator rolls **91** independently of the conveyor **10**. Thus, a motor **120** (Figure 2) is mounted on an extension of the platform **112**, and drives a speed reducer **121** which in turn drives a sprocket **122** through a conventional clutch operated by a control lever **124**. Sprocket **122** is axially aligned with shaft **111**, and drives shaft **110** by means of a chain and sprocket **125** and **126**, which in turn drives shaft **111** by a chain drive **127**.

Each of the adhesive applicator rolls **91** is supported above a sump or tank **100** for containing the adhesive and means are provided for elevating the adhesive and supplying it to the roll. Thus, a bell crank shaped bracket **130** is pivotally mounted in the tank **100**, and carries a sheave wheel or pulley **131** at the end of the horizontal arm **130**–*a*, the sheave **131** dipping into the adhesive. A cooperating pulley or sheave **132** is carried by a shaft **133** rotatably supported just below the platform **112** (see particularly Figure 4).

A belt **134** preferably comprising a light spiral spring passes about the sheaves **131** and **132** and is appropriately tensioned by means of an adjusting screw **135** engaging the vertical arm **130**–*b* of the bracket **130**. Shaft **133** is driven in a direction such that the inner reach of the belt **134**, adjacent the roll **91**, travels downwardly, the outer reach travelling upwardly from the body of adhesive, carrying adhesive up over the sheave **132** and downwardly until removed by a trough **136** having a U-shaped slot closely surrounding the belt **134**. The adhesive is discharged by the trough **136** unto the top of the roll **91**, and thence drains downwardly over the surface of the roll into the sump **100**. To remove excess adhesive, a flange **137** is provided in the frame **90** which closely approaches the roll surface, acting as a scraper and distributor.

To control the amount of adhesive carried by the belt **134**, a scraper **138** is provided on the bracket **130**, and comprises upper and lower plates **139** and **140** with oppositely directed overlapping slots **139**–*a* and **140**–*a* cooperating to form an opening **141** for the belt **134**. The lower plate **140** is adjustably secured on the bracket **130** for movement to vary the depth of the slot with respect to the belt **134** by screws **142** engaging slotted holes **140**–*b* in the plate. The upper plate **139** is similarly secured on plate **140** for movement to adjust the depth of the slot **139**–*a* with respect to the belt **134**, by screws **143** threaded into plate **140**, one of which engages a slotted hole **139**–*b* in the plate **139**. These adjustments combine to vary the effective size of the opening **141**. A shaft **145** similar to shaft **133** is provided for oper-

ating the belts on the other side of the conveyor **10**. One of these shafts, for example that described as **145** is driven by means of a chain **146** from shaft **110**, and in turn drives the other shaft **133** through a pair of spin gears **147** and chain drive **148**.

It is sometimes desirable to use hot adhesive material for attaching the labels. Accordingly, means comprising a conventional heater **150** may be provided for any or all of the sumps **100**, with a single thermostatic control for all the heaters diagrammatically indicated at **151** on Figure 4. Additional heaters may be provided, particularly to facilitate starting of the machine when cold. For this purpose a heater may be provided adjacent each of the applicator rolls **91** accommodated in the frame **90** as indicated at **152** on Figures 6 and 9. Similar heaters may be provided adjacent the upper ends of the belts **134** and the upper sheave **132**, as indicated at **153** in Figures 1 and 5. These heaters **152** and **153** are entirely conventional and comprise a cylindrical housing adapted for enclosure in a bore as **154** (Figure 5) closed by a threaded plug **155**.

An important feature facilitating the use of hot adhesive is the mounting of the lower adhesive transfer sheave **131** in a manner to permit its ready removal for cleansing. Thus, the bell crank **130** is mounted on a shaft **156** which extends across the sump **100** and is supported at its opposite ends in plates **157** and **158** respectively secured on the opposite side walls of the sump **100**. Each of these plates has a groove or slot **159** with a vertical portion **159–*a*** and a horizontal portion **159–*b*** in which the shaft **156** is seated (see Figure 4). By moving the shaft **156** inwardly (toward the center of the machine) and upwardly, the shaft **156** together with the bracket **130** and sheave **131** may be readily removed, or installed by a reverse movement. The belt **134** has its opposite end joined by a pair of hooks as at **134–*a*** so that the belt may be easily removed and replaced.

The label magazine M will now be described, see Figures 1, 2, 9, 10 and 11. This magazine is mounted on the frame F on one side of the conveyor **10** and has a horizontal floor or surface forming member **165** upon which a stack of labels L are supported vertically edgewise, and so held as to have free contact with the salient zone of a container after it has passed the sets of adhesive applicator rolls **12**, **13** and **14** and to be secured thereon so that the label will be withdrawn from the magazine and wrapped about the container as the container is rotated and advanced past the magazine.

At the opposite ends of the member **165** are vertical parallel side walls **166** and **167** between which the stack of labels L is confined for movement toward the conveyor **10** and the path of travel of the containers. For moving the label stack, a pusher **168** is slidably mounted on the floor member **165** between the side walls **166** and **167** and guided for movement toward and away from said path. A flexible chain or cable **169** passing over pulleys **170** and **171** mounted on the member **165** is secured at one end to a clevis **172** attached to the pusher **168** and depending through a slot **173** in the member **165**, and at the other end to a weight **174**.

The pusher **168** has a backing plate **175** secured thereon, formed in two sections, **175–*a*** and **175–*b***, the section **175–*a*** being curved outwardly and pivoted at **176**. A spring pressed plunger **177** urges section **175–*a*** and the leading ends of the stacked labels outwardly of the magazine for initial engagement with the containers. Ratchet teeth **178** are formed in the upper face of the member **165** and are normally engaged by a spring urged pawl **179** slidably carried by the pusher **168**. The pusher **168** and the backing plate **175** are continuously urged toward the path of travel of the containers by the weight **174** but are restrained against reverse movement. When it is desired to retract the pusher **168**, to replenish the supply of labels L, the pawl **179** may be released by means of the lever **180**, and the pusher **168** moved back to its outer position where it engages the detents **181** carried respectively by a pair of arms **182** pivoted to the member **165** and spring urged upwardly. When it is desired to release the pusher, the arms **182** are swung downwardly by means of handle **183**, retracting the detents **181**.

