Aug. 23, 1955 R. E. DOANE ET AL 2,715,975

LABEL APPLYING MACHINES

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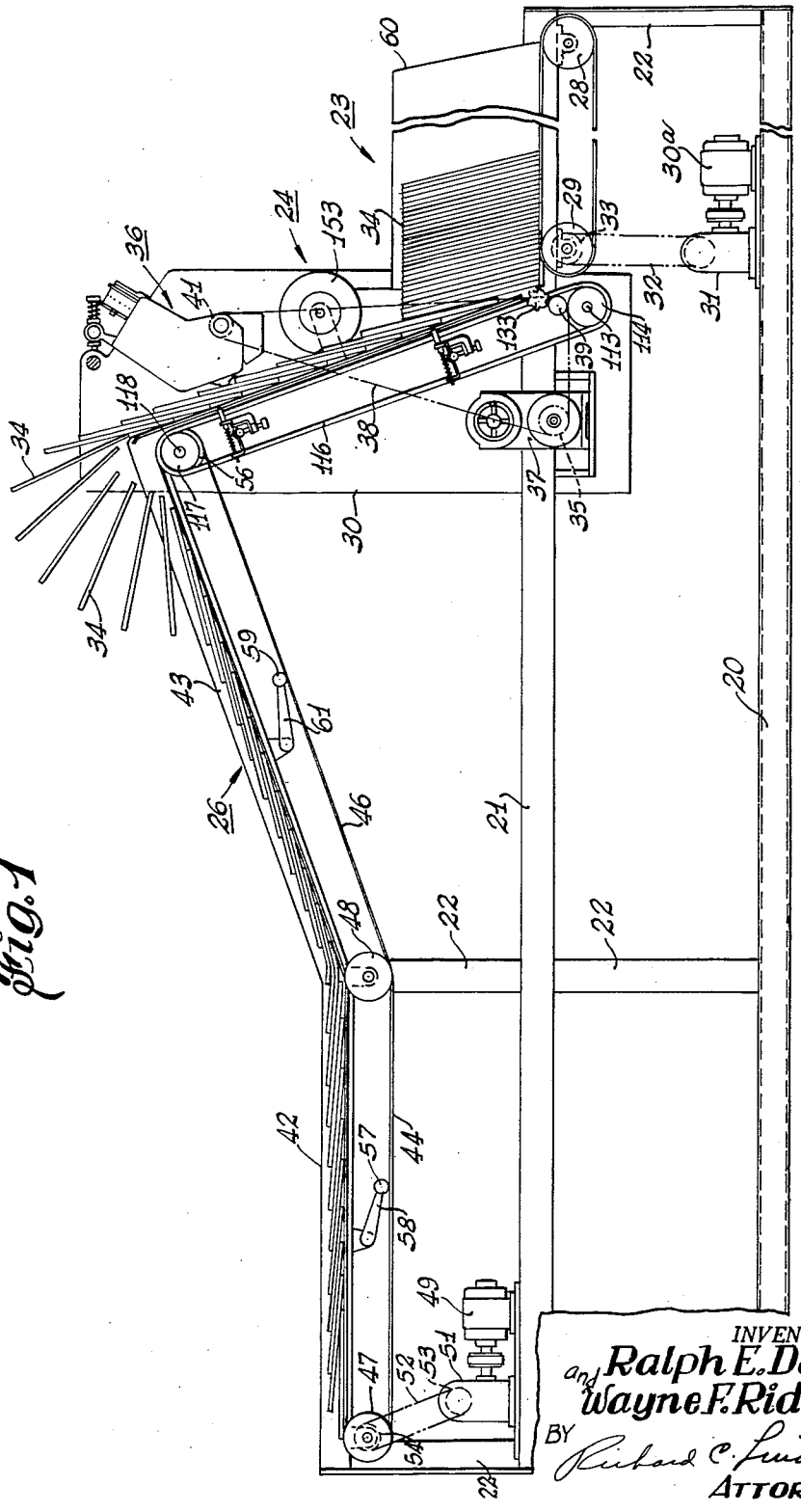

Fig. 1

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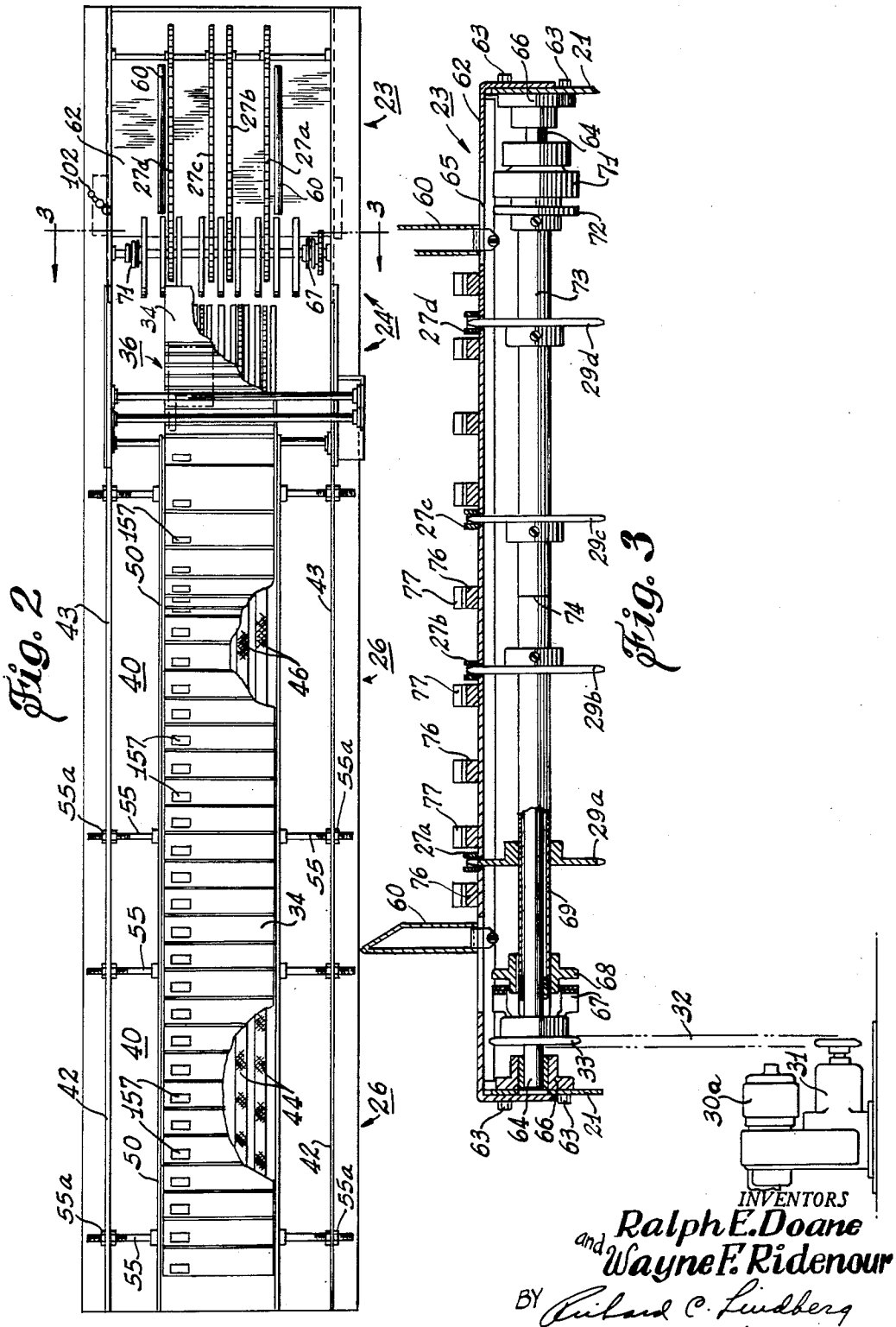

