March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 1

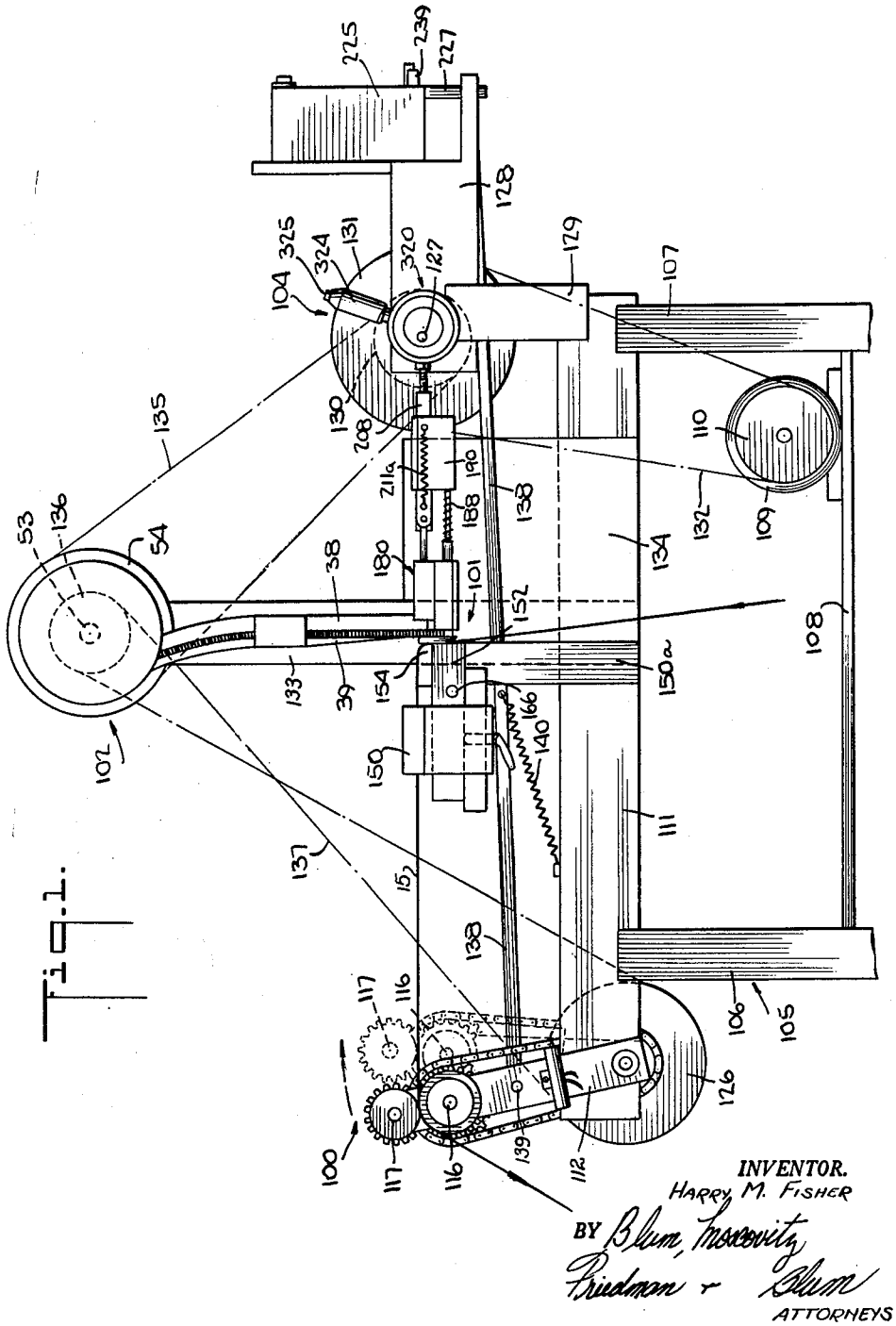


Fig. 1.

INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz
Friedman & Blum
ATTORNEYS

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 2

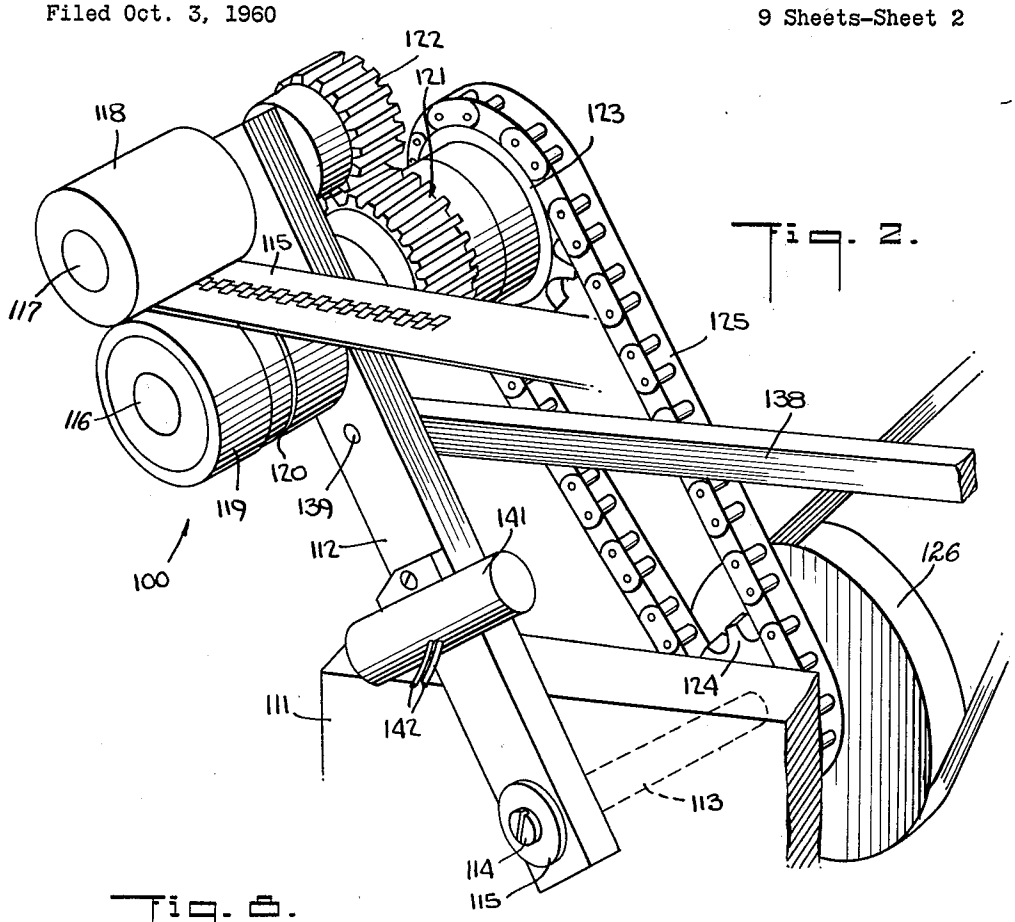


Fig. 2.

Fig. 8.

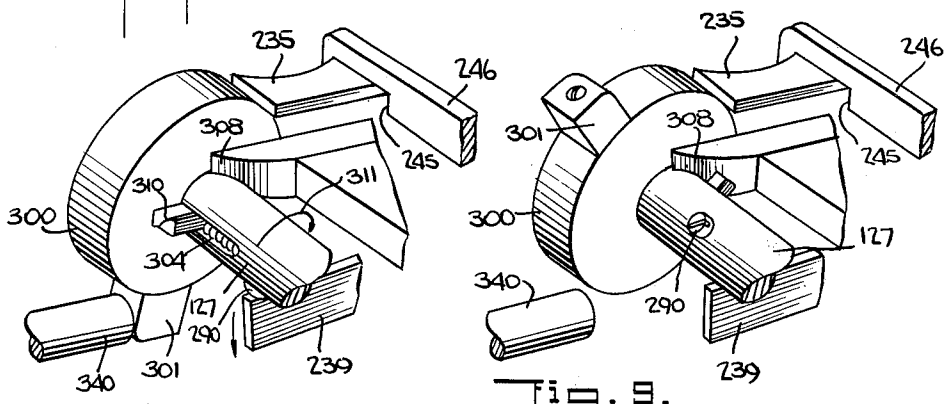


Fig. 9.