The labels L are normally retained in the magazine by a plurality of means **185** providing substantially aligned knife edges or prongs engaging the upper and lower edges of the outermost label L at spaced points. When the label is pulled outwardly by the movement of the container to which the label is attached, the knives **185** make small cuts releasing the label and engaging the next one behind it. Adjacent the trailing end of the label is a rod or bar **186** spanning the label stack for imparting a curling movement to the trailing end of the label as it is pulled from the stack, to assist in the wrapping of the label about the container.

The lower set of upwardly extending knife forming means **185** are mounted on the floor member **165** by the aid of a detachable piece **187**. The complementary set of downwardly extending knife forming means **185** are carried by an adjustable cross bar **188** secured to the side walls **166** and **167** by the aid of wing nuts **189**. Furthermore, the upper and lower prongs **185** adjacent the curling rod **186** and the curling rod itself are adjustable with respect to the magazine as by being mounted in upper and lower movable plates **190** and **191** secured in adjusted position respectively by screws **192** and **193**.

Mechanism of a known type may be utilized for applying the adhesive or "lap paste" for securing the trailing end of the label. However, a novel form of mechanism, generally indicated by B is shown for this purpose, and will now be described, see Figures 1, 2, 9, 10, 12 and 15. This mechanism B is mounted on the frame F opposite the label magazine M and comprises an arm **200** with a flexible wiper blade **201** made for example of an appropriate grade of natural or artificial rubber secured at its outer end. The arm **200** is secured on a shaft **202** which is rotatably supported by upper and lower bearings **203** and **204**. The arm **200** is connected by mitre gearing **205**, in driving relation with a longitudinally extending shaft **206**, rotatably supported on the frame F by suitable bearings, two of which are indicated respectively at **207** and **208**. The longitudinal shaft **206** is in driving relation by mitre gearing **209** with a counter shaft **210** supported by a bearing structure **211** beneath the conveyor guide **45** and driven by means of a pinion **212** fixed on the shaft **210** engaging a spur gear **213** secured on the conveyor drive shaft **29** (see particularly Figures 1, 2 and 15). In this way the wiper blade **201** is driven in synchronism with the conveyor chain **20** and by proper choice of the ratio of gears **212** and **123** can be caused to arrive in proper adhesive applying position at the same instant that the conveyor **10** brings a container C to adhesive receiving position.

Adhesive is supplied to the wiper blade **201** by means of a fountain roll **215** rotatably mounted in adjustable spaced parallel relation with respect to shaft **202**, the spacing being such that the blade **201** contacts only a small angular portion of the surface of the roll **215**. The roll **215** is fixed on a shaft **216** which projects from the opposite ends thereof and is engaged respectively by bearing arms **217** and **218** which in turn are fixed to a shaft **219** supported for angular movement in a bracket **220**. The arms **217** and **218** with the shaft **219**, form a yoke or frame **221** supporting the fountain roll **215**, which by angular adjustment about the axis of the shaft **219** varies the distance between the roll **215** and the axis about which the wiper blade **201** revolves. This varies the extent of the surface on roll **215** contacted by the blade **201** and thus controls the amount of adhesive carried by the blade **201**.

One of the arms of frame **221**, for example the upper arm **217**, has a lug **217–*a*** extending toward the other arm **218**, engaged in opposite sides by adjusting screws

222 and 223 threaded through projections 220–*a* and 220–*b*. By loosening one screw and tightening the other, the frame 221 may be swung about the axis of shaft 219; by tightening both screws, the frame may be secured in adjusted position.

The fountain roll 215 is driven simultaneously with the wiper blade 201 by the aid of a chain drive 224, the chain being sufficiently loose to accommodate the necessary adjustment of the roll 215. Adhesive is supplied to the adhesive roll 215 from a sump 225 by means including a spiral spring belt 226, quite similar to those used for the adhesive applicator rolls, and driven by means including a sprocket 227 on the shaft 206. If desired, heating means can be provided, similar to that used in connection with said applicator rolls. A scraper blade 228 for restricting and distributing the adhesive on the surface of roll 215 is shown as carried by the frame 221, being attached to lug 217–*a* of the upper arm 217.

After the container C has been rotated and advanced past the label magazine M, the container C is appropriately turned to pass in the direction of the wide sides between a pair of pressure or lay down roll structures generally indicated by the numeral 15 (see Figures 2, 3, 13, 14 and 17) with the lap or trailing end of the label L unattached as indicated at 17 (Figure 14).

Each of the rolls 230 of the structure 15 comprises a resilient surface extending the full height of the containers C, and is resiliently urged against the container so that a smoothing and pressing action is had against the label on the container sides. This action is greatly facilitated since the lap 17 has not yet been adhered.

Each of the rolls 230 comprises a flanged mandrel or spool 231 of metal or other rigid material with a body 232 of sponge rubber or the like and a soft and yielding exterior shell 233 of natural or artificial rubber, for example, secured thereon. Each roller 230 is rotatably mounted on a spindle 234 being axially restrained thereon by upper and lower set screw collars 235 and 236. The spindles 234 are maintained against rotation in any suitable manner and are supported by engagement of the lower collars 236 with brackets 237 secured to opposite sides of the conveyor guide member 45. The brackets 237 also serve as guides for the spindles 234 having for this purpose transverse slots 237–*a* which allow limited movement of the spindles toward and away from each other but prevent movement longitudinally of the conveyor 10.

The upper portions of the spindles 234 are similarly restricted by a slotted transverse member 238 secured to the rail 57. Tension springs 239 and 240 respectively connect the upper and lower ends of the spindles 234, for urging the rollers 230 toward each other, adjustable stop means 241 and 242 being provided to limit such movement.