Fig. 2

Fig. 3

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Fig. 4

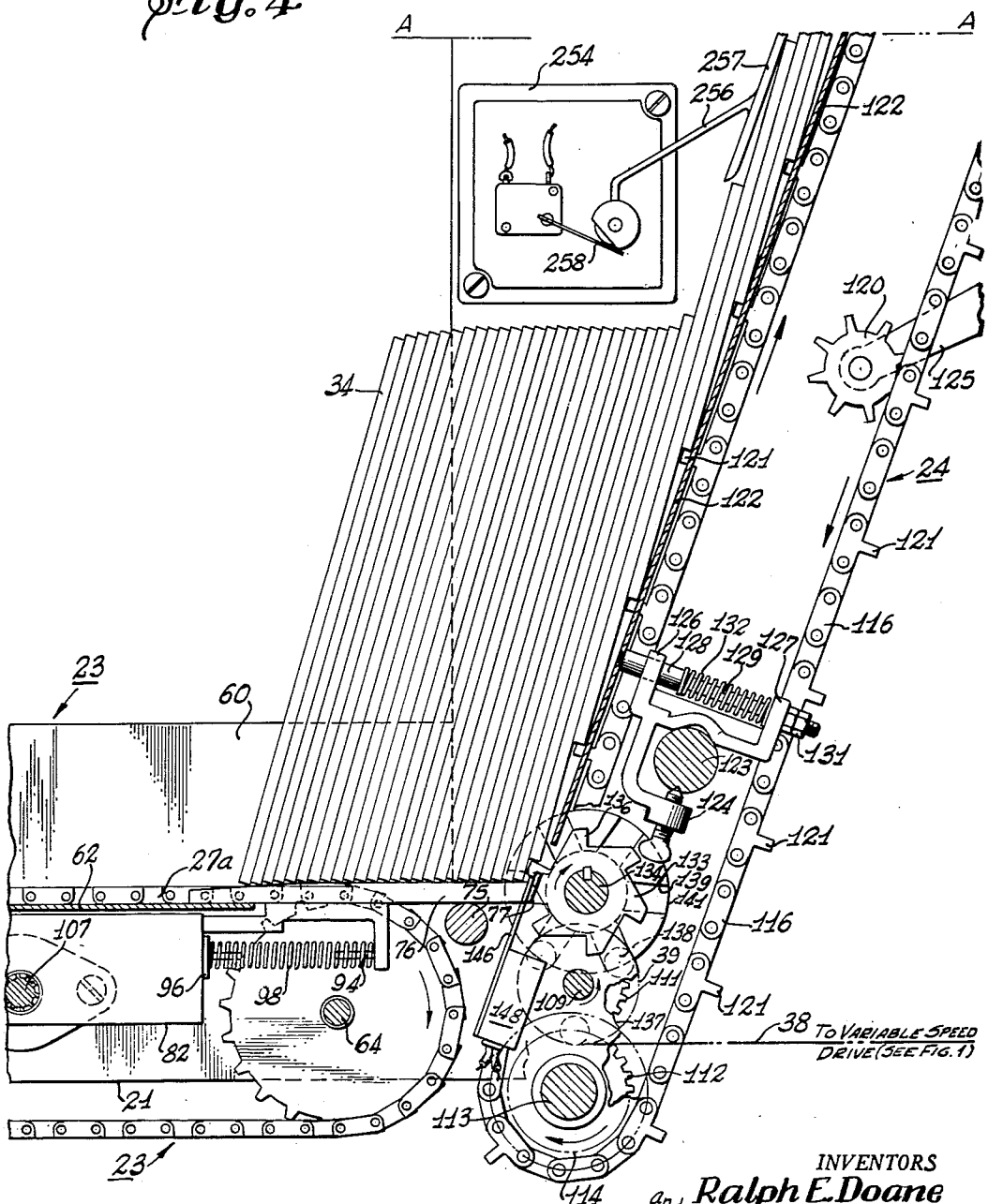

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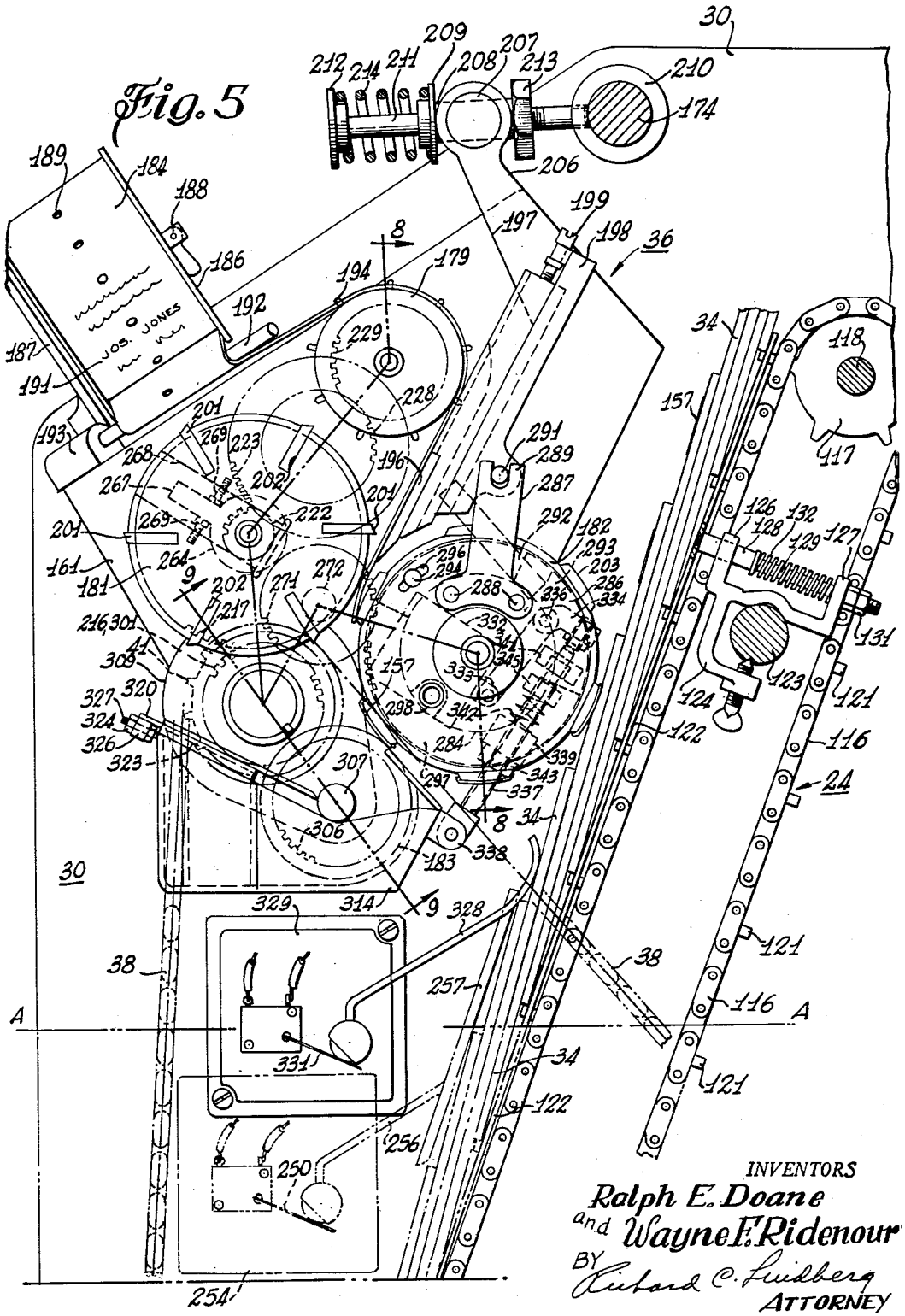
Fig. 5



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LABEL APPLYING MACHINES

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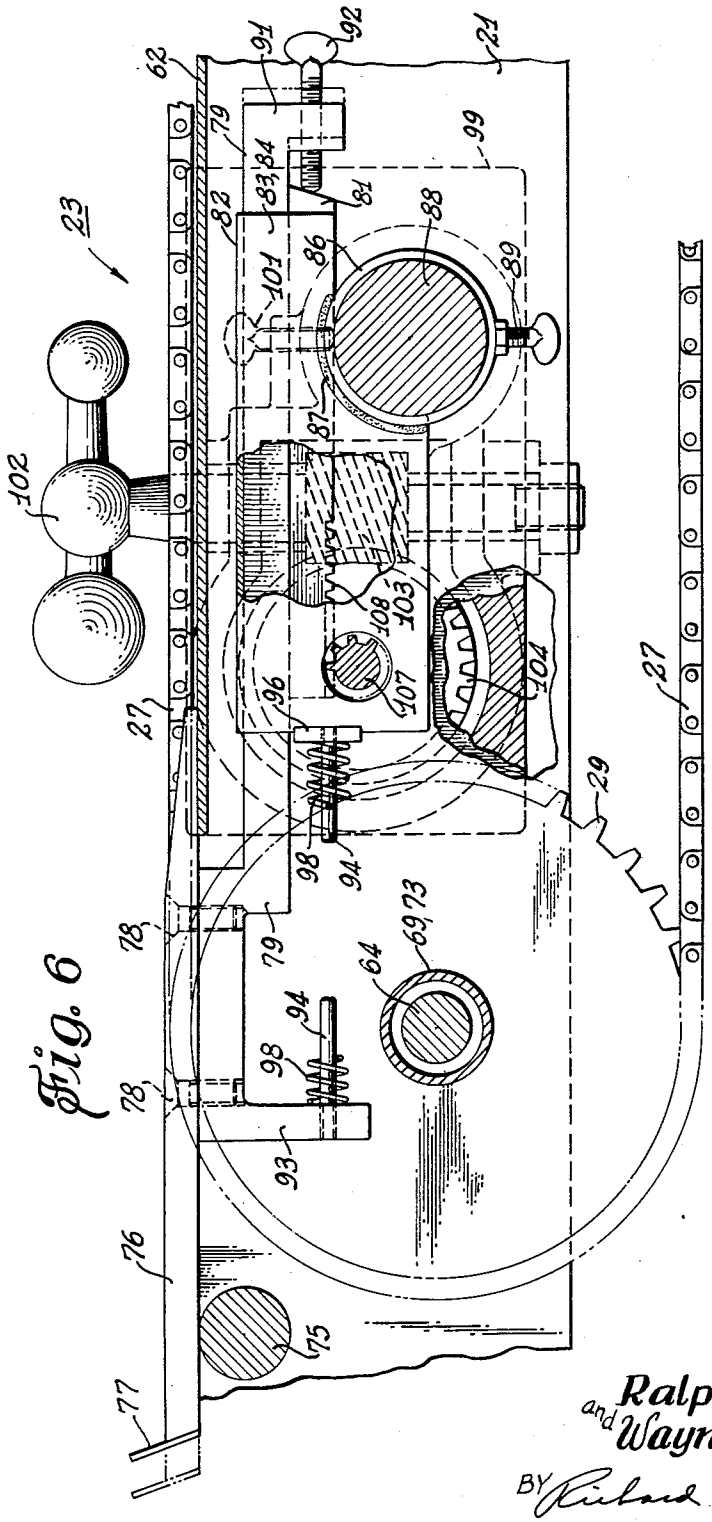