INVENTOR.
HARRY M. FISHER
BY Blum Moscovitz Friedman & Blum
ATTORNEY

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 3

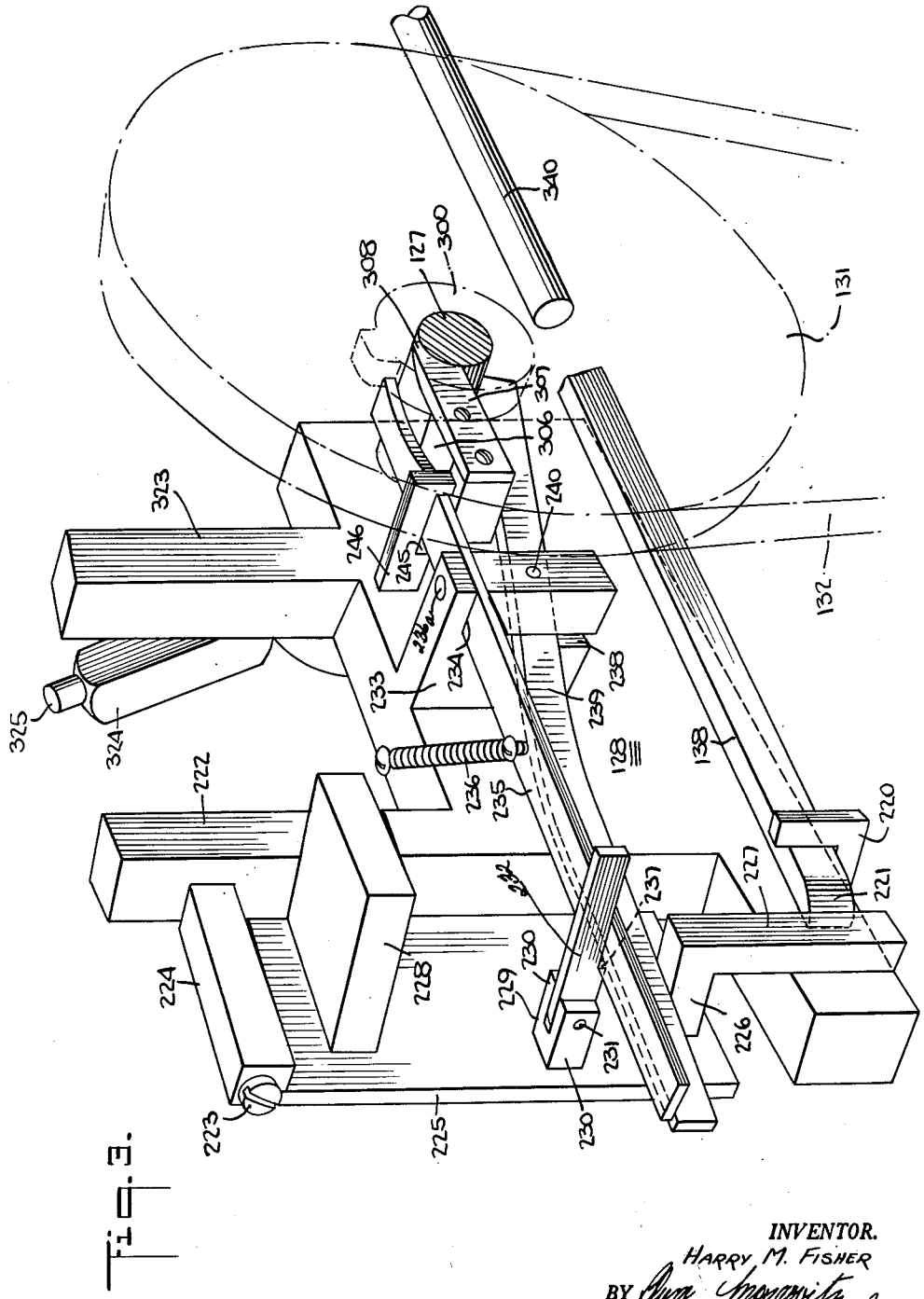


FIG. 3.

INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz, Friedman & Blum
ATTORNEYS

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 4

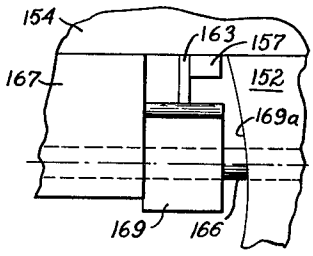


Fig. 4A.

Fig. 4.

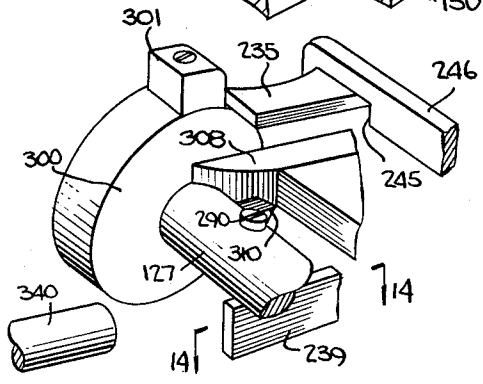
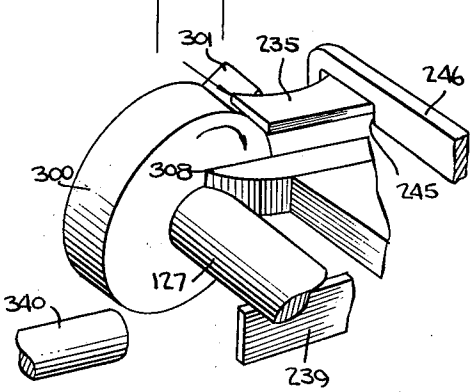


Fig. 6.

Fig. 7.



INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz, Friedman & Blum
ATTORNEY

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 5

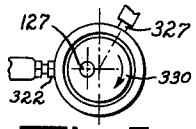


Fig. 5A.

Fig. 5.