It has been found desirable to so restrict the rotation of the rollers 230 so that a slight drag is exerted on the containers as they advance between the roller and to insure that the rollers are not spinning from the passage of one container when the succeeding container reaches the rollers. Accordingly, a light spring strip 243 is attached to the upper end of each roller 230 by the aid of a cap screw 244 and partly encircles the upper collar 235 to serve as a friction brake.

After the container C has passed between the pressure rollers 230 it is rotated a quarter turn clockwise and advanced in the direction of the narrow sides with the lap or trailing end 17 of the label L on the advancing side, between the means 16 comprising a pressure roller 250 and a revolving lap brush 251 (see Figures 1, 2, 3, 16 and 17).

The pressure roller 250 may be substantially identical in construction and mounting with the previous described rollers 230, except that the brake is omitted and the tension springs 252 and 253 are anchored to fixed points on the frame. The pressure roller 250 urges the container C against the brush 251 which is so rotated that that portion of its periphery adjacent the container C moves in a direction opposite to the advance of the container and engages the trailing end or lip 17 and forces it against the container surface. Since the surface engaged had a previously applied adhesive coating, as hereinbefore discussed, the lap adheres to the container and the application of the label is complete.

As clearly shown in Figures 1 and 16, the lap brush 251 is secured on a shaft 252 which is rotatably supported in bracket 253 mounted on the conveyor guide 45. The lower end of shaft 252 has a mitre gear 254 fixed thereon and meshing with a cooperating mitre gear 255 carried by a transverse shaft 256 also rotatably supported by the bracket 253, and connected by a chain drive 257 in driving relation with the countershaft 210.

After the container C has passed the roller 250 and brush 251, the chuck 21 is rotated through an appropriate angle to position the container C for advance in the direction of its wide sides and advanced to the end of the conveyor 10, where it is transferred to a conventional conveyor 260 in any suitable manner. The final rotation of the chuck is such that the chuck is properly positioned to receive a container upon return to the opposite end of the machine, previously discussed guide means being provided to maintain the chuck against rotation during such return.

The operation of the machine may now be discussed. The containers C are fed from the left hand end of the machine and down the inclined surface provided by the tongue 61–*a* where they are successively engaged by the chuck 21 and advanced between the pairs of adhesive applicator rolls 12 and 13. After passage between said rolls, the ratchet tooth facing in the direction of advance engages stop pin 55–*a* imparting rotation to the chuck which is continued through an angle of 90° by means of the rack section 54–*a* of suitable length which engages the gear 35, incorporated in the chuck. To permit such rotation, the space between the overhanging guide flanges 49 and 50 is appropriately increased (see Figure 17). During such rotation and advance, the advancing corner or salient zone contacts the first adhesive applicator roll 91–*b* of the staggered pair 14, which applies adhesive to the area adjacent said corner, constituting the pick up glue, as well as the narrow side of the container. In Figure 3 the outline of the container C is shown by broken lines, the salient zone or corner to which the pick up glue is applied is indicated by "x," and the label "L" is indicated by a full line. To maintain the container in contact with the applicator roll, a backing member 104 is provided opposite the roll 91–*b* for engaging the upper end of the opposite side of the container (see Figure 9), said backing member being recessed at 104–*c* to accommodate the container corner diagonally opposite the corner receiving the pick up glue.

After the chuck has completed this initial 90° turn it passes between a portion of the guide flanges 49, 50 which engage the end surfaces of the chuck maintaining it in position to advance the container in the direction of the narrow side past the adhesive applicator roll 91–C of the pair 14, which applies adhesive to the other narrow side surface. A backing member 105 is provided opposite the applicator roll for maintaining the container in contact therewith.

A short distance beyond the last engaged roll the guides 49–50 are again spaced to allow the chuck 21 to rotate and a starting pin 55–*b* is provided to initiate further rotation of the chuck 21 as the gear 35 engages a second rack section 54–*b*. The starting pin 55–*b* and rack 54–*b* are so located that the chuck 21 will rotate an amount to cause the corner X carrying the pick up glue to engage the leading end of the outermost label L in the magazine M. If desired, a backing member 106 (see Figure 17) similar to the previously described backing members 104

and 105 may be provided to engage the opposite container corner at this point. The rack section 54–*b* is of such length that continued advance of the chuck to a point beyond said magazine will rotate the container so that the label is pulled from the magazine and wrapped about the container, the rotation of the container continuing thereafter until the container is again advancing in the direction of the wide sides.

At some intermediate point in the advance, when the corner X is spaced opposite the magazine, the wiper blade 201 of the adhesive applicator B will contact this corner and apply a layer of adhesive or "lap paste" exteriorly on the label L. The length of the label is somewhat greater than the perimeter of the container, the excess being adapted to form a lap overlaying the initially attached leading end portion. The movement of the container past the magazine, however, is not relied on to attach the lap.

After the container C has passed the magazine and while it is advancing in the direction of the wide sides, it is passed between the pressure rollers 230, the spacing of the guides 49, 50 being reduced to engage the sides of the chuck at this point. Beyond the pressure rollers 230 the spacing of the guides is again increased and a starting pin 55–*c* and rack section 54–*c* rotate the chuck 21 so that the corner *x* and the lap 17 of the label are advancing toward a counterrotating brush 251, which lays the lap 17 down against the lap paste. Another starting pin 55–*d* and rack section 54–*d* then rotate the chuck 21 additionally so that when returned by the conveyor it will be in proper position to receive another container.

In that form of the invention just described, the adhesive applicator rolls 91 are of rigid material and are resiliently mounted to accommodate passage of the containers and to engage the surface thereof. In that form of the invention disclosed in Figures 27 to 29, the adhesive applicator rolls 261, 262, 263 and 264 are shown as mounted for rotation about fixed vertical axes and have resilient container engaging surfaces, the resilience accommodating variations in the containers and insuring contact with the surfaces thereof. Furthermore, the spacing between the rolls of each pair and the resilience of the rolls is such that the applied adhesive extends a substantial portion of the distance around each corner of the container when it is applied to the side surfaces thereof.