Fig. 6

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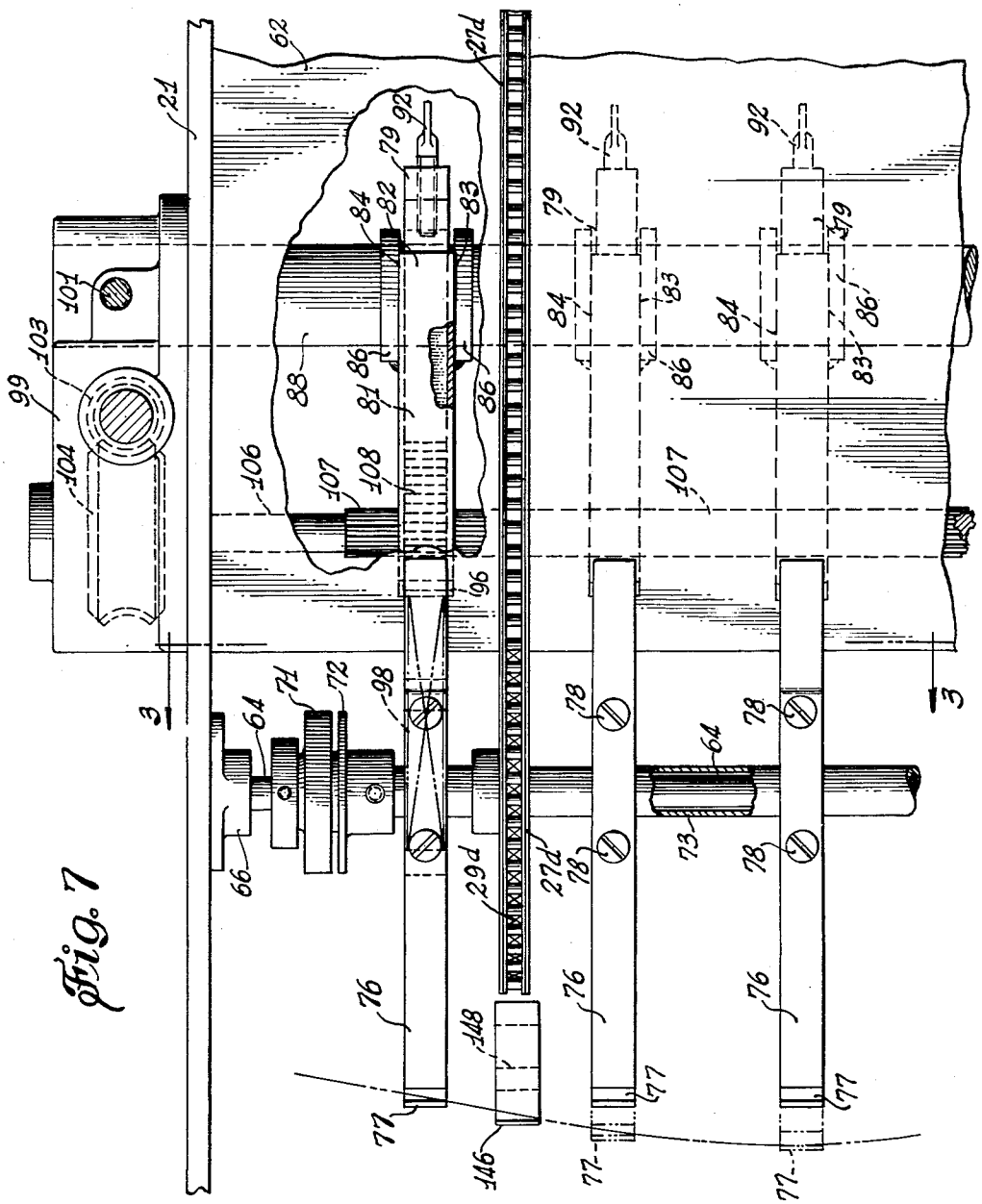

Fig. 7

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LABEL APPLYING MACHINES

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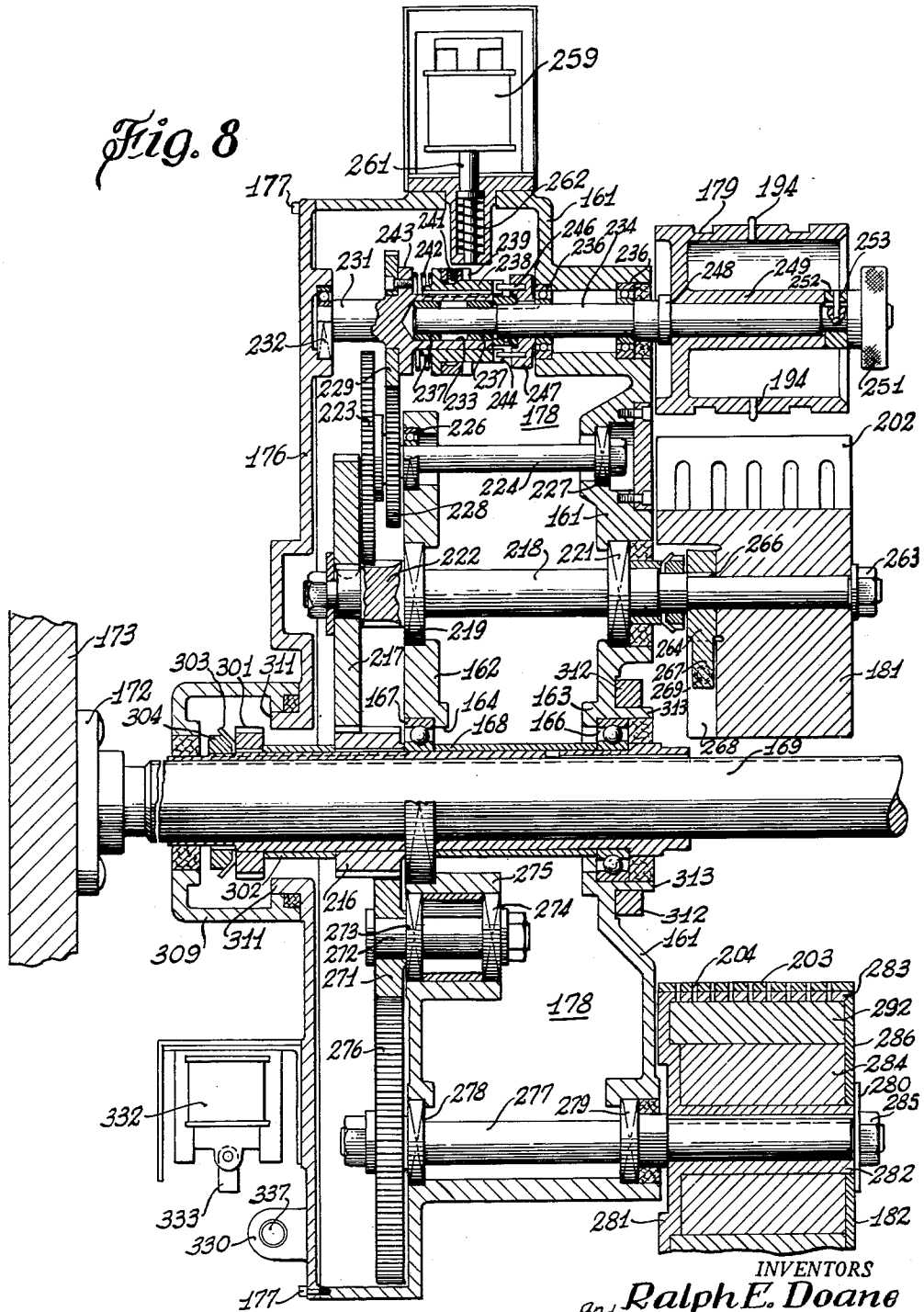
Fig. 8



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LABEL APPLYING MACHINES

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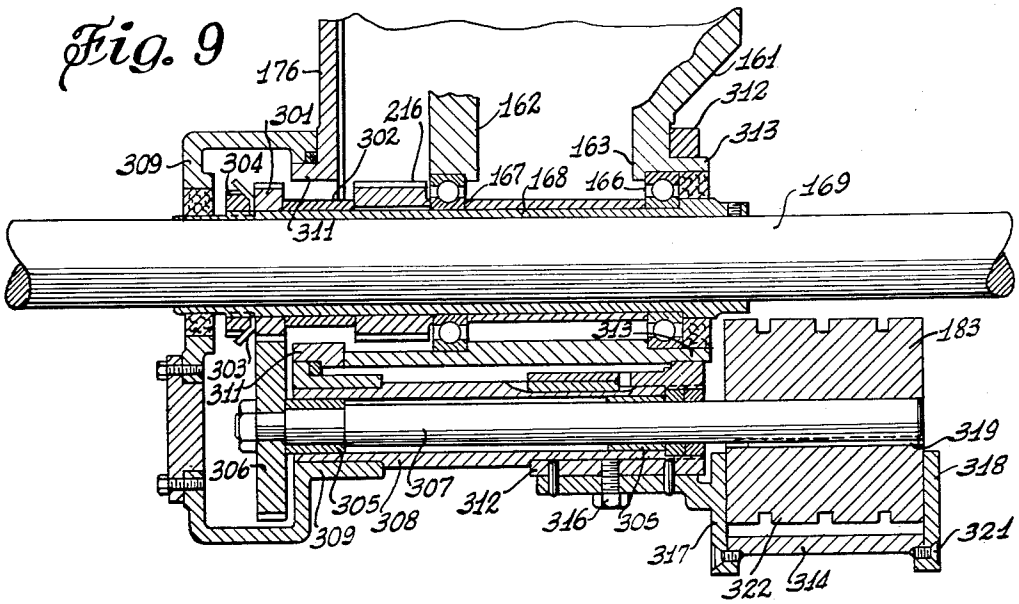
Fig. 9