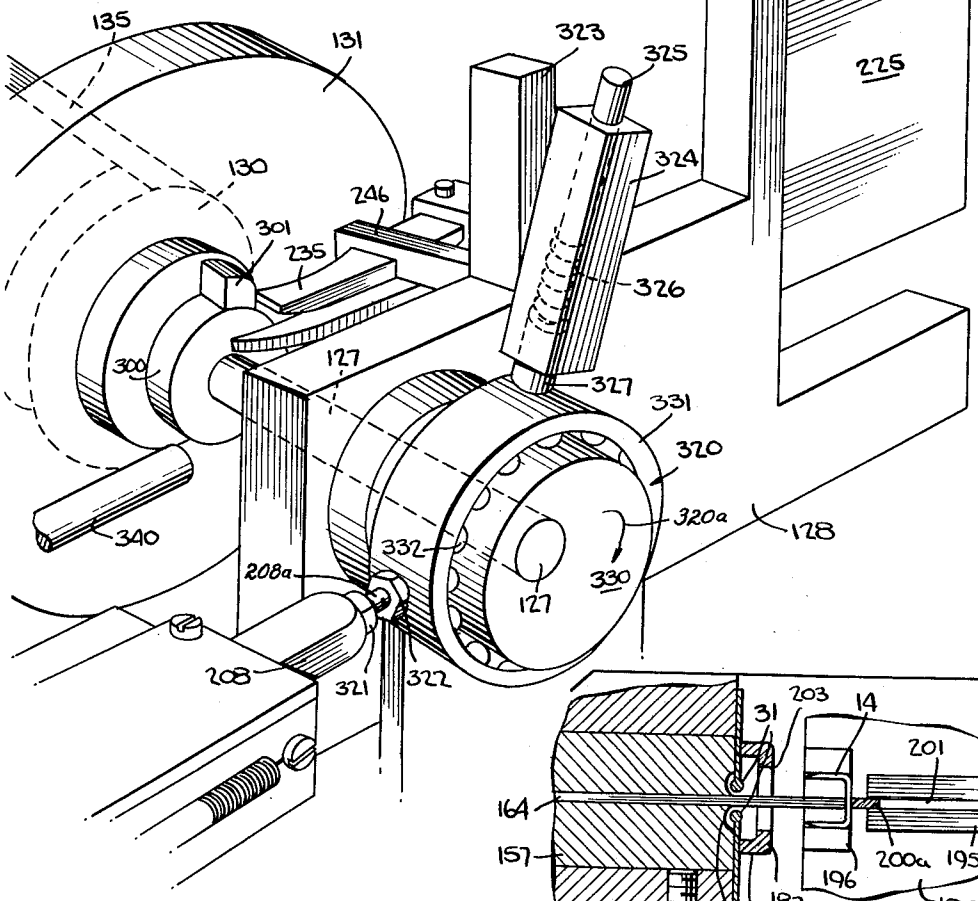


Fig. 22.

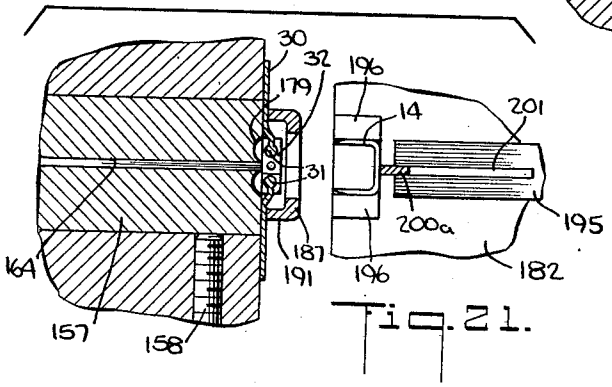


Fig. 21.

INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz, Friedman & Klein
ATTORNEYS

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 6

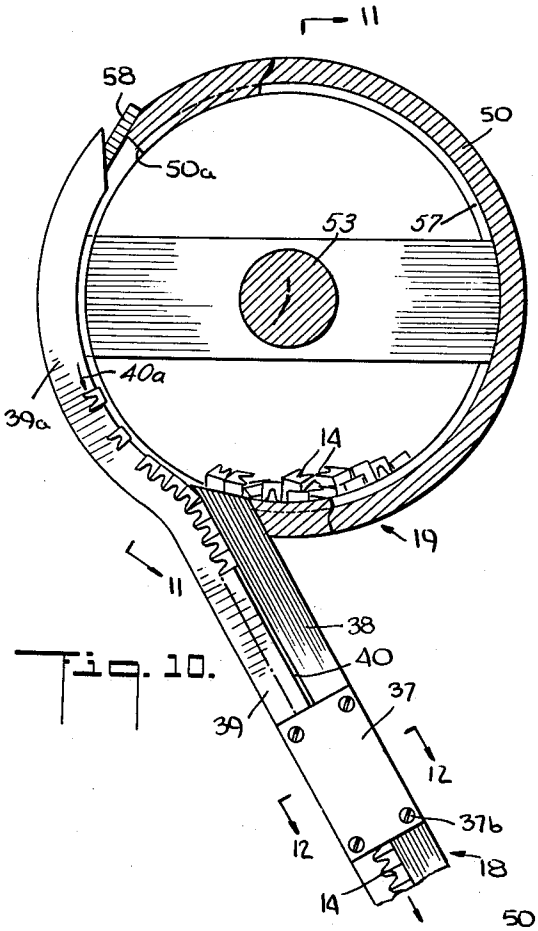


Fig. 10.

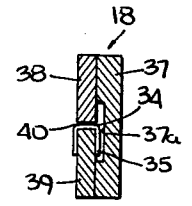


Fig. 12.

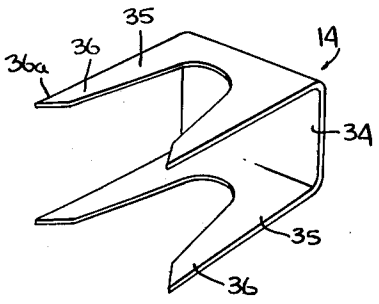


Fig. 13.

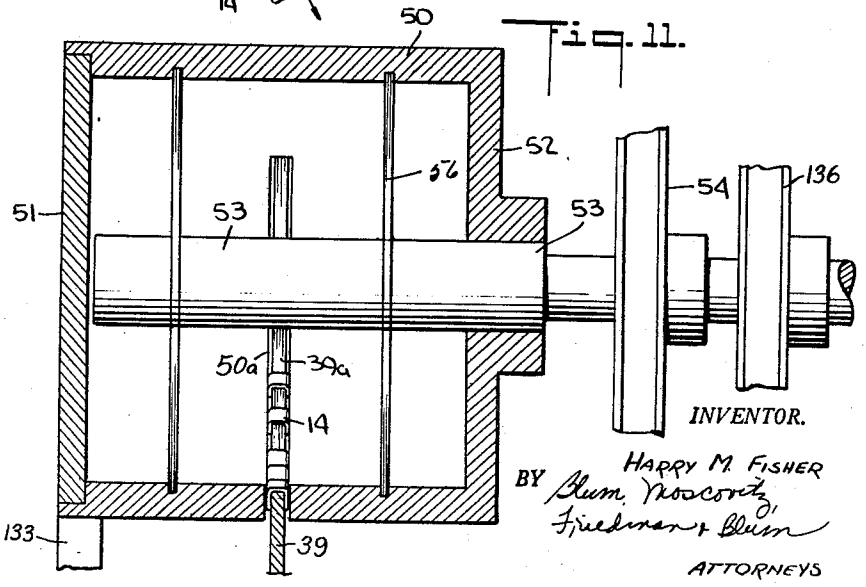


Fig. 11.

INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz, Friedman & Blum
ATTORNEYS

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 7

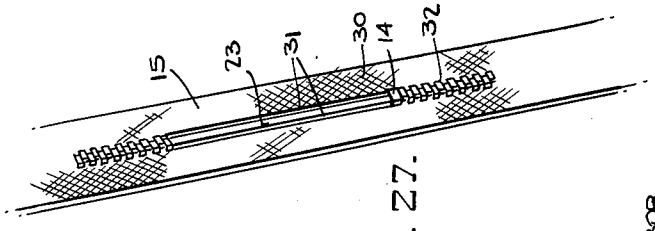


Fig. 27.

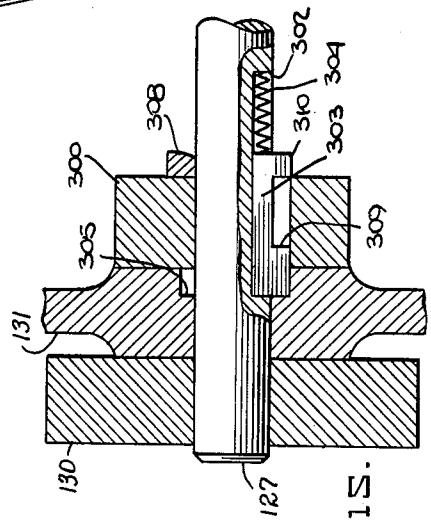


Fig. 15.