Referring to Figures 27, 28 and 29, a conveyor 270 is shown which is quite similar to that of the preceding form, including a chain 271 with rotatable chucks 272 substantially identical with chucks 21, guide members 273–274 for maintaining the chucks against rotation during certain portions of their path of travel, and a starting pin and rack 275 and 276 for turning the chucks 272. The rolls 261 and 262, 263 and 264 of each pair are oppositely disposed, the container C–1 being appropriately guided to pass in the direction of its wide sides between the rolls 261 and 262, and then rotated a quarter turn and passed in the direction of its narrow sides between the rolls 263 and 264. By way of example, the container C–1 is shown as of tapering configuration so that one end is larger than the other, the rolls 261, 262, 263 and 264 being correspondingly tapered.

Corresponding rolls of each pair 261, 263 and 262, 264 are rotatably mounted respectively in similar frames 277 and 278 adjustably secured for movement toward and away from each other on opposite sides of the conveyor 270 by the aid of angle brackets 280 on the machine frame F–1. The rolls 261 and 263 and driven by a longitudinally extending shaft 281 mounted on the frame 277 and connected with the rolls as by mitre gears 283 and 284. The rolls 262 and 264 are driven in a similar manner by a shaft 282 on the frame 278.

The shafts 281 and 282 are connected in driving relation by the aid of a drive chain 285, one of the shafts as 281 being connected in driving relation with a countershaft 286 by a drive chain 287. The countershaft 286 is connected to be driven from the conveyor 270 by the aid of a pair of level gears 288 and 289 respectively on the countershaft 286 and on the shaft 290 carrying the conveyor chain sprocket 291.

The rolls 261 and 263 are mounted above an adhesive sump 293, rolls 262 and 264 being mounted above a similar sump 294. Each of the rolls 261, etc., may be supplied with adhesive by means of a belt which elevates the adhesive from the sump as in the first described form of the invention or by other means such as a pump 297 (Figure 27).

For this purpose, the sumps 293 and 294 drain freely into a tank 298 to which the intake of the pump 297 is connected by a conduit 299. The discharge from the pump 297 is connected by a conduit 300 with a pair of distributor pipes 301 and 302 suitably supported and extending respectively above the rolls 261, 263 and 262, 264. The adhesive discharge from the distributor pipe 301 is led respectively to the rolls 261 and 263 by the aid of elongated rubular nozzles 301–*a* and 301–*b*, similar nozzles 302–*a* and 302–*b* being provided for the pipe 302. The pump 297 may be driven in any suitable manner, as by a chain drive 303 from the conveyor sprocket shaft 290, the discharge being controlled by the aid of a bypass valve 300–*a* and valves 301–*c* and 302–*c* in the respective distributor pipes 301 and 302.

A modified form of adhesive applicator roll mounting permitting movement of the roll to accommodate itself to the container is shown in Figures 30 to 33. By way of example, the roll 306 is shown as tapered with a plurality of container engaging bands and arranged to apply the "pickup" glue to the corner area of a tapered container C–1 shown in Figure 46, for which purpose a roll mounted in this manner is particularly suitable. The container C–1 is arranged to be advanced from left to right past the roll and rotated to cause the corner area to contact the roll 306, by a conveyor 307 substantially identical with that of the first described form of the invention The mounting comprises a generally square frame 308 with upper and lower horizontal arms 308–*a* and 308–*b* providing bearings for the roll shaft 305 and vertical side bars 308–*c* and 308–*d*, one of which as 308–*c*, has a hemispherical socket 309 for accommodating a ball member 310 adjustably supported in a frame member 311 by the aid of a horizontally extending threaded shank 310–*a*. A roller 312 is rotatably mounted on the other bar 308–*d* in horizontal alignment with the ball member 310, and is vertically confined between upper and lower rail members 313 and 314 mounted on the member 311. In this way the roll 306 is movable toward and away from the path of movement of the containers C–1, as well as in a vertical plane to vary its inclination with respect thereto. Another roller 315 is mounted adjacent the upper end of the bar 308–*d* for rotation about a vertical axis and engages a flat stationary member 316, for maintaining the frame 308 in assembled relation on the ball member 310, but allowing it to move as just described.

A tension spring 317 is provided, extending between the top of frame 308 and an anchor 318 on the top rail 319 corresponding with element 57 of the first described form of the invention. A compression spring 320 is confined in a barrel 321 secured to the frame member 311 between an adjustable stop 322 and a movable plunger 323 engaging an extension 308–*e* on frame 308 which projects through a slot 311–*a* on the member 311. Springs 317 and 320 urge the roll 306 inwardly about the ball 310 as a pivot and cause it to incline in accordance with the surface of the container. This inward movement is appropriately limited by stop member 316–*a* at the end of member 316 engageable by roller 315, and the end surface 311–*b* of slot 311–*a* engageable by extension 308–*e*.

The roll 306 is arranged to be driven by the aid of a horizontal shaft 325 rotatably mounted on frame 308 and having a bevel gear 326 fixed thereon and engaging a bevel gear 327 fixed on the shaft 305 to which the roll 306 is secured. Shaft 325 in turn is driven from a drive

shaft 328 by means of a drive chain 329 connecting sprockets 330 and 331 respectively on shafts 325 and 328, the chain 329 being sufficiently slack to accommodate the movement of shaft 325 incident to operation of the roll 306. Adhesive may be supplied to the roll by any suitable means, for example, an elevating belt or pump as previously discussed.

The apparatus disclosed in Figures 1 et seq., is quite suitable for applying labels to containers having converging sides, since the manner of mounting the various applicator rolls, pressure rolls, etc., is such as to permit substantial inclination of the roll axes from the vertical, see for example Figures 7 and 8. Optionally, appropriately tapered rolls, such as those shown in Figures 27 and 31 may be provided.

Brief consideration will show that the label for such a container, as shown for example in Figure 46, must have substantially parallel curvate edges of different lengths in accordance with the perimeters of the large and small ends of the container, and oppositely inclined ends. A development of such a label is shown in Figure 47. This label, denominated L–1, is adapted to be wrapped about the container and to provide a short overlapped portion in a manner similar to that of the label in the first described form of the invention.