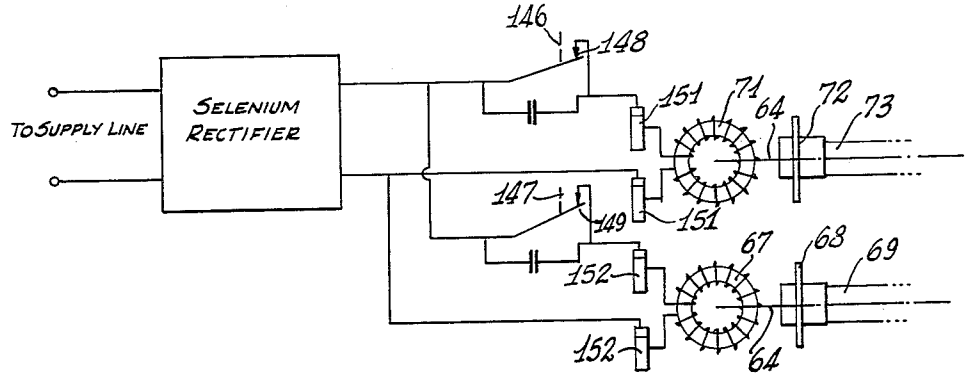


Fig. 11

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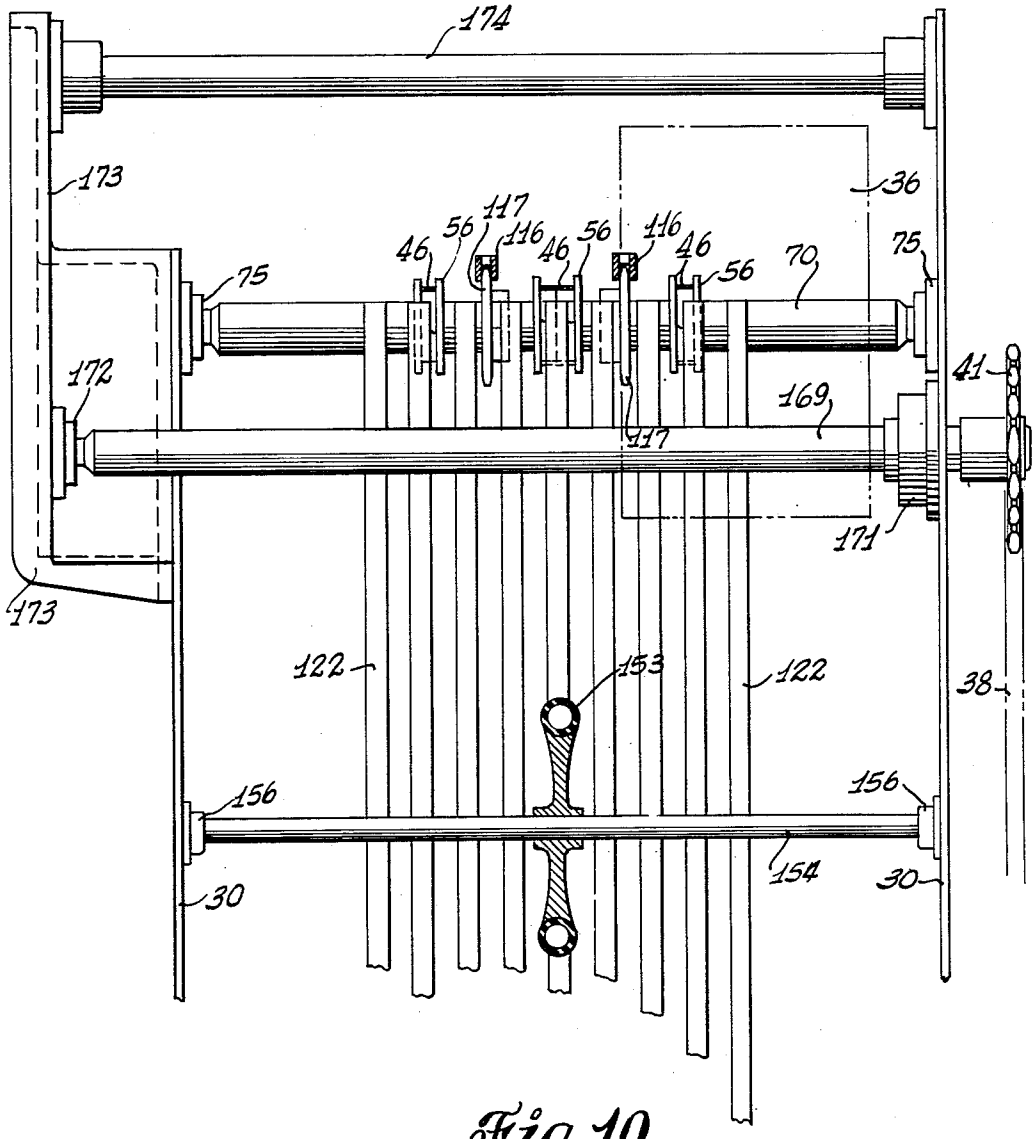

Fig. 10

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United States Patent Office 2,715,975 Patented Aug. 23, 1955

2,715,975

LABEL APPLYING MACHINES

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Application August 23, 1950, Serial No. 181,044

5 Claims. (Cl. 216—28)

This invention relates to improvements in machines for applying a label to a flat article such as a magazine, newspaper, catalogue, flyer or tabloid, and has particular reference to a mailing machine wherein the mailing pieces are fed in partial overlapping relationship to a label applying head.

Heretofore, machines for applying an address label to a magazine or other periodical have been characterized by mechanism for feeding an individual mailing piece on to a chain conveyor having lugs for transporting the mailing piece to a label applying or printed impression head for the application thereto of an address label or printed impression, the mailing piece then being removed from position at the label applying head on to a delivery conveyor. The starting and feeding of each piece was sometimes occasioned by damage to the edges of each mailing piece, and in order to avoid battering of the edges by this method of feeding such machines had to be operated at speeds which were not entirely economical.

The mailing machines of the prior art have sometimes been characterized by a feed hopper for a stack of mailing pieces, a shuttle table having a lug engaging the back edge of the bottom-most mailing piece being employed to feed the bottom-most mailing piece between a pair of feed rollers which moved the mailing piece on to a conveyor bed for transport by lug-bearing chains. The shuttle table and its lug and the feed rollers all had a tendency to mar the exposed surfaces of each magazine or mailing piece. Furthermore, the three and four color work to be found in magazine covers has been accompanied by the use of inks which exhibit a smearing tendency when the magazines have been slipped or fed from a stack at the feeding hopper on to the chain conveyor, and the effort expended in fine color work for the front and back covers of the magazine has sometimes been lost by the smearing arising from the operation of the mailing machines of the prior art.

In lieu of shuttle feeders other arrangements have been employed for feeding the individual mailing pieces to the feed rollers, such as vacuum feeders or needle feeders, all of which had definite limitations as to the weight or thickness of each mailing piece capable of being fed, but irrespective of which kind of feeding arrangement was employed to feed the mailing pieces to the feed rollers, such machines had the additional disadvantage of employing feed rollers with the attendant difficulties recited above.

The mailing machine according to the present invention is preferably characterized by mechanism for moving the magazines or similar flat articles while they are stacked one against another in substantially vertical position thereby reducing the weight of the magazines as would be occasioned by vertically stacking the magazines one on top of another, the magazines being removed from the moving stack in partial overlapping relationship by a lap-feed conveyor for the application to each article or magazine of a label of any suitable kind. The machine according to the present invention is preferably characterized by means for accelerating each magazine in the plane of each

magazine prior to removing each by the lap-feed conveyor, to the end that the lower edge thereof will not be battered by the lap-feed conveyor; and further, to the end that the amount of slipping of one with respect to another will be held to a minimum and thereby avoid the possibility of smearing thereof. The invention may further be characterized by control of the feed mechanism by the removal by the lap-feed conveyor of an individual magazine from the stack, so that at all times the stack is in position for the withdrawal therefrom of individual magazines in partial overlapping relationship.

With the foregoing considerations in mind, it is a principal object of this invention to apply address labels to a magazine or other mailing piece without the necessity of stopping and re-starting each mailing piece for the address label applying operation, to the end that the edges of each mailing piece will not be battered or damaged.

A further object is to afford mechanism for feeding mailing pieces in overlapping relationship with only a small area of each mailing piece exposed sufficiently large in size for applying an address label to such exposed area, so that the amount of slippage of one magazine with respect to another will be held to a minimum to avoid smearing of the color work thereon.

Still another object is to feed the magazines in such overlapping relationship that the speed of travel of each magazine is reduced to a minimum, yet providing an hourly or daily production which is as great or greater than possible heretofore.

Yet another object is to provide mechanism for accelerating each mailing piece from rest up to the speed of a lug-bearing conveyor chain to the end that each piece will not be damaged by the conveyor lugs.

Other objects and important features of the invention will be apparent from a study of the following description taken together with the drawings which together illustrate a preferred embodiment of the invention and what is now considered to be the best mode of applying the principles thereof. However, the invention is not intended to be limited by the embodiment herein disclosed, and the scope of the invention is intended to be limited only by the spirit and breadth of the appended claims.