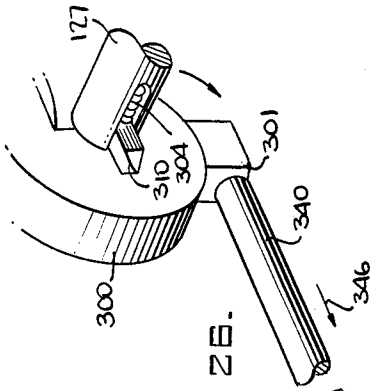


Fig. 26.

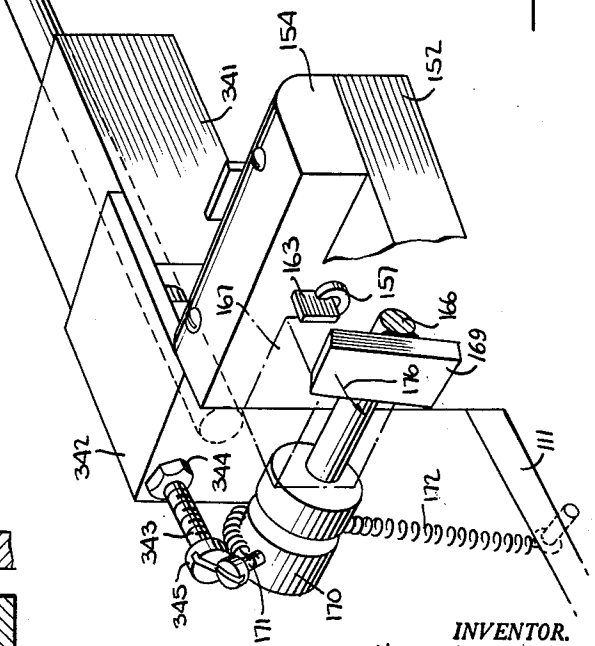
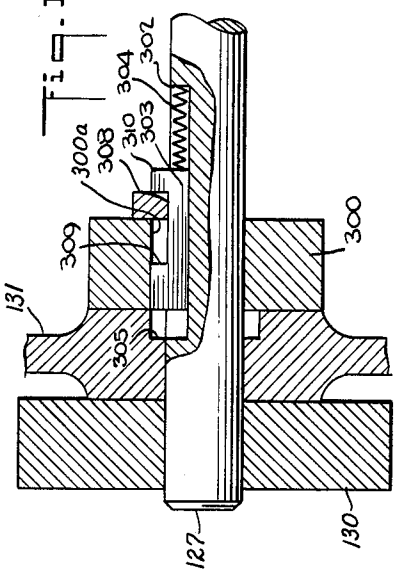


Fig. 14.



INVENTOR.
HARRY M. FISHER
BY Blum Moscowitz Friedman & Kalb
ATTORNEYS

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 8

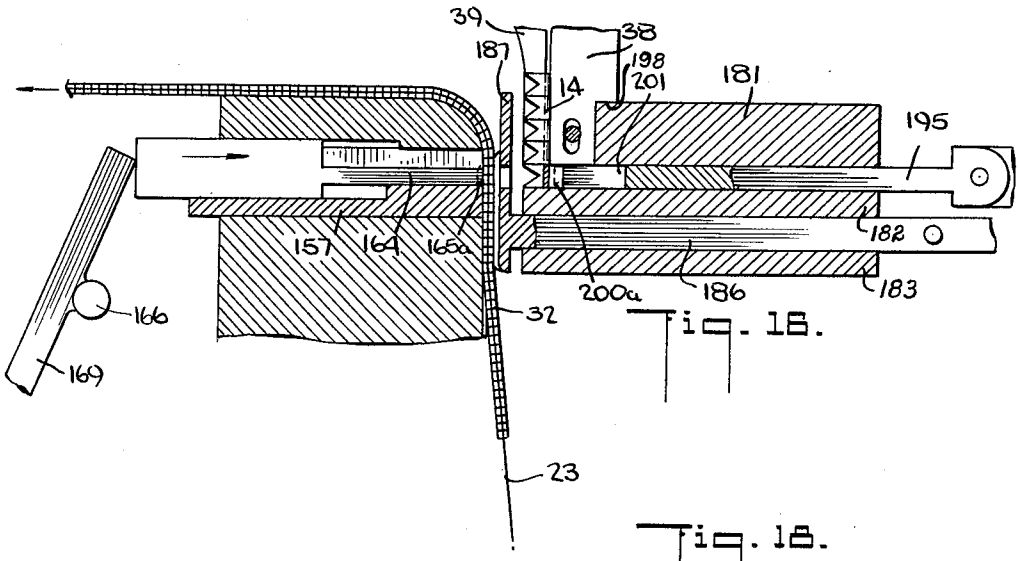
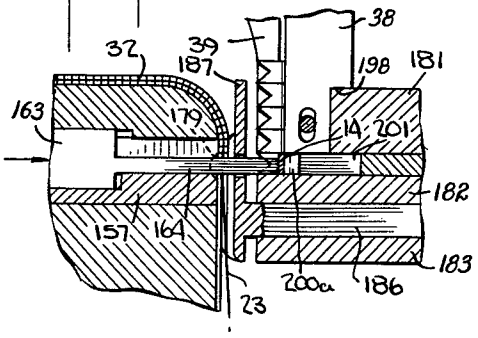
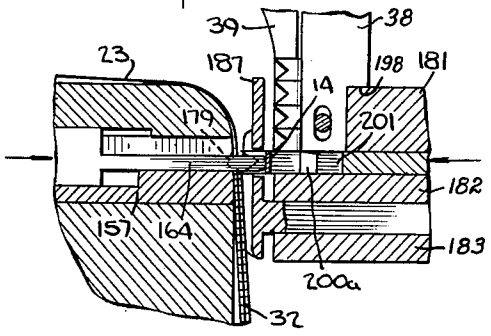


Fig. 16.

Fig. 18.

Fig. 17





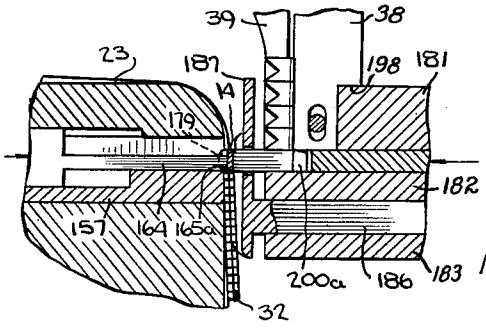


Fig. 19.