It is not always desirable to apply the "pick up" glue to the corner zone of the container to initially engage and pick up the label, as illustrated in the first described form of the invention. Thus, some types of fiber containers have quite sharp corners and are liable to be distorted by the pressure of an applicator roll on the corner. Also, it has been found that the application of labels to tapering containers is facilitated by providing "pick up" glue on one of the narrow sides of the container.

Figure 34 shows schematically a labeling machine which is substantially identical with the machine of Figure 1 except for embodying a modified form of label magazine M–1 for holding tapered container labels L–1 (to be described hereinafter) and re-arrangement of certain of the rolls in a manner more suitable for handling tapered containers, such as C–1. Thus, the narrow side adhesive applicator rolls 13 are directly opposite each other, the container advancing between them in the direction of the narrow sides so that the "pick up" glue is applied across the container side *y* by the applicator roll 91–*b*–1. Further, a "lay down" roll 336 is provided in lieu of or supplementing the lap brush 251 (Figure 3) of the pressure rolls 16 for causing the overlapping portion 17–*a* of the label to adhere, being so located as to engage the advancing corner of the container C–1 as the container emerges from between the opposed pressure rolls 15.

Referring to Figures 35 to 42, particularly Figure 35, the modified form of label magazine generally indicated by M–1, is similar to the previously described form of magazine M and is mounted at one side of a conveyor 340, substantially identical with the conveyor 10 of the first described form of the invention, adapted to advance and rotate the containers C–1 past the magazine M–1.

The magazine M–1 comprises a horizontal member 341 with raised portions 341–*a* along the opposite sides of its upper surface and cooperating therewith to form a label supporting surface 341–*b* sloping downwardly toward the center of the magazine and on which a stack of labels L–1 are adapted to rest on their short edges. Means 342 and 343 providing upwardly extending side walls 342–*a* and 343–*a* are secured to the opposite sides of the member 341 by the aid of the horizontal flanges 342–*b* and 343–*b*, forming a unitary structure or frame 344. The structure 344 is adjustably secured to the guide member 345 of the conveyor 340 by the aid of mounting brackets 346 and 347 formed integrally with the means 342 and 343 respectively. Each of the brackets 346 and 347 has a horizontal portion 346–*a* and 347–*a* overhanging the guide member 345 and vertically depending portions 346–*b* and 347–*b* adjacent the side of said member. A bolt 348 extends through a clearance slot 349 in each of said depending portions and is threaded into the guide member 345. A set screw 350 is threaded vertically through each horizontal portion 346–*a*, 347–*a* and engages an upper surface of the conveyor guide member 345. As shown in Figure 37, the slots 349 have a width substantially greater than the diameter of the bolts 348. Thus, with bolts 348 loosened, set screws 350 are adjusted to support the magazine so that the upper and lower edges of the labels are properly positioned with respect to the containers as they are advanced past the magazine, and the magazine is also adjusted longitudinally so that the leading ends of the labels are properly positioned with respect to the advancing containers. Bolts 348 are then tightened to secure the magazine in adjusted position.

It is desirable that the leading and trailing ends of the labels L–1 when the labels are in the magazine M–1 should lie respectively in vertical planes, normal to the path of advance of the containers and have substantially the same inclination as the corner portions of the container. Since it is preferable that the labels be inclined backwardly (away from said path of advance), the containers C–1 are advanced with their small ends down.

To support the labels L–1 with their ends so inclined, a backing member or pusher 355 similar to that shown in the first described form of the invention is provided with its end portions appropriately inclined. Furthermore, to accommodate the greater length of the upper edge of the label so that the ends lie in the vertical planes, the central portion of the pusher 355 is inclined at a greater angle from the vertical than the end portions (see Figure 37).

The pusher 355 is resiliently urged toward the path of container advance by mechanism 356 including a weight (not shown) attached to one end of a chain 357 passing over guide rollers 358, the other end of the chain being attached to a guide shoe 359 secured to the bottom of the pusher 355 and projecting downwardly through a slot 360 in the magazine bottom member 341.

A spring pressed pawl 361 carried by the pusher 355 (Figure 40) serves by engagement with ratchet teeth 362 provided in the side member 342 to prevent retraction of the pusher 355. An operating handle 363 is provided for optionally disengaging the pawl 361 to permit movement of the pusher away from the path of container advance.

The pusher 355 is operated by the weight mechanism 356 to urge the label stack toward the advancing containers. However it is desirable that the leading ends of the labels be supplementarily urged forward, for which purpose the pusher 355 is provided with hingedly connected portions 355–*a* urged forwardly by a plunger 364 slidably carried by the pusher 355 operated by a compression spring 365. The plunger 364 has a reduced portion 364–*a* with a wing-nut 366 threaded on the outer end thereof, and which by adjustment alters the tension of spring 365 as well as limiting the forward movement of the plunger 364 and the pusher portion 355–*a*. Except in so far as the labels are supported in curved configuration, the arrangement of the pusher 355 is quite similar to that of the pusher in the first described form of the invention.

Means are provided for restraining outward or forward movement of the labels in response to the force exerted by the pusher. Thus, a horizontal bar 367 extends across the front of the magazine M–1 above the label stack and is adjustably supported on the side members 342 and 343 by the aid of compression springs 368 and 369. Threaded rods 370, 371 are mounted on the side members 342 and 343 adjacent the springs 368 and 369 respectively and extend upwardly through clearance openings in the bar 367, wing nuts 372 and 373 on the upper ends thereof limiting upward movement of the bar 367 and by ad-

justment altering the spacing of said bar above the label stack.