In the drawings:

Figure 1 is a general front view of a lap-feed label applying machine according to the present invention;

Figure 2 is a general plan view thereof, the position of the mailing head for applying the address labels being shown in phantom outline.

Figure 3 is a view taken along the line 3—3 of Figure 2 and along the line 3—3 of Figure 7, looking in the direction of the arrows, showing the clutching and driving mechanism for the feed shelf conveyor;

Figure 4 is a substantially back elevation view of the lower portion of the lap-feed conveying mechanism, and the forward-most portions of the feed shelf and the feed shelf conveyor, looking from the back of the machine to the front as seen in Figure 1;

Figure 5 is a view similar to Figure 4, showing the upper portion of the lap-feed mechanism and details of the rotary label applying head, Figures 4 and 5 being capable of being matched along the line A—A in Figures 4 and 5;

Figure 6 is an enlarged partly elevational and partly sectional view of a portion of the feed shelf and the feed shelf conveyor for delivering mailing pieces to the lap-feed conveying mechanism, and showing details of the adjusting mechanism for the stop fingers of the feed shelf;

Figure 7 is a plan view of a portion of the feed shelf and the feed shelf conveyor, certain parts being broken

away to show details of the adjusting mechanism for the stop fingers;

Figure 8 is a section taken along the line 8—8 of Figure 5 showing details of construction of the label applying head for applying a pasted and severed address label to a mailing piece being conveyed by the lap-feed conveyor of Figures 4 and 5;

Figure 9 is a section taken along the line 9—9 of Figure 5 showing details of the mechanism for swinging the paste roller away from the label applying roller, details of the paste reservoir also being shown;

Figure 10 is a detailed side elevation view of a portion of the lap-feed conveying mechanism looking from the right to the left as seen in Figure 1, the position of the label applying head being shown in phantom outline; and

Figure 11 is a circuit diagram for controlling the magnetic clutches shown in Figure 3.

General description of machine

Referring now to Figures 1 and 2 of the drawings, the mailing machine according to the present invention is supported on a framework consisting of longitudinally extending base members **20**, a pair of horizontal frame members **21** which are spaced above the base members **20**, and which are connected together by vertical frame members **22**. The framework thus far described provides a support for a feed shelf **23**, a lap-feed conveyor **24**, and a delivery conveyor **26**.

The feed shelf **23** is provided with a conveyor **27** in the form of a plurality of block chains which travel around sprockets indicated generally as a group at **28** and **29**, sprockets **29** being driven by a motor **30***a* through a variable speed drive **31**, the speed drive **31** being connected by a chain **32** to turn a drive sprocket **33**, see also Figure 3.

The conveyor chains **27** are each designated by the numbers **27***a* to **27***d* and are adapted to move a plurality of articles **34**, such as magazines or other flat articles on to the lap-feed conveyor **24**, whence they are moved in partial overlapping relationship with respect to each other past a label applying head indicated generally at **36** which is supported, as will be described in more detail as this specification proceeds, upon a pair of vertical support plates **30**, see also Figure 10. It will be noted that the articles **34** are stacked against the lap-feed conveyor **24**, each of the articles **34** resting upon a lower edge thereof and inclined slightly from the vertical so that the foremost of the articles will tend at all times to bear against the lap-feed conveyor **24**. A motor and variable speed drive **37** drives a chain **38** which is trained around sprockets **39** and **41** to drive the lap-feed conveyor **24** and the label applying head **36** in perfect synchronism. As seen generally in Figure 1, the lap-feed conveyor is inclined from the vertical, and thereby moves the articles **34** in partial overlapping relationship in a generally upward direction from the feed shelf **23**.

The label applying head **36** is adapted to apply a label, such as the perforated address label employed in the mass mailing of nationally circulated periodicals or the like, upon each article **34**, whence each article **34** is moved by the lap-feed conveyor **24** on to the delivery conveyor **26**. The delivery conveyor includes pairs of spaced angles **42**, **43** which are connected by a pair of web plates **40**, see Figure 2, to provide a flat bed and support for a number of conveyor belts **44** and **46**. As shown in Figure 1, the angles **42** are supported at each end upon the vertical standards **22**, while the angles **43** are supported at the left end upon one of the vertical standards **22** and at the right end upon the side frame plates **30**. The conveyor belts **44** are trained around drive pulleys **47** and idler pulleys **48**, and power is supplied to drive the belts **44** by a motor **49** and a variable speed drive **51** connected by a drive chain **52** which is trained around sprockets **53** and **54**. The belts **46** are trained around the idler pulleys **48** and idler pulleys **56**

supported on an idler shaft **70** journaled at **75** to the side frames **30**, see Figure 10. The belts **44** are adjusted in tension by idler pulleys **57** mounted at the end of an arm **58** pivoted from the underside of the angles **42**, and the tension of the belts **46** is likewise adjusted by tension idler pulleys **59** mounted at the end of an arm **61** also pivoted to the underside of the angles **43**. The articles **34** which are moved by the delivery conveyor **26** may be suitably guided by side guide plates **50**, see Figure 2, which are adjusted according to the width of the articles **34** by spacer bolts **55** which are locked in position by adjusting nuts **55***a* bearing against the vertical legs of the flanges **42** and **43**.

It will be seen from the description thus far that the articles **34** will be fed by the conveyor chains **27** of the feed shelf **23** on to the lap-feed conveyor **24**, where they are labeled individually by the label applying head **36**, the articles then being fed by the lap-feed conveyor **24** onto the delivery conveyor **26**.

Details of feed shelf and feed conveyor

Referring now particularly to Figures 2, 3, 4, 6 and 7 of the drawings, the feed shelf **23** includes a channel shaped plate member **62** which overlies the vertical legs of the side frames **21**. As shown in Figure 3, the channel member **62** is held in place by cap bolts **63**. The plate **62** thus provides a support for the group of conveyor chains **27** which are of the block type in order to present a substantially smooth surface to the underside of the articles **34**.

As shown also with respect to Figures 2 and 3, the magazines or flat articles **34** are moved on block chains **27***a* to **27***d* inclusive, between side guides **60** which are capable of being adjusted according to the width of the magazines **34** in transverse slots **65**, any suitable means being provided for holding the side guides **60** to the plates **62**.

As shown in Figure 3, the drive sprocket **33** for the feed chains **27***a* to **27***d* is fast upon a shaft **64** which turns in a journal **66** held to the side frames **21** by the cap bolts **63**. Sprocket **33** turns with a magnetic clutch **67** which cooperates with a moving clutch member **68** having a sliding key fit with a hollow shaft **69** encircling the shaft **64**. A magnetic clutch **71** is mounted on the other end of the shaft **64** adjacent the opposite side frame **21** and cooperates with a moving clutch member **72** which has a sliding key fit with a second hollow shaft **73**, the hollow shafts **69** and **73** abutting each other as at **74**. The moving clutch member **68** is adapted to move into clutching engagement with the magnetic clutch **67** to drive sprockets **29***a* and **29***b* and their associated block chains **27***a* and **27***b*. Likewise, the moving clutch member **72** is adapted to move into clutching engagement with the magnetic clutch **71** to drive the sprockets **29***c* and **29***d* together with their associated block chains **27***c* and **27***d*.

The articles **34**, which are moved by the block chains **27***a* to **27***d* inclusive, are adapted to move along adjustable stop bars **76** having stops **77** fastened to the ends thereof, see also Figures 4, 6 and 7. The adjustable stop bars **76** together with their stops **77** are capable of being adjusted longitudinally with respect to each other to define a curve in the articles **34** as they move along the feed shelf **23**. The stops **77** will thus provide a curved cross-section through each of the articles when such cross-sections are taken on a horizontal plane. The stop bars **76** and the stops **77** may likewise be moved together as a unit to adjust the position of the first one of the articles **34** with respect to the lap-feed conveyor **24**. To this end each of the adjustable stop bars **76** is held by screws **78** to a stop bar mounting **79**. As shown in Figure 6, the adjustable stop bars **76** may also be supported on a tie bar **75** holding the frames **21** in spaced-apart relationship. The stop bar mounting **79** in turn rests upon an individually movable rack bar **81**, and the stop bar mounting **79** and the rack bar **81** are held for movement within a stop bar guide **82** having vertically

depending limbs **83**, **84**, see also Figure 7. A ring **86** is brazed to the depending limbs **83** and **84**, as at **87**, and each guide **82** is held in position to a tie bar **88** spacing the said side frames **21**, **21** by means of a set screw **89** threaded into each ring **86** and bearing against the tie bar **88**.

As seen with particular reference to Figure 6, each stop bar mounting **79** is formed with a downward extending arm **91** which forms a support for an adjusting screw **92** adapted to bear against the right end of the rack bar **81**. The other end of the stop bar mounting **79** is likewise formed with a downward extending arm **93** having a spring guide **94** mounted thereon. An abutment **96** is welded to the forward end of the stop bar guide **82** and is provided with a similar spring guide **97**, a spring **98** being held between the abutment **96** and the arm **93**. The spring **98** is of the compression type and tends to move the abutment **96** and the arm **93** apart. It will be seen that the position of each stop bar **76** and the stop bar mounting **79** may be suitably adjusted with respect to the rack bar **81** by turning the adjusting thumb screw **92** as desired.