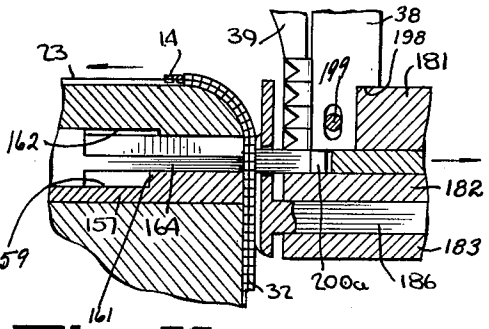


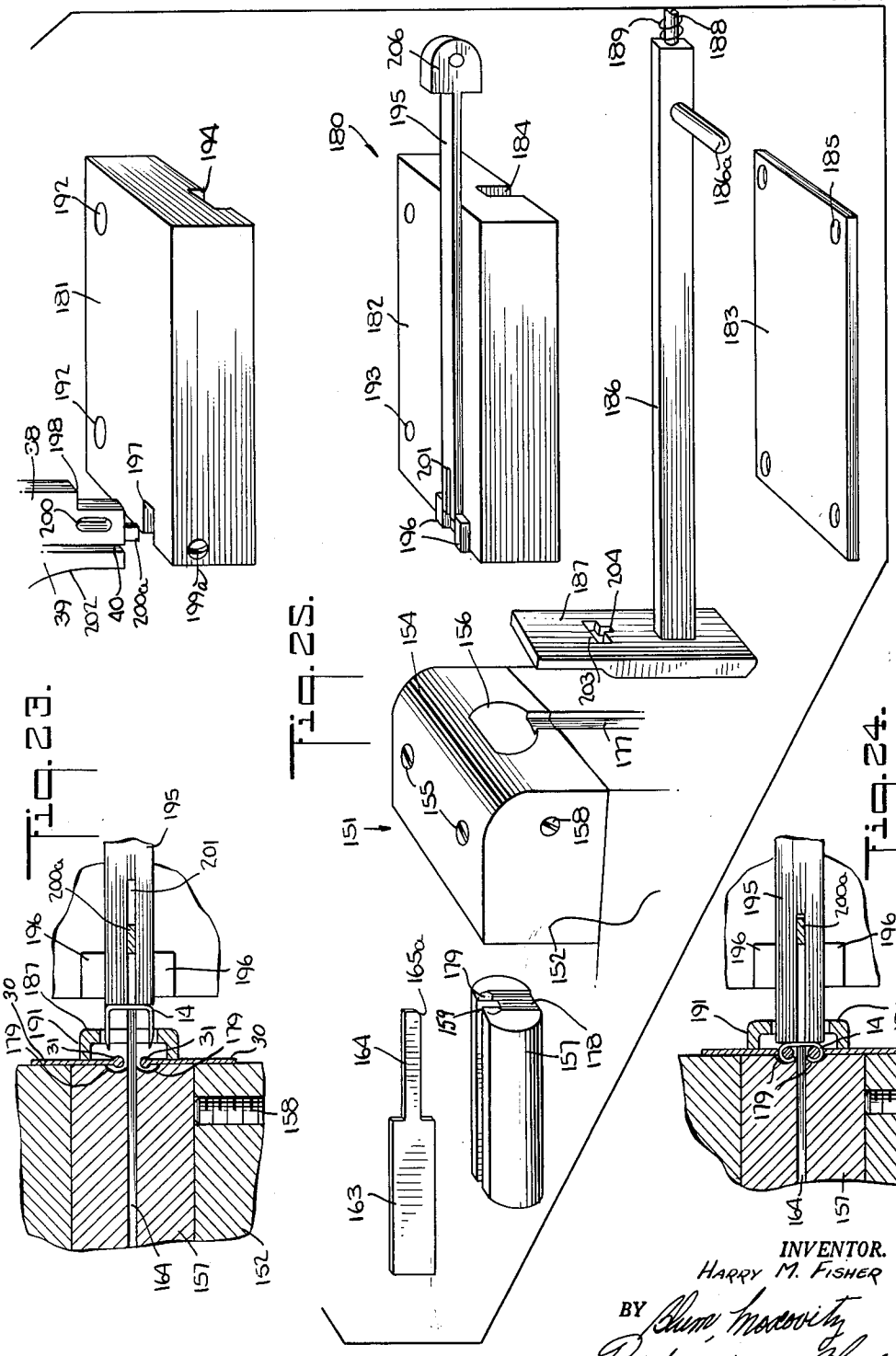
Fig. 20.

INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz
Friedman & Blum
ATTORNEY

March 17, 1964 H. M. FISHER 3,124,805

BOTTOM STOP APPLICATOR

Filed Oct. 3, 1960 9 Sheets-Sheet 9



INVENTOR.
HARRY M. FISHER
BY Blum, Moscovitz, Friedman & Blum
ATTORNEYS

United States Patent Office 3,124,805 Patented Mar. 17, 1964

3,124,805

BOTTOM STOP APPLICATOR

Harry M. Fisher, 157—36 22nd Ave., Whitestone, N.Y.

Filed Oct. 3, 1960, Ser. No. 60,087
7 Claims. (Cl. 1—106)

This invention relates to an improved machine for applying bottom stops to zipper blanks and the like.

In accordance with known practice, it has been common to produce long zipper blanks, comprising a pair of tapes, each tape having scoops mounted thereon, and the scoops being adapted to be interlocked by a slider. Also in accordance with such known practice, these blanks are originally made in a continuous length, with intervals of tape having scoops thereon. The interruption interval or slit between successive sets of scoops varies depending upon manufacturing practice. By way of illustration, such interruption interval or slit might be on the order of two inches. Ultimately, the tapes are intended to be severed across the scoop interruption intervals to form the individual zippers.

In order to prevent the scoops of a particular zipper from separating, it is necessary that appropriate means be provided at the ends of the chain of scoops. In particular, it has been known to provide a form of staple commonly known as a bottom stop, to one end of each set of scoops prior to cutting the tape at the interruption intervals. This invention is concerned with improved means for applying said staple known as a bottom stop to one end of the succession of scoops forming one zipper in conjunction with the tapes on which they are mounted. Subsequently, and as no part of this invention, appropriate fastening means of one type or another are applied to the other end of the interval of scoops on each tape of the zipper.

Also in accordance with known practice, it has been known to place the tape and scoop assembly manually in a press, in which the bottom stop is applied to the end of the chain of scoops by means of a plunger and die.

One object of this invention is to provide an automatic machine for applying bottom stops to zippers.

Another object of this invention is to provide an automatic machine for applying bottom stops to zippers, wherein the drive means for the tapes may be in continuous operation.

Another object of the invention is to provide a machine of the above-described type which can be operated at extremely high speed.

Another object of this invention is to provide an improved hopper for feeding the bottom stops or staples to the applicator machine.

In accordance with a preferred embodiment of the invention, the machine includes an anvil over which the blank may be drawn by means of draw rollers. These rollers are located in advance of the anvil and are mounted so as to be movable toward and away from the anvil, the rollers being spring biased toward the position thereof away from or remote from the anvil. Also in accordance with the preferred embodiment, the anvil has a through slot therein through which a pin extends slidably, this pin being normal to the blank as it is drawn over the anvil. Spring means urge one end of the pin against the blank. During the travel of the blank, the pin rides against the scoops until it enters a scoop interruption interval or slit. When the trailing end of the scoop interruption interval or slit strikes the pin, the tape cannot advance. The mounting of the rollers is such that as the result of their continued rotation, they move toward the anvil, against the action of the spring. This movement of the draw means toward the anvil actuates a one revolution clutch which in turn permits an application mechanism to apply a bottom stop to the blank against the end of the pin and

against the anvil. The pin is retracted somewhat as the result of this application of the bottom stop and bears against such bottom stop. The pin is shaped so that the action of the draw rollers can cause the bottom stop and subsequent scoops to slide over the ends of the pin, thereby permitting resumption of the movement of the blank. The spring for the draw rollers then returns them to their normal position, the combined action of this spring and of the draw rollers providing a rapid increment to the movement of the blank.

As an important feature of the invention, the action is essentially mechanical. Furthermore, the feeler pin which senses the location of a scoop interruption interval, at the same time serves as a stop to halt temporarily the movement of the blank, and furthermore serves thereby to actuate the clutch which controls the applicator mechanism. As a further feature of the invention, in the event that a bottom stop is not presented by the hopper to the applicator mechanism, the applicator mechanism is constructed so as to cooperate with the pin to lock the blank from further movement and to actuate means for turning off the machine. This provides positive means for preventing any portion of the blank from passing the anvil station without a stop being applied thereto.