A plurality of restraining means **374**, each comprising a small knife blade **374**–*a* with a shank **374**–*b* are mounted in suitable openings **374**–*c* provided on the member **341** and the bar **367** being adjustably secured therein by a set screw **374**–*d*. The blades **374**–*a* are arranged in pairs to conform substantially with the curvature of the upper and lower edges of the pusher **355**, the lower blade of each pair thus being offset forwardly of the corresponding upper blade (see Figure 39). The configuration of the upper and lower edges of the label are indicated by broken lines in this figure marked respectively L–**1**–*a* and L–**1**–*b*. These members **374** are adjusted so that the blades **374**–*a* project a short distance over the upper and lower edges of the labels, and cut through the successive labels as they are pulled from the magazine M–**1** by the advancing containers C–**1** in a well understood manner. It may be desirable at some points to provide a pair of the restraining members **374** in spaced alignment for engaging the top label edge to control accurately the withdrawal of the labels from the magazine, such members being shown in Figure 35 to the left of the center bar **367**.

A bar or curling rod **375** extends across the label stack near the trailing end thereof and is rotatably secured at its opposite ends to the top bar **367** and the bottom member **341** respectively. The rod **375** is inclined therein substantially at the same angle as the corner zones of the containers.

The pusher **355** urges the label stack against the curling rod **375**, so that a considerable pull is required on the outermost label to remove it from behind the rod, which serves to wrap the label tightly about the container as well as imparting a curl to the trailing end portion of the label which facilitates adhering such portion or overlap to the container. Longitudinal adjustment of the rod **375** may be provided as by mounting its upper end in a movable block **376** secured in adjusted position as by screw **376**–*a*, and its lower end in a movable member **377** adjustably secured to member **341** as by screws **377**–*a*. To permit such adjustment, the members **376** and **377** have clearance openings respectively accommodating the ends of the rod **375** (see Figure 37). These members **376** and **377** are independently adjustable so that the rod **375** may be adjusted in the direction of container advance. This adjustment serves to vary the force required to pull the label from behind the rod. It has been found that such a curling rod has an improved action if banded, that is with alternate portions of large and small diameter (see Figure 37). For convenience, the upper and lower retaining means **374** immediately adjacent the curling rod **375** may be mounted respectively in the blocks **376** and **377**.

The leading ends of the labels L–**1** are restrained by a pair of fingers **378** and **379** slidably mounted in the side wall **342** of the magazine M–**1**. Thus, referring particularly to Figures 37, 39 and 41, the member **342** may be formed with a separate forward portion **380** having a pair of horizontal rectangular guide ways **381** and **382** therein, slidably mounting the rectangular elements **383** and **384**. Each of these elements **383** and **384** has a forward extension **385** and **386** with a lateral projection **385**–*a*, **386**–*a* overhanging the leading end of the labels L–**1** (see Figures 39 and 43 to 45). A light compression spring **387**, **388** urges the fingers **378**, **379** outwardly, a stop plate **389** secured on the forward wall portion **380** by engagement with the shoulders **378**–*a*, **379**–*a* on the fingers, limiting outward movement thereof. The arrangement is such that the projections **385**–*a*, **386**–*a* limit outward movement of the label stack by the pusher **355**, the leading ends of the labels having the same inclination as the corner zones of the containers C–**1**. Furthermore, the inside surface of the forward portion **380** converges slightly toward the opposite side member **343** to produce a crowding effect on the labels as they move forwardly in the magazine M–**1** accentuating the outward bulge imparted by the hinged section **355**–*a* of the pusher **355** (see Figure 39). To assist in maintaining the labels L–**1** properly positioned in the magazine M–**1** with their center portions downwardly curved, an arm **390** (Figures 35 and 36) is adjustably secured to the top bar **367** and extends rearwardly therefrom for engaging the midportion of the top edges of the labels L–**1** in the magazine M–**1**.

The manner of operation of the label magazine will now be discussed, see particularly Figures 34, 43, 44 and 45. Thus, after application of suitable adhesive to the wide sides and one narrow side of the container, and of "pick up" glue to the other narrow side Y, as previously discussed, the container C–**1** is advanced and rotated, the parts being so proportioned and the magazine M–**1** so adjusted longitudinally that the leading corner zone "W" of the container C–**1** adjacent the side Y engages the fingers **379** and similarly engages the other finger **378** as shown in Figure 43. Since the pitch diameter of the gear **35** mounting the chuck **21** is nearly the same as the distance across corners of the container C–**1**, the container practically rolls on this corner, depressing the fingers **378**, **379**, as indicated in Figure 44, and allowing the container to advance past the fingers bringing a portion of the side Y against the outwardly bulged surface of the leading end portion of the outermost label L–**1**. Further advance of the container releases the fingers **378**, **379** which return to their normal positions and brings more of the side Y against the label (Figure 45). Further advance of the container C–**1** pulls the end of the label from behind the finger projections **385**–*a* and **386**–*a* as well as pulling the label from behind the retaining members **374**. The label is not necessarily wrapped tightly about the container as the advance proceeds past the magazine M–**1**, but may hang loose at intermediate points as shown in Figure 34, the final pull required to free the label from behind the curling rod **375** serving to draw the label tight about the container. Any looseness or wrinkles remaining will be smoothed out by the pressure rolls **15** for which purpose it may be desirable that the braking force on the roll engaging that side of the container with the fully attached label (the bottom roll in Figure 34) be substantially reduced.

To facilitate replenishment of the label stack in the magazine M–**1**, means are provided for maintaining the remaining portion of the stack in an upright position when the pusher **355** is retracted. For this purpose, a pair of members **391** and **392** are mounted in the top bar **367** adjacent the respective ends of the label stack for free vertical sliding movement (see Figures 35 and 42). Since the members **391** and **392** are substantially identical, the description of one will suffice for both. Thus, the lower end of the member **391** is forwardly and downwardly bevelled as indicated at **391**–*a*, Figure 42, a cross pin **393** being provided above the bar **367** to limit downward movement of the members. The members **391** and **392** thus have a ratchet like action, permitting unrestricted forward movement of the labels, but dropping to maintain the labels in front upright upon removal of the supporting surface from beneath the members **391** and **392**.