Referring also to Figure 7, a housing **99** is bolted to the outside face of one of the side members **21** and a set screw **101** engages the tie bar **88** which extends through the side frame **21** and into the housing **99**. The housing **99** affords a support for a ball crank **102** and a worm **103** turned thereby. A worm wheel **104** is turned by the worm **103** and is fast upon a pinion shaft **106** having a long pinion **107** integral therewith. The pinion **107** meshes with rack teeth **108** formed on the underside of each of the rack bars **81**, and it will be seen that by rotating the ball crank **102** the stop bars **76** may be moved to the left or the right, as seen in Figures 6 and 7, as a unit, thereby adjusting the position of the first article **34** with respect to the lap-feed conveyor mechanism **24**.

Details of lap feed conveyor mechanism

Referring now to Figures 1, 4, 5 and 10, the lap feed conveyor **24** is driven by the endless chain **38** which is trained around sprocket **35** of the adjustable speed driving mechanism **37**, the sprocket **39**, and the label head sprocket **41**. The sprocket **39** is fast upon a shaft **109**, see Figure 4, journaled in the side frames **30**. A gear **111**, also fast upon the shaft **109**, meshes with a gear **112** fast upon a shaft **113** journaled in the side frames **30** at the lower end of the lap feed conveyor **24**. A pair of drive sprockets **114** are fast on the shaft **113**, and conveyor chains **116** are trained around the sprockets **114**. The sprocket chains **116** are spaced from each other as shown in Figure 10, and turn upon idler sprockets **117** mounted on the idler **70** which journals in bearings **75** to the side frames **30** adjacent the upper end thereof, see also Figure 5. As shown in Figure 4, the chains **116** may be suitably adjusted in tension by swinging idler sprockets **120** mounted on an arm **125** which is adjusted with respect to the side frames **30**. The conveyor chains **116** are provided with evenly spaced lugs **121**, which are of a height sufficient to engage each article or magazine **34** as it is fed by the feed shelf conveyor chains **27***a* to **27***d*, inclusive, toward the lap-feed conveyor chains **116**.

As shown in Figure 10, the articles **34** are supported on flat resilient metal strips **122** which provide a resilient bed for the articles **34** as they move along the lap feed conveyor **24**. As shown in Figures 4 and 5, the side frames **30** are properly spaced by tie rods **123**, and the metal strips **122** are resiliently supported on brackets **124** secured to the tie rods **123**. The brackets **124** include a pair of spaced arms **126**, **127**, and the arm **126** is drilled to receive a pin **128** which is tapped into the spaced strips **122**. The pin **128** has a portion of reduced diameter **129** which is fitted into a drilled hole in the arm **127**. The reduced end **129** of the pin **128** is provided with a pair of stop nuts **131**, and a spring **132** is bottomed at one end on the arm **127** and at other end on the pin **128**. It will be apparent that the strips **122** may be permitted to yield slightly against the force of the spring **132**, and according to the pressure applied by the label applying head **36** against the articles as they move in partial overlapping relationship on the lap-feed conveyor **24**.

It will be noted that the strips **122** may be individually adjusted on each of the brackets **124** so that a desired amount of curvature may be introduced into each mailing piece **34** while being conveyed, and also so that the amount of projection of the lugs **121** between the strips **122** may be varied as desired.

Means are provided for accelerating individual articles which have been moved along the feed shelf **23** by the feed shelf conveyor chains **27***a* to **27***d*, inclusive, to the speed of the conveyor chains **116**, so that the lugs **121** thereof will not batter nor injure the edges of the articles **34**. To this end a star wheel **133** is keyed to a shaft **134** journaled in the side frame plates **30**. The star wheel **133** is provided with teeth **136** which engage each individual mailing piece **34** and accelerate each from a position of rest to a speed corresponding to the speed of the lugs **121**, so that at the time the lugs **121** will have engaged the lower edge of the individual article **34** its speed will have been brought up to that of the lugs **121**. The star wheel **133** is given an intermittent motion by means of a Geneva stop motion which includes a Geneva crank **137** made fast to the shaft **109**. The Geneva crank **137** has three evenly spaced crank pins **138** which move in slots **139** of a Geneva wheel **141**, also fast to the shaft **134** supporting the star wheel **133**. The Geneva wheel **141** is adapted to be intermittently rotated by the engagement of one of the crank pins **138** in one of the slots **139** to provide an intermittent motion of the Geneva wheel **141** which varies from a position of rest to a maximum angular velocity and then back to a position of rest, the action being repeated by the engagement of a succeeding crank pin **138** with a succeeding slot **139** in the Geneva wheel. The teeth **136** of the wheel **133** are so disposed with reference to the slots **139** of the Geneva wheel that when the teeth **136** have achieved their maximum velocity by the action of the Geneva stop mechanism, the lugs **121** will at such time of maximum velocity of the star wheel **133** engage the article or magazine **34**.

Feed shelf conveyor control mechanism

Referring now to Figures 3, 4, 7 and 11, mechanism is provided for controlling the movement of the articles **34** on the conveyor chains **27***a* to **27***d*, and so that the conveyor chains **27***a* to **27***d* are controlled by the presence of an article **34** which is in position for removal from the feed shelf **23** by the lugs **121** of the lap-feed conveyor chains **116**. That is to say, the feed conveyor chains **27***a* to **27***d* are moved by the action of the articles **34** in being removed by the lugs **121** of the lap feed conveyor chains **116**. To this end sensing fingers **146**, **147** are placed adjacent the extreme side-most stop fingers **77**. The sensing fingers **146** and **147**, see Figure 11, cooperate respectively with switches **148**, **149**, switch **148** only being shown in Figure 4. The sensing finger **146** is so arranged with respect to the switch **148** that the contact of a mailing piece **34** with the sensing finger **146** causes the switch **148** to open. As seen in Figure 11, the switch **148** is connected in circuit with a selenium rectifier and with a slip ring **151** to supply power to the winding of the magnetic clutch **71**. The switch **149**, which is actuated by the sensing finger **147**, is likewise connected in circuit with the selenium rectifier to supply power to slip rings **152** to the winding of the magnetic clutch **67**. It will be remembered, see Figure 3, that the magnetic clutch **71** controls the movement of the sprockets **29***c* and **29***d* to operate the chains **27***c* and **27***d*, and it likewise will be remembered that the magnetic clutch **67** controls the rotation of the sprockets **29***a* and **29***b* and the operation of the chains **27***a* and **27***b*.

The stop fingers **77**, which are so disposed with refer-

ence to the lap feed conveyor chains **116**, are arranged to give a desired amount of curvature to the articles or magazines **34**, and in order to maintain the curvature of the magazines as they are moved by the feed shelf conveyor chains **27***a* to **27***d*, the sensing fingers **146** and **147** are thus adapted to control the movement of the conveyor chains **27***a* to **27***d* to maintain such curvature, and to position the magazines **34** for removal by the lugs **121** of the lap feed conveyor chain **116**. Thus, when the switch **148** is closed by the movement of the first of the magazines **34** by the medium of the star wheel **133** and the lugs **121**, the magnetic clutch **71** will be energized to move the chains **27***c* and **27***d*. Likewise, when the switch **149** is closed by the removal of the first of the magazines **34** by the medium of the star wheel **133** and the lugs **121** of the conveyor chains **116**, the winding of the clutch **67** will likewise be energized to cause the conveyor chains **27***a* to **27***b* to be moved. Since the magazines **34** must at all times be in position against the flexible strips **122** and against the stops **77** for engagement by the lugs **121**, the magnetic clutches **67** and **71** will be energized with pulses of current as may be determined by the closing of the switches **148** and **149**. Thus at all times the desired curvature of the magazines **34** will be maintained to insure that the lugs **121** will engage a lower edge of each of the magazines as they are advanced by the chains **27***a* to **27***d* along the feed shelf **23**.

In the case where magazines are fed along the feed shelf, the stitched or folded edge is thicker than the cut or trimmed edges, and in order to maintain the proper feed, the pair of chains nearest the folded edge will be required to move through a greater distance for each magazine than the other pair of chains. Such differential movement of each pair of chains is of course irrespective of whether any desired curvature is made in each.

General description of label applying mechanism

The articles **34** which are thus removed from the feed shelf **23** are conveyed in a generally vertical direction by the lap feed conveyor **24**, see Figure 1, and are adapted to pass under a flexible roller **153** supported on a shaft **154** held in adjustable journals **156** on the side frames **30**. The resilient roller **153** is thus adapted to override the articles **34** as they move in partial overlapping relationship along the adjustable strips **122** of the lap feed conveyor **24**, in such a fashion as to place a slight amount of pressure thereon.

Referring now to Figures 5, 8 and 9 of the drawings, the articles which have been moved along the lap-feed conveyor **24** in partial overlapping relationship with respect to each other then move past the label applying head **36**, see also Figure 1, for the application to each individual article of a severed and pasted label **157**, see also Figure 2. As shown in Figures 5, 8, and 9, the label applying head **36** includes a main frame **161** having a rib **162** formed therewith. The main frame housing **161** and the rib **162** are provided with supports **163** and **164** for bearings **166** and **167**. The bearings **166** and **167** are supported on a sleeve **168** which is keyed to a shaft **169** journaled at one end in a bearing **171** in one of the side frames **30** and journaled at the other end in a bearing **172** supported on a bracket **173** supported by the other side frame **30**, see Figure 10. The bracket **173** is held in proper spaced relationship with respect to the other side frame **30** by a tie bar **174**. As seen also with respect to Figure 10, the shaft **169** is adapted to be turned by the sprocket **41** which is driven by the drive chain **38**.