Other objects and advantages of this invention will become apparent from the following description, in conjunction with the annexed drawings, in which a preferred embodiment of the invention is disclosed.

In the drawings:

FIG. 1 is a side elevational view of the improved machine, showing a zipper blank being drawn through the machine.

FIG. 2 is a detail perspective view of the drive mechanism for drawing the zipper blank through the machine.

FIG. 3 is a detail perspective view of a portion of the machine, showing the control mechanism for the one revolution clutch.

FIG. 4 is a detail perspective view of the machine, showing in particular the mechanism for applying the bottom stop to the blank.

FIG. 4*a* is a top plan view of a detail showing the cut-out.

FIG. 5 is a detail perspective view of the machine, showing the control mechanism for the one revolution clutch.

FIG. 5*a* is a side detail elevational view showing the clutch.

FIG. 6 is a fragmentary perspective view of the one revolution clutch in accordance with this invention, the clutch being shown prior to actuation thereof.

FIG. 7 is a view similar to FIG. 6, showing the clutch control in its initial rotary movement.

FIG. 8 is a perspective view similar to FIG. 6, showing an intermediate stage of its revolution.

FIG. 9 is a further perspective view similar to FIG. 6, showing the clutch near the end of its revolution.

FIG. 10 is a vertical section of one form of hopper suitable for use in accordance with this invention, the track leading from the hopper being broken away.

FIG. 11 is a section on line 11—11 of FIG. 10.

FIG. 12 is a section on line 12—12 of FIG. 10.

FIG. 13 is a perspective view of the bottom stop.

FIG. 14 is a fragmentary longitudinal section of the one revolution clutch mechanism, showing the clutch disengaged.

FIG. 15 is a view similar to FIG. 14, showing the clutch engaged.

FIG. 16 is a fragmentary longitudinal section of the machine showing the mechanism for applying a stop to the zipper blank, prior to actuation of the mechanism.

FIG. 17 is a view similar to FIG. 16, showing a pin extended through the zipper blank and against the bottom stop.

FIG. 18 is a view similar to FIG. 16, showing a stop about to be applied to the blank.

FIG. 19 is a view similar to FIG. 16, showing the stop applied to the blank.

FIG. 20 is a view similar to FIG. 16, showing the parts returning toward their starting positions.

FIG. 21 is a fragmentary horizontal sectional view of the stop application mechanism showing the stop prior to its application to the zipper blank and showing the aforesaid pin riding against the scoops of the blank.

FIG. 22 is a view similar to FIG. 21, showing the pin extended through the blank.

FIG. 23 is a view similar to FIG. 21 showing the stop being applied to the blank.

FIG. 24 is a view similar to FIG. 23, showing the stop fully applied to the blank.

FIG. 25 is a fragmentary exploded perspective view of the various parts of the stop application mechanism.

FIG. 26 is a fragmentary perspective view of the machine showing a stage of operation of the one-revolution clutch.

FIG. 27 is a fragmentary perspective view of the blank showing the stop applied thereto.

General Description

The machine includes as major elements a feed assembly **100** for a zipper blank **15**, an application mechanism **101** for applying bottom stop staples **14** to the blank **15**, a hopper mechanism **102** for supplying staples to application mechanism **101**, and a control mechanism including a one revolution clutch, designated by the reference numeral **104**, for the stop application mechanism **101**, the one revolution clutch being adapted to be actuated by the feed mechanism **100**.

The Zipper Blank

Zipper blank **15** (FIG. 27) comprises a pair of tapes **30** in side-by-side relationship and having adjacent beads **31**. Scoops **32** are fixed to the respective tapes **30**, over the beads **31**, in the usual manner, with the scoops on one tape releasably locked with the scoop on the other tape. In the specification and claims, it will be understood that the term "scoop" includes equivalent interlocking elements. The tapes are divided into scoop intervals, wherein the interlocking scops are affixed thereto, and scoop interruption intervals, wherein the scoops are omitted, thereby defining a series of slits **23** in the zipper blank. Optionally, but without limitation thereto, the slits **23** are of uniform length and the scoop intervals are of uniform length which is much greater than the length of slit **23**.

The Zipper Blank Feeder

The machine is mounted on a longitudinally extending frame **105** (FIG. 1) having a front standard **106** and a rear standard **107**, which may be mounted on a floor or other suitable support. Below the top of standards **106** and **107**, they are coupled by a plate **108** upon which motor **109** having an output pulley **110** rotatable about a lateral axis, may be mounted. A longitudinally and vertically extending plate **111** is fixed to the upper ends of standards **106** and **107**, and extends slightly forwardly of standard **106**.

The lower end of a lever **112** (FIG. 2) is turnably attached to the front end of bar **111** by means of lateral pivot shaft **113** which extends through said bar **111** and turnably through an opening in lever **112**. Lever **112** is secured to the end of shaft **113** by means of screw **114** and washer **115**. Lever **112** extends above bar **111** and also is forwardly, upwardly inclined in its normal position.

A pair of lateral shafts **116** and **117** extend through the upper end of lever **112**, with shaft **117** located above shaft **116**. Roller **118** is fixedly mounted on shaft **117** at one side of lever **112**. Roller **119** is fixedly mounted on shaft **116** at the same side of lever **112**. Roller **119** has a peripheral circumferential groove **120**. The zipper tape assembly **15** is adapted to be drawn frictionally forwardly between the rollers **118** and **119**, with the scoops **32** extending into groove **120**.

On the other side of lever **112**, gears **121** and **122**, having 1—1 ratio, are fixably mounted on shafts **116** and **117** in meshing relationship with each other. Outwardly of gear **121**, sprocket **123** is fixably mounted on shaft **116**. A further sprocket **124** is turnably mounted on shaft **113** and is coupled to sprocket **123** by means of chain **125**. Pulley **126** is turnably mounted on shaft **113** outwardly of sprocket **124** and is fixedly coupled to sprocket **124** and is adapted to be driven so as to rotate the driving members of the feed assembly **100**.

In order to drive pulley **126**, lateral shaft **127** is mounted on vertically and laterally extending frame member **128** (FIG. 1) located at the rear of the machine. This frame member **128** is fixed to frame member **111** by means of a vertically extending frame member **129** and is located above frame member **111**. At one end of shaft **127**, pulleys **130** and **131** are turnably mounted thereon to turn in unison. Pulley **131** is coupled to pulley **110** by means of pulley belt **132**. Vertically extending frame member **133** is fixed to frame member **111**, so as to extend above same, by means of frame member **134** (FIG. 1). Laterally extending shaft **53** extends turnably through the upper part of frame member **133**. Pulley **54** is mounted on shaft **53** and is coupled to pulley **130** by means of pulley belt **135**. A further pulley **136** coupled to pulley **54** on shaft **53** is coupled to pulley **126** by means of belt **137**.

Longitudinally extending control bar **138** is mounted upon lever **112** by means of pivot **139** and extends toward the rear of the machine. Spring **140** between bar **138** and frame member **111** urges bar **138** forwardly. Hence spring **140** normally maintains draw rollers **118** and **119** in their full line position of FIG. 1.

Safety mercury switch **141** on lever **112** (FIG. 2) is normally closed. Leads **142** of switch **141** are included in the electric supply circuit (not shown) of motor **109**. Upon abnormal rearward movement of bar **138** and drive assembly **100**, switch **141** is opened and motor **109** stops running.

The Mounting Mechanism

The application mechanism **101** is supported upon upright **150***a* fixed to member **111** at the center of the frame, as well as vertically and longitudinally extending frame plate **134** fixed to member **111** behind member **150***a* (FIG. 1).