In those forms of the invention so far described, the adhesive has been applied to the container surfaces in spaced bands. It may sometimes be necessary to have the adhesive substantially entirely cover the surfaces. This can be readily done by providing the pair of rolls on each side of the container, such as rolls **91**, with wider container contacting portions or flanges, such as shown in Figure 48. Therein one of the rolls as **400** has a pair of spaced portions or bands **400**–*a* of greater diameter adapted to apply adhesive to the upper and lower thirds of the container surface, the other roll **401** having an intermediate portion or band **401**–*a* of greater diameter adapted to apply adhesive to the middle third. Thus, after

the container has passed both rolls **400** and **401**, the contacting surface will be substantially entirely covered.

It is also possible to provide a single roll adapted to give full coverage of the container surface. However, to allow for irregularities and distortion of the container surface which cannot be accommodated by the swivel mountings heretofore disclosed, it is desirable that the roll be resilient. One form of such a roll, shown by way of example in Figure 49, is substantially identical, except for its manner of mounting, with the pressure rollers of the first described form of the invention. Thus, the roll **402** comprises a metallic spool or core **403** provided having end flanges **403**–*a* between which is secured a sponge rubber body **404** covered with a resilient exterior shell **405** of natural or artificial rubber. The core **403** is suitably secured on a supporting and driving shaft **406**, as by the aid of a key **407**.

I claim:

1. In a label applying machine: means forming a conveyor for advancing containers to be labaled; pairs of adhesive applicators on opposite sides of the conveyor respectively for simultaneously contacting opposite surfaces of said containers; a label magazine on one side of the conveyor; an adhesive applicator on the opposite side of the conveyor from said magazine; pressure members on opposite sides of the conveyor for simultaneously contacting the labels on opposite sides of said containers, operation of the conveyor serving to advance the containers successively past said adhesive applicators, the label magazine, and said pressure members, means restraining rotation of said containers while said containers are being advanced in contact with said pairs of applicators, and means intermittently rotating said containers after advance thereof past said pairs of applicators.

2. In a label applying machine: means forming a conveyor for advancing containers to be labeled; means intermittently rotating said container, a pair of opposed adhesive applicators between which the conveyor passes with opposite surfaces of the containers in simultaneous contact with said applicators; a second pair of adhesive applicators in staggered relation respectively on opposite sides of the conveyor; a label magazine on one side of the conveyor; an adhesive applicator on the opposite side of the conveyor intermediate the ends of the magazine; pairs of opposed pressure members on opposite sides of the conveyor respectively, operation of said conveyor serving to advance the containers successively past said adhesive applicators, the label magazine, and said pressure members, and means restraining rotation of said containers while said containers are advanced between said first named pair of applicators as well as when moved past one of the applicators of said second pair.

3. In a label applying machine: means forming a conveyor for the containers to be labeled; means for rotatably mounting the containers in spaced relation on the conveyor; means normally restraining the containers from rotating; means whereby advance of the conveyor imparts successive, predetermined angular rotation to said containers; pairs of adhesive applicators mounted on opposite sides of the conveyor respectively for contacting said containers when said containers are restrained from rotation; a label magazine on one side of the conveyor; an adhesive applicator on the other side of said conveyor; and pressure members mounted on opposite sides of the conveyor for contacting opposite sides of said containers while said containers are restrained from rotation, operation of the conveyor serving to advance the containers in adjusted angular position past said adhesive applicators, the label magazine, and the pressure members.

4. In a label applying machine: means forming a conveyor for the containers to be labeled; means for rotatably mounting the containers in spaced relation on the conveyor; a pair of opposed adhesive applicators respectively on opposite sides of the conveyor for simultaneously contacting opposite surfaces of said containers, means restraining rotation of said containers while contacting said applicators; means for imparting a predetermined angular rotation to the container after passage between said applicators; a pair of adhesive applicators in staggered relation respectively on opposite sides of the conveyor, engageable successively by said container during said rotary movement and after said movement; a label magazine on one side of the conveyor; means for rotating said container to bring a salient zone thereon adjacent the leading end of said magazine and to rotate thereafter a predetermined amount such as to cause a label to be wrapped about the container; pairs of pressure members respectively on opposite sides of said conveyor; and means operable only when said containers are intermediate said pairs for imparting predetermined angular rotation to the containers.

5. In a labeling machine: means forming a conveyor for advancing containers to be labeled; pairs of adhesive applicators on opposite sides of the conveyor respectively; means for applying labels about successive containers; a pair of oppositely disposed pressure rolls between which the containers pass after application of the label; means resiliently urging said rolls toward each other to exert flattening and smoothing pressure on the label; brake means for restricting rotation of said rolls, means operable only while said containers are advanced between said applicators and said pressure rolls for rotating said containers, and means restraining rotation of said containers while the containers pass between said applicators as well as while the containers pass between said rolls.

6. In a labeling machine: pairs of oppositely disposed adhesive applicator rolls, a label magazine, and pairs of oppositely disposed rollers for smoothing and pressing the label; a movable conveyor element extending between the rolls and rollers of each of said pairs, and past said magazine, a container chuck rotatably mounted on said element and including a gear wheel; spaced rack sections engageable by said gear for imparting intermittent rotation to said chuck as it is advanced by said element, and means restraining rotation of said chuck during advance of said chuck between said rolls as well as during advance of said chuck between said rollers.

7. In a labeling machine: means forming a conveyor for advancing containers to be labeled: means for intermittently rotating said containers; pairs of adhesive applicators on opposite sides of the conveyor respectively; means restraining said containers from rotation as said containers pass between said applicators means for applying labels about successive containers, each of said labels having an overlapping portion; a pair of oppositely disposed pressure rolls between which the containers pass after application of the label; means resiliently urging said rolls toward each other to exert flattening and smoothing pressure on the label; means restraining said containers from rotation as they pass between said pressure rolls brake means for restricting rotation of at least one of said rolls; and a pressure roll for engaging said containers while rotating and advancing after flattening and smoothing of the label for adhering said overlapping portions.