The frame **161** is closed by a cover plate **176** which is held to the frame at a plurality of points as by cap bolts **177**. The frame **161** and the cover plate **176** thus define a housing **178** for gearing to drive a pin roller **179**, a rotating knife support **181**, a label applying roller **182**, and a paste applying roller **183**, see also Figure 9, to feed, sever and apply paste to individual labels **157** which are supplied from a rolled strip **184** thereof mounted on a supply reel **186** supported on a standard **187** and a spindle **188** secured to the frame **161** in any convenient manner. As seen in Figure 5, the strip **184** contains evenly spaced perforations **189**, which lie on either side of appropriate intelligence **191**, as for example the address of a magazine subscriber. The strip **184** is guided around a pin **192** struck out at an angle of 45° to the substantial plane of the housing frame **161**, and supported on an abutment **193** secured in any convenient manner to the upper side of the frame **161**. The strip **184** is guided over the pin roller **179**, and pins **194** extending from the pin roller **179** are arranged to feed the strip **184** around the periphery thereof. The strip **184** is then guided over a stationary knife **196** supported on a gib **197** which is adjustable with respect to a stationary gib support **198** by means of an adjusting screw **199**. The strip **184** which has thus been fed by the pin roller **179**, is moved past the rotating knife support **181**, which has a plurality of knives **201** extending radially from the periphery thereof. As seen in Figure 8, the knives **201** may be held in slots **202** of the knife support **181** in any convenient manner, and it is preferable to adjust the knives **201** in position by means of wedges, not shown. The strip **184** which has been advanced by the pin roller **179** is thus severed by the knives **201** into the individual address labels **157**, as seen in Figure 2, and the individual address labels **157** are then held by suction to a raised pad **203** of the label applying roller **182**. As shown in Figure 8, the raised pad **203** has a plurality of suction openings **204** therein and the suction pressure applied thereto may be achieved by suitable mechanism as shown in an application of Wayne F. Ridenour, Ser. No. 89517, filed April 25, 1949, for Improvements in Mailing Machines, now Patent No. 2,606,681 patented Aug. 12, 1952.

The individual address labels **157** rotate with the label applying roller **182** past the paste applying roller **183** which applies a film of adhesive to the address label. The label **157** and the label applying roller **182** continue their rotation together whereby the severed and pasted label **157** is applied to the mailing pieces which have been fed in partial overlapping relationship by the lap feed conveyor **24**, see particularly Figure 5.

The housing **178** which is defined by the frame **161** and the cover plate **176** is adapted to be rotated as a unit together with the pin roller **179**, the knife support **181**, the label applying roller **182** and the paste applying roller **183** upon the shaft **169** as a turning center, so that the position of the label applying roller **182** may be adjusted to accommodate different thicknesses of the mailing pieces **34**. The housing **178** which is adapted to be rotated about the shaft **169** as a turning center is held in position by an arm **206** extending generally upward therefrom from the frame **161**, see Figure 5. The arm **206** is bifurcated to receive a pin **207** which is cross drilled for a sleeve **208** having a flange **209** extending therefrom. A rod **211** having a head **212** is tapped into a ring **210** supported on the tie bar **174**, and is threaded to hold an adjusting nut **213**. A spring **214** is held between the head **212** and the flange **209** and normally tends to urge the arm **206** against the adjusting nut **213**. It will be seen that the resiliency of the spring **214** allows the housing **178** to move slightly in a counterclockwise direction as seen in Figure 5, to accommodate slight variations in thickness of the articles **34** as they are moved along the lap feed conveyor **24**. It will also be apparent that the nut **213** may be adjusted in position to rotate the frame **178** in either direction in accordance with the average thickness of the mailing pieces **34**.

Details of construction of pin feed roller

Referring particularly to Figure 8, the pin roller **179** is adapted to be rotated in timed relationship to the main drive shaft **169**, and is driven through the medium of a gear train which includes a gear **216** keyed to the sleeve **168** which turns with the shaft **169**. The gear **216** meshes with a gear **217** fast to a shaft **218** supported on a bearing **219** held in the rib **162** and a bearing **221** supported in the main frame **161**. A pinion **222** is fast to the shaft **218** and meshes with a gear **223** fast on an idler shaft **224** which is journaled in a bearing **226** held in the rib **162** and a bearing **227** supported in the frame **161**. A gear **228** is fast on the idler shaft **224** and meshes with a pin wheel drive gear **229** made fast to a strip throw-out shaft **231** turning in a bearing **232** supported in the cover plate **176**. The strip throw-out shaft **231** is counter-bored as at **233** to receive a pin roller drive shaft **234** which is supported on bearings **236** held in the main frame housing **161**, the pin roller drive shaft **234** being additionally supported within the counter-bore **233** of the strip throw-out shaft **231** upon needle bearings **237**.

A driving connection is afforded between the strip throw-out shaft **231** and the pin roller drive shaft **234** and as shown in Figure 8 a flanged sliding throw-out clutch sleeve **238** is slidably keyed to the strip throw-out shaft **231**. A strip throw-out ratchet **239** is fastened by a set screw **241** to the flanged sleeve **238**, and a spring **242** is held between a flange **243** formed on the strip throw-out shaft **231** and the sliding throw-out clutch sleeve **238** to urge the flanged sleeve **238** to the right as seen in Figure 8. The throw-out clutch sleeve **238** is milled with a number of radial slots **244** which correspond in number to the number of ratchet teeth on the ratchet **239**, and which are adapted to be engaged by pins **246** spaced evenly around a stationary clutch member **247** keyed to the shaft **234**. A collar **248** is formed on the shaft **234**, and the pin roller **179** is formed with a hub **249** which bears against the collar **248**, and is held in place by a knurled nut **251** threaded to the end of the shaft **234** and bearing against a collar **252** having a sliding connection to the shaft **234** at a pin key **253**. It should be noted that the number of ratchet teeth on the throw-out ratchet **239** correspond to the number of pins **194** on the pin roller **179**, and that the number of pins **246** in the stationary clutch member **247** likewise correspond to the number of pins **194** on the pin roller **179**. It will be noted that the bias of the spring **242** is in a direction to urge the radial slots **244** into matching engagement with the pins **246** whereby a driving connection will be afforded through the gear train **216**, **217**, **223**, **228** and **229** to drive the pin roller **179** and withdraw the strip **184** from the supply reel **186**.

Means are provided for disengaging the driving connection to the pin roller **179** whereby the throw-out sliding clutch member **238** is moved to the left as seen in Figure 8, when the articles **34** are being moved at irregularly spaced intervals along the lap feed conveyor **24**. Referring now to Figure 5, a switch frame **254** is mounted upon one of the side frames **30**, and is provided with a switch actuator **256** having a sensing finger **257** which will remain in the dotted line position shown when the magazines **34** are being fed at regularly spaced intervals. The sensing finger **257** is of a dimension less than the exposed length of two regularly spaced magazines, so that if the lugs **121** of the lap feed conveyor chain **116** fail to move the magazines at the desired regularly spaced intervals, the sensing finger **257** will rock in a clockwise direction, as seen in Figure 5, to actuate a switch finger **258**. A solenoid **259**, see Figure 8, is secured to the top of the frame **161** of the housing **178** and is provided with a moving armature **261** which is biased to a release position by means of a spring **262**. Upon rocking of the switch fingers **256** and **258** in a clockwise direction, as seen in Figure 5, the solenoid **259** is energized to cause its armature **261** to contact one of the ratchet teeth **239**. Since the ratchet teeth **239** are beveled and rotate with the strip throw-out shaft **231**, the sliding clutch throw-out member **238** will be moved to the left, thereby making the clutching connection between the radial slots **244** and the pins **246** inoperative, thereby causing the pin roller **179** to stop the feed movement of the perforated strip **184**. It will be seen that when the magazines **34** are once more fed at regularly spaced intervals, the switch fingers **256** and **258** will resume their dotted line position as seen in Figure 5 to deenergize the solenoid **259** and cause the armature **271** thereof to be moved upward by the bias of the spring **262**. The clutching connection is once more provided by the radial slots **244** and the pins **246** to drive the feed roller **179** for feed movement of the perforated strip **184**.

Details of construction of rotating knife support

The rotating knife support **181** is driven by the coaction of the gears **216** and **217**, the gear **217** being fast upon the shaft **218**. The rotating knife support **181** is held in position on the shaft **218** as by the retaining nut **263** shown in Figure 8. A driving connection is provided between the rotating knife support **181** and the shaft **218** by means of a hub **264** keyed at **266** to the shaft **218**. The hub **264** is provided with a radial extension **267** which extends within a radially extending slot **268** formed in the rotating knife support **181**, see also Figure 5, and as shown, the radial extension **267** is spaced from the walls of the slot **268** formed in the rotating knife support **181**. The position of the radial extension **267** with respect to the walls of the slot **268** is adjusted by cap screws **269** which thread into the knife support **181**, the head of said screws **269** bearing against the radial extension **267**. It will thus be seen that the angular position of the knife support **181** may be adjusted in either direction a slight amount so that the knives **201** will sever the strip **184** which has been fed by the pin roller **179** along the stationary knife **196** at the perforation **189**.