Anvil support **151** is fixed to the outer face of upright **150***a* by any suitable means. Anvil support **151** includes a block **150** which extends laterally and vertically and has a rectangular aperture in the bottom of which support block **151***a* is received (FIG. 4). Block **151***a* extends forwardly and rearwardly of block **150**. Block **152** rides slidably upon block **151** and through the upper part of the aperture of block **150**, as shown in FIG. 4. Block **152** may be moved and locked in position by any suitable means (not shown).

Block **154** is fixed to the top rear of block **152** by means of screws **155**. Block **154** has a laterally elongated, convex upper rear surface (FIG. 25). Blank **15** is brought from below and behind block **152**, over the convex surface of block **154** (FIG. 1) and between rollers **118** and **119** as described above. In case of re-threading of the blank, clearing a jam or cleaning, block **152** may be temporarily slid forwardly.

As shown in FIG. 25 and other views, block **154** has a longitudinally extending through bore **156**. Bore **156** is generally cylindrical and is flattened at the top and bottom. Anvil member **157** conforms in shape to bore **156** and extends non-rotatably therethrough. Set screw **158** extends laterally through block **152** and against the side of anvil member **157**. Anvil member **157** has anvil de-

pressions 179 in the top of its rear face. Depressions 179 are vertically aligned with vertical groove 178 in the rear face of member 157 and vertical groove 177 in the rear faces of blocks 154 and 152. Grooves 177 and 178 receive the scoops of the blank.

Member 157 has a vertically and longitudinally extending slot 159 extending axially therethrough and to the top thereof. Slot 159 extends between anvil depressions 179. The rear part of slot 159 is of reduced height to define a stop shoulder 161 (FIG. 20 and other views) extending upwardly from the bottom of slot 159. Vertically and longitudinally extending slot 162 in block 152 is located above and communicates with slot 159.

Vertically and longitudinally extending plate 163 is longitudinally slidably received in slots 159 and 162. Rearward movement of plate 163 is limited by stop 161. Rear extension 164 of plate 163, which extension 164 may be considered as a pin, is of reduced height and clears stop 161 and can extend rearwardly thereof. In the rearmost position of plate 163, its rear end abuts shoulder 161, and pin extension 164 extends through blank slit 23 and rearwardly thereof.

The movement of plate 163 and pin 164 is regulated in part by means of rocker shaft 166 (FIG. 26), which extends laterally turnably through block 167 mounted on the front of block 154 by means of screw 168; block 167 being located forwardly of block 152. Shaft 166 also extends turnably through a lateral bore of block 152. Plate 169 (FIGS. 4 and 26) is welded to shaft 166 and is movably received within cutout 169*a* of block 152. The upper end of plate 169 opposes the front of plate 163. Collar 170 is fixedly mounted on shaft 166 at the other side of block 167 from block 152. Screw 171 in the periphery of collar 170 serves as a post to which the upper end of coil spring 172 is connected. Spring 172 extends around the rear of collar 170 under tension. The lower end of spring 172 is connected to frame piece 111.

Initially, as blank 15 is conveyed, pin 164 strikes the scoops 32 and is in its front position (FIG. 16). Plate 169 is upward rearwardly inclined and presses pin 164 rearwardly. When pin 164 opposes slit 23, the action of spring 172 causes plate 169 to push plate 163 and pin 164 rearwardly. Pin 164 in slit 23 and abutting a section of scoops 32, prevents movement of blank 15. Bar 138 moves rearwardly, because of the continued action of rollers 118 and 119 on the blank.

In order to mount the stop in place and move pin 164 forwardly, a three part guide element 180 (FIG. 25 and other views) is fixed to plate 134 (by any suitable means, not shown) behind block 152 (in the relative positions shown in FIG. 4). This guide element 180 comprises upper block 181, intermediate block 182 and lower plate 183.

Block 182 has a vertically and longitudinally extending through slot 184 extending to its lower face. Plate 183 closes the bottom of slot 184 and is connected to the bottom of block 182 by screws through holes 185. Bar 186 extends frictionally slidably through slot 184. Forwardly of element 180, vertical pressure plate 187 is fixed to bar 186. Rearwardly of element 180, longitudinally extending rod 188 is fixed to the rear end of bar 186 and extends slidably through a suitable bore of bearing block 190 fixed to frame plate 134 behind element 180 (FIG. 4). Spring 189 around rod 188 bears between bar 186 and block 190 and urges plate 187 forwardly. Pin 186*a* on bar 186 limits forward movement thereof by engagement of pin 186*a* against the rear of block 182. Vertical side flanges 191 on the front of plate 187 (FIG. 23) bear against tapes 30 outwardly of beads 31 and hold blank 15 against the rear face of block 152 with beads 31 received within grooves 177 and 178.

Block 181 rests upon block 182 and is secured thereto by screws through holes 192 and 193. Block 181 has a through longitudinal slot 194 in the lower face thereof, in which bar 195 is slidably received. Block 182 has bosses 196 on its upper face, at the front thereof, between which said bar 195 slides. Block 181 is slightly shorter than block 182 and bosses 196 are located in front of block 181.

The scoop supply mechanism 102, as will be explained in detail below, includes a track 18 having vertically extending coplanar bars 38 and 39, bar 38 being located rearwardly with respect to bar 39. Stop 14 has its head 34 in the space between bars 38 and 39, with legs 35 straddling bar 39. Bar 38 is received in notch 197 in the front of block 181 and extending to the top thereof. Bar 38 has a rear bottom notch to define a shoulder 198 which rests on block 181. Lateral pin 199 extends through bore 199*a* of block 181 and slot 197 and vertically elongated slot 200 in bar 38. Slit 40 between bars 38 and 39 opposes and is spaced above block 182 between bosses 196. The clearance between the lower ends of bars 38 and 39 and the top of block 182 is slightly greater than the height of stop head 34. The lower edges of the lowermost stop head 34 and legs 35 rest on block 182 between bosses 196. Projection 200*a* on the lower end of bar 38 is received slidably in elongated slot 201 in the front of pusher bar 195. The lower front of bar 39 is cut away at 202 to clear plate 187.

In the forward stroke of pusher bar 195, its front end carries the lowermost stop 14 through slot 203 in plate 187 (which is closely spaced from block 154) and hence against pin 164, and finally carries the stop legs against anvil depressions 179. In the event that no stop is present, pin 164 can move through slot 201 and slot 203 and also through slot 204 which communicates with the lower edge of slot 203. This positively prevents movement of blank 15.

In order to guide bar 195, it has a rear head 206 which is coupled to front yoke 207 of longitudinal bar 208 (FIG. 4) by lateral pivot pin 209 (FIG. 4). This bar 208 extends slidably through a longitudinal through groove in the top of block 190, the top of block 190 being closed by plate 210 via screws 211. Spring 211*a* between pin 212 of yoke 207 and pin 213 on block 190 urges bar 195 rearwardly.

The Hopper

Hopper 19 (FIGS. 1 and 11) is in the form of a cylindrical drum 50 having end plates 51 and 52. End plate 51 is removable, so that drum 50 may be filled with stops 14. Drive shaft 53 extends through end wall 52, and has the aforesaid driven sprocket 54 mounted on the outer end thereof.

Laterally spaced blades 56 extend transversely with respect to shaft 53 and have bores through which shaft 53 extends. Blades 56 are fixed to shaft 53. The ends of each blade 56 extend slidably into a circumferential groove 57 in the wall of drum 50.