8. In a labelling machine, means forming a conveyor for advancing containers to be labelled, pairs of adhesive applicators on opposite sides of the conveyor; means for applying labels about successive containers, means for rotating the containers as they are advanced by said conveyor, a pair of oppositely disposed pressure rolls positioned to simultaneously contact opposite surfaces of the containers, means urging said rolls toward each other, means including a pressure roll positioned to engage said containers after the containers are advanced past said pair of pressure rolls, means for restraining said containers from rotation as said containers pass between a pair of said adhesive applicators, and means for restraining said containers from rotation while said containers are in contact with said pair of pressure rolls.

9. In a labelling machine, means forming a conveyor

for advancing containers to be labelled, pairs of adhesive applicators on opposite sides of the conveyor respectively; means for applying labels about successive containers, means for rotating the containers as they are advanced by said conveyor, means restraining rotation of asid containers as they pass between at least one of said pairs of applicators, a pair of oppositely disposed pressure rolls positioned to simultaneously contact opposite surfaces of the containers, means urging said rolls toward each other, means including a pressure roll positioned to engage said containers after the containers are advanced past said pair of pressure rolls, and resilient means urging said last named roll for contacting the containers.

10. In a labelling machine, means forming a conveyor for advancing containers to be labelled, pairs of adhesive applicators on opposite sides of the conveyor respectively; means for applying labels about successive containers, means for rotating the containers as they are advanced by said conveyor, means restraining rotation of said containers as they pass between said applicators, a pair of oppositely disposed pressure rolls positioned to simultaneously contact opposite surfaces of the containers, means urging said rolls toward each other, means restraining rotation of said containers while they contact said pressure rolls, means including a pressure roll positioned to engage said containers after the containers are advanced past said pair of pressure rolls, and a brush opposed to said last named roll for contacting the containers as they contact the last named roll.

11. In a labelling machine, means forming a conveyor for advancing containers to be labelled, pairs of adhesive applicators on opposite sides of the conveyor respectively; means for applying labels about successive containers, means for rotating the containers only after advance thereof between at least one of said pairs of applicators, a pair of oppositely disposed pressure rolls positioned to simultaneously contact opposite surfaces of the containers, means urging said rolls toward each other, means including a pressure roll positioned to engage said containers after the containers are advanced past said pair of pressure rolls, a brush opposed to said last named roll for contacting the containers as they contact the last named roll, and means urging said last named roll toward said brush.

12. In a label applying machine: means forming a conveyor for advancing containers to be labeled; a pair of opposed adhesive applicators between which the conveyor passes; means intermittently rotating said containers; a second pair of adhesive applicators in staggered relation respectively on opposite sides of the conveyor; means restraining said containers from rotation as they pass between said first mentioned pair; a pair of backing members in staggered relation respectively on opposite sides of said conveyor disposed to contact the surfaces of the containers opposite the surfaces contacted by said staggered applicators; means restraining rotation of said containers after the containers pass one of the applicators of said staggered pair; a label magazine on one side of the conveyor; an adhesive applicator on the opposite side of the conveyor intermediate the ends of the magazine; and pairs of opposed pressure members on opposite sides of the conveyor respectively, operation of said conveyor serving to advance the containers successively past said adhesive applicators, the label magazine, and said pressure members.

13. In a label applying machine: means forming a conveyor for advancing and intermittently rotating containers to be labeled; pairs of adhesive applicators on opposite sides of the conveyor respectively; means supporting each applicator for universal movement, means resiliently urging said adhesive applicators toward each other; a label magazine on one side of the conveyor; an adhesive applicator on the opposite side of the conveyor from said magazine; pressure members on opposite sides of the conveyor, and means resiliently urging said pressure members toward each other, operation of the conveyor serving to advance the containers successively past said adhesive applicators, the label magazine, and said pressure members.

14. In a labelling machine, pairs of adhesive applying rolls, a conveyor for successively advancing containers to be labelled between the rolls of each pair, the rolls of each pair having circumferential adhesive applying portions, the adhesive applying portions on each pair of rolls being disposed for applying adhesive to a different area of successive containers between the upper and lower surfaces of the containers, means for resiliently urging the rolls of each pair toward one another, means for applying labels about successive containers, oppositely disposed pressure rolls between which the containers are advanced from said label applying means, means for turning the containers as they are advanced, means restraining rotation of said containers as they pass between rolls of at least one of said pairs, and means restraining rotation of said containers as they pass between said pressure rolls.

15. In a labelling machine, pairs of adhesive applying rolls, a conveyor for successively advancing containers to be labelled between the rolls of each pair, the rolls of each pair having circumferential adhesive applying portions, the adhesive applying portions on each pair of rolls being disposed for applying adhesive to a different area of successive containers between the upper and lower surfaces of the containers, the rolls of one of said pairs being spaced apart in the direction of advance of the containers, means mounting each of said rolls for universal movement, means for resiliently urging the rolls of each pair toward one another, means for applying labels about successive containers, oppositely disposed pressure rolls between which the containers are advanced from said label applying means, and means for turning the containers as they are advanced between the pairs of rolls.

16. In a labelling machine, pairs of adhesive applying rolls, a conveyor for successively advancing containers to be labelled between the rolls of each pair, the rolls of each pair having circumferential adhesive applying portions correspondingly spaced apart thereon, the adhesive applying portions on each pair of rolls being disposed for applying adhesive to a different area of successive containers between the upper and lower surfaces of the containers, means for resiliently urging the rolls of each pair toward one another, means for applying labels about successive containers, oppositely disposed pressure rolls between which the containers are advanced from said label applying means, means for turning the containers as they are advanced between the pairs of rolls, means spaced in the direction of advance of said containers for successively restraining the containers from rotation.

17. In a labelling machine, a conveyor for advancing containers to be labelled, a plurality of pairs of adhesive applying rolls arranged with the rolls of each pair respectively on opposite sides of the conveyor for contacting opposite surfaces of the containers passing therebetween, said pairs of rolls being spaced in the direction of advance of the containers, means for rotating said containers as they are advanced, means in the path of advance beyond said pairs of rolls for applying labels to successive containers, and means at spaced points along said path restraining rotation of said containers.

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