Details of label applying roller

Referring again to Figure 8, the label applying roller **182** is driven by the main drive pinion **216** which meshes with an idler pinion **271** mounted on a shaft **272** turning in bearings **273** and **274** supported in a flange **275** formed as a part of the rib **162**. The idler pinion **271** meshes with a driving gear **276** fast upon a shaft **277** supported upon bearings **278** and **279** located respectively in the rib **162** and the housing frame **161**. The label applying roller **182** is in the form of a hollow annulus **281** having a hub **282** keyed to the shaft **277**. The annulus **281** is formed with evenly spaced flats **283** to which the raised pads **203** are secured in any convenient manner. The hub **282** of the roller **281** supports a stationary filler block **284**, and a closure plate **286** for the open end of the annulus **281** is also supported upon the hub **282** in abutting relationship with the stationary filler block **284**. The closure plate **286** and the stationary filler block are held in position by a washer **280** bearing thereagainst and held in position by a nut **285** threaded to the end of the shaft **277**. The stationary cylindrical block **284** and the closure plate are held against rotation by means of an arm **287**, see Figure 5, supporting cap bolts **288** tapped into closure plate **286** and the stationary cylindrical filler block **284**. As seen with respect to Figure 5, the arm **287** is provided with a yoke **289** which partly surrounds a pin **291** extending from the gib support **198**.

A pair of arcuate pad segments **292** and **293** partly encircle the stationary filler block and may be adjusted in position angularly with respect to each other by means of adjusting screws **294** tapped therein, and angularly movable in slots **296** in the closure plate **286**. The arcuate pad segments **292** and **293** thus define an arcuate shaped recess **297** which is subjected to a source of vacuum pressure connected to a fitting **298** which is in communication with the recess **297**, the source of vacuum

pressure thus creating a suction against the openings **204** in the pad **203** as it revolves with the cut and severed label **157**. The arcuate pad segments are so adjusted angularly that the suction pressure against the severed labels is relieved when the pads **203** rotate against the magazine **34** with the severed and pasted label therebetween.

Details of paste applying mechanism

Referring to Figures 8 and 9, the cut and severed label **157** which revolves with the raised pad **203** of the label applying roller **182** is moved past the paste applying roller **183** in contact therewith for the application thereto of a film of adhesive prior to rolling the label **157** upon each individual article **34**. Referring now to Figures 8 and 9, the sleeve **168**, which is keyed to the shaft **169**, also has fast thereto a gear **301** which is spaced from the gear **216** by a sleeve **302**. The gear **301** is held in position by a washer **303** and a locking nut **304** threaded to the end of the sleeve **168**. The gear **301** meshes with a gear **306** fast to a shaft **307** journaled in bushings **305**, which are supported in a hollow stationary axle shaft **308**. A housing **309** supports one end of the axle shaft **308** and swivels with the hollow axle shaft **308** about a trunnion **311** formed on the closure plate **176**. The other end of the hollow axle shaft **308** is supported in a housing member **312** which swivels about a trunnion **313** on the housing frame **161** together with the housing **309**. Referring now to Figure 9, a glue reservoir **314** is secured to the underside of the housing member **312** by cap bolts **316**. The reservoir **314** thus defines walls **317** and **318** which enclose the paste roller **183**. As shown with particular reference to Figure 9, the paste roller **183** is made fast to the shaft **307** by means of a key **319**, the wall **318** being held in abutting relationship with respect to the roller **183** by means of countersunk screws **321** to prevent endwise movement of the paste roller **183** on the shaft **307**. The periphery of the paste roller **183** is provided with spaced circumferentially extending slots **322**, and a scraper knife **320** is slidably adjustable in a groove **323** formed in the wall potrions **317** and **318** of the paste reservoir to meter the thickness of the paste film formed on the periphery of the roller **183** as it turns within the paste reservoir **314**. As shown in Figure 5, the scraper knife **320** may be adjusted in position by adjusting nuts **324** bearing against an ear **326**, the adjusting nuts **324** being supported upon a stud **327** extending from one edge of the paste reservoir **314**.

Means are provided for swiveling the paste roller about the trunnions **311** and **313** to remove the periphery of the paste roller **183** from contact with the raised pad **203** when the pin roller **179** has been disengaged by an irregular spacing of the magazines as they are conveyed along the lap feed conveyor mechanism **24**. To this end a sensing finger **328** is adapted to contact the magazines **34** as they move along the lap feed conveyor **24**. The sensing finger **328** is pivotally mounted on a switch frame assembly **329**, and the sensing finger **328** is so arranged that when it rocks in a clockwise direction as seen in Figure 5, as may be occasioned by irregular feeding of the magazines **34**, a switch finger **331** is actuated to close a circuit to a solenoid **332** mounted on the cover plate **176**, see also Figure 8. The solenoid **332** has an armature **333** which is retracted upon energization of the solenoid **332** to rock a bell crank **334** pivoted to support **336** held to the cover plate **176**. The end of the bell crank **334** remote from the armature **333** bears against a push rod **337** connected to a lug **338** struck out from the paste reservoir **314**. The push rod **337** is supported on bosses **339** and **341** supported on the cover plate **176**. The movement of the push rod **337** is opposed by a spring **342**, one end of the spring **342** abutting the boss **339**, and the other end of the spring **342** abutting an adjustable collar **345** threaded to push rod **337**. A nut **343** is threaded to the push rod **337** and adjusts the position of the paste roller **183** with respect to the raised pad **203** in accordance with the thickness of the paste film carried by the paste roller **183** as it rolls over the severed label **157** carried by the raised pad **203**.

It will be seen that upon movement of the finger **328** in a clockwise direction, as may be occasioned by irregular spacing of the magazines **34**, the switch **331** will be closed to energize the solenoid **332** and rock the bell crank **334** to move the paste roller **183** out of contact with label **157**.

It will be noted from the foregoing that when the switch **254** is causing disengagement of the pin roller **179** from its driving means, a severed label **157** will not be held by one of the raised pads **203** of the label applying roller **181**, and that by operation of the switch **331**, the paste roller **183** will be brought out of contact with the pad which is unoccupied by a severed label **157**, so that a film of adhesive will not be applied to the raised pad **203**. It will be apparent that the raised pads are kept free from adhesive which would occur if not for the presence of the solenoid operated mechanism for removing the paste roller **183** from proximity to the raised pad **203**.

Summary

From the foregoing description of the invention, it will be apparent that there has been provided a new and different machine for applying labels to flat, flexible articles such as nationally circulated magazines, newspapers or the like. The machine according to the present invention is characterized by the feeding of each individual article with complete freedom from the operation of any mechanism which would tend to batter, smear or otherwise injure the articles. By the provision of the lap feed conveyor mechanism described, it is possible to transport or convey the same number of articles past a label applying head with a greatly reduced linear speed. It will be apparent that by the provision of a label applying head having a plurality of raised pad portions for applying the label, the rotational speed of the label applying head will be lowered in accordance with the lowered linear speed of each of the articles or magazines.

It will be likewise apparent from the foregoing description that the articles may be placed upon a feed shelf in substantially vertical position, transported along said feed shelf and be removed therefrom one by one in overlapping relationship at a speed which is greatly less than the speed required of such individually transported magazines or articles in the machines of the prior art. By the use of an accelerating device, such as the star wheel **133**, the mailing pieces **34** may be individually accelerated to the speed of a rapidly moving conveyor mechanism with a consequent lessening of injury of each magazine at the edges thereof.

While the unique features and improvements of the present invention are shown as incorporated in a preferred embodiment of the invention, and in a form which the invention may assume in practice, the scope of the invention is not intended to be limited by the precise embodiment shown nor otherwise than by the spirit and breadth of the claims here appended.

We claim:

1. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in a substantially vertical path in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article whilst being conveyed past said label applying head in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

2. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, means for accelerating an article in a foremost position on said feed shelf to the speed of said conveying means, a label applying head for applying a label to each article whilst being conveyed past said label applying head in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

3. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed self having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article while being conveyed in such partial overlapping relationship comprising a continuouly rotating feed roller having perforation engaging pins extending from the periphery thereof for engaging the perforations of an intervally perforated strip and advancing the same, a continuously rotating label applying roller, a stationary knife interposed between said feed roller and said label applying roller across which said strip is fed, a continuously rotating roller having a knife thereon cooperating with said stationary knife for severing a label from said strip to be carried by said label applying roller, said label applying roller holding a severed label to the periphery thereof for the application of a label to each of said articles while being conveyed in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

4. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article while being conveyed in such partial overlapping relationship comprising a continuously rotating feed roller having perforation engaging pins extending from the periphery thereof for engaging the perforations of an intervally perforated strip and advancing the same, a continuously rotating label applying roller, a stationary knife interposed between said feed roller and said label applying roller across which said strip is fed, and a continuously rotating roller having a knife thereon cooperating with said stationary knife for severing a label from said strip to be carried by said label applying roller, said label applying roller having a plurality of raised portions thereon of length substantially equal to the distance between said perforations, said raised portions being spaced about the periphery of said label applying roller a distance equal to the exposed length of the articles being conveyed in such overlapping relationship, means for holding each severed label to said raised portion, means for applying adhesive to each severed label prior to applying the severed labels to said articles, and means driving said conveying means and label applying head in synchronism.

5. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article while being conveyed in such partial overlapping relationship comprising a continuously rotating feed roller having perforation engaging pins extending from the periphery thereof for engaging the perforations of an intervally perforated strip and advancing the same, a continuously rotating label applying roller, a stationary knife interposed between said feed roller and said label applying roller across which said strip is fed, and a continuously rotating roller having a knife thereon cooperating with said stationary knife for severing a label from said strip to be carried by said label applying roller, said label applying roller having a plurality of raised portions thereon of length substantially equal to the distance between said perforations, said raised portions being spaced along the periphery of said label applying roller a distance equal to the exposed length of the articles being conveyed in such overlapping relationship, said raised portions having suction openings in the face thereof for holding a severed label thereto, a paste roller for applying adhesive to each severed label while bing held in position on said raised portion, prior to applying the severed labels to said articles, and means driving said conveying means and label applying head in synchronism.

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