Drum 50 has a central circumferentially extending slit 50*a* extending from near the top thereof to the bottom thereof. Bar 38 of track 18 extends into the bottom of slit 50*a*. Bar 39 of track 18 also extends into the slit and is curved as shown at 39*a* corresponding to the cylindrical shape of drum 50, and extends to near the top of slit 50*a*. The slight gap is closed by any suitable element 58. Bars 38 and 39 are coplanar and of rectangular cross section and are slightly spaced from each other to define the aforesaid slit 40. Plates 37 (only one is shown) are fixed to bars 38 and 39 by means of screws 37*b* to hold the bars fixed relative to each other.

Blades 56 agitate stops 14. Certain stops reach the position in which their legs 35 straddle bar 39*a* with their heads 34 frictionally abutting the inner edge of bar 39*a*. Said stops 14 then slide downwardly on bar 39*a* under the influence of gravity (arrow 40*a*) until heads 34 enter slit 40 with legs 35 then straddling bar 39. Stops 14 then slide down track 18. Lengthwise groove 37*a* in plate 37 provides clearance for legs 35 (FIG. 12).

The Control Mechanism

Control mechanism **104** (FIGS. 1 and 3) is actuated by the previously mentioned bar **138**, which is moved rearwardly against the action of spring **140**, when the moving web or blank stops moving and the drive mechanism **100** is pivoted towards its broken line position of FIG. 1. This bar **138** is longitudinally slidably supported adjacent its rear end by means of an L-shaped bracket **220** which is fixed to frame member **128**. The extreme rear end of bar **138**, designated by the reference numeral **221**, is tapered or wedge-shaped and has a convex contour, to serve as a cam.

Frame member **128** has an upward extension **222** near the rear thereof. Longitudinally extending pivot shaft **223** is fixed to frame extension **222** and extends rearwardly thereof. Block **224** is turnably mounted on pin **223**; plate **225** is fixed to block **224** and extends vertically downwardly therefrom and also extends longitudinally. Bracket bar **226** extends laterally from plate **225**, adjacent the bottom thereof, and connects at its free end with an integral downwardly extending leg **227** which is attached to the rear end of frame member **128**, behind and aligned with bracket **220**. Upon sufficient rearward movement of bar **138**, the cam portion **221** enters between bar **227** and frame member **128** and pivots plate **225** slightly about its axis. Essentially, plate **225** is moved to the left, as viewed from the front of the machine. Block **228** fixed to plate **225** near its pivot, on the same side as bar **226**, serves to maintain the center of gravity of the assembly of plate **225** and its bracket so as automatically to return bar **227** into abutment with frame member **128** when bar **138** is moved forwardly out of engagement with bar **227**.

Bracket **229** is fixed to plate **225** on the same side as bar **226** and somewhat above bar **226**. Bracket **229** is U-shaped and has spaced lateral legs **230**, between which extends a longitudinal pivot **231**. Laterally extending bar **232** is mounted upon pivot **231** so as to be turnable about the axis thereof.

Bracket block **233** extends laterally from frame member **128** forwardly of member **222**, and on the same side of member **128** as bracket **220**. Bracket block **233** has a horizontal slot **234** adjacent the top thereof and opening on the free vertical edge thereof. Lever bar **235**, which actuates the one-revolution clutch, is turnably received within said slot **234** upon vertical pivot pin **236***a*. Lever **235** is spaced from frame member **128**. Spring **236** between lever **235** and frame member **128**, located rearwardly of pivot **236***a*, biases the rear end of lever bar **235** toward frame member **128**. Lever bar **235** extends rearwardly of bar **232**. Bar **232** extends over and laterally past bar **235** and normally rests by gravity thereupon. The lower free portion of bar **232** is cut away to provide a shoulder **237** against the side edge of bar **235**. When plate **225** is pivoted, either by manual pressure thereon or by rearward movement of bar **138**, shoulder **237** catches against the side of lever **235** and pivots it, against the action of spring **236**.

Forwardly of pivot **236***a*, lever **235** extends through notch **245** in lateral bar **246** fixed to frame member **128**. Normally, spring **236** holds bar **235** in position in which lever **235** abuts the end of notch **245** remote from frame member **128**.

Plate **233** has a vertical slot **238** extending to the bottom thereof. Lever bar **239** extends through slot **238** and is supported therein turnably by means of lateral pivot **240**. The rear portion of lever bar **239** extends under bar **232**, between lever **235** and plate **225**. Normally, the weight balance of lever bar **239** is such that it is out of engagement with bar **232**. When the front portion of bar **239** is depressed, elevating the rear portion of lever **239**, it strikes and elevates bar **232**, so that shoulder **237** is located above and clears lever **235**.

As previously mentioned, motor **110** drives pulley **131** by means of belt **132**, and pulley **130** which turns in unison with pulley **131**, drives remaining parts of the machine. These pulleys **130** and **131** are turnably mounted on previously mentioned shaft **127**. Collar **300** (FIGS. 3, 14, 15 and 26) is turnably mounted on shaft **127** inwardly of and adjacent pulley **131**. Collar **300** serves as a cam, since it carries a cam projection or boss **301**. Normally, collar **300** does not turn. Normally, boss **301** abuts the front end of lever **235** (FIG. 6).

Shaft **127** has an axially elongated groove **302** extending into the periphery thereof. This groove **302** extends laterally beyond each side of cam **300** and underlies the inner portion of the periphery of the bore of pulley **131**. Slide member **303** is slidably received within groove **302**. Spring **304** in groove **302** extends between the inner end of groove **302** and the inner end of slide **303** and urges slide **303** outwardly. Slide **303** protrudes beyond the periphery of shaft **127** and into a radial slot **300***a* (FIG. 14) in the wall of the bore of cam **300**. In the inner position of slide **303**, shown in FIG. 14, slide **303** is located entirely inwardly of pulley **131**. In the outer position of slide **303**, shown in FIG. 15, slide **303** extends to the extreme outer end of groove **302** and also extends into a radial recess **305** in the inner face of pulley **131** communicating with the bore of pulley **131**. In this latter position of the slide, cam **300** turns in unison with pulley **131**. There are optionally four equally spaced radial recesses **305** in pulley **301** for reception of slide **303**.

Block **306** is fixed to frame member **128** below member **246** and above lever **239** (FIG. 3). Bar **307** is fixed to the longitudinal face of block **306** and extends longitudinally and vertically and extends forwardly thereof. The front end **308** of bar **307** serves as a wedge. Slide **303** has an elongated notch **309** (FIGS. 14 and 15) which can accommodate wedge **308**. Adjacent the inner edge of notch **309**, the slide **303** is shaped to provide a radially offset cam surface **310** which cooperates with wedge **308**. Specifically, the face of wedge **308** is convex and the member **310** is tapered and convex. In the upright position of cam **310**, in which it abuts wedge **308**, the cam **310** is oppositely tapered and oppositely convex with respect to wedge **308**. When cam **310** is out of engagement with wedge **308**, cam **300** and pulley **131** turn in unison. When wedge **308** is located in engagement with cam **310**, cam **300** does not turn in unison with pulley **131**.

In the starting position of the clutch, shown in FIG. 6, boss **301** abuts the front end of lever **235**, and cam **310** engages against the widest part of wedge **308** adjacent the lower end thereof. Arrow **311** in FIG. 8 gives the direction of turning of cam **300**, this being such as to tend to drop the cam **310** below the level of wedge **308**.

A bias is imparted to the cam **300** so as to tend to turn it in the direction so as to move cam **310** out of engagement with wedge **308** when boss **301** is released by lever **235**. To this end, eccentric cam **320** (FIG. 5) is mounted on shaft **127** on the side of frame member **128** which is opposite to pulley **131**. Cam **320** serves as the drive for the previously described bar **208** which in turn controls the mechanism for applying the stop to the tape. Of course, in the start position of FIG. 6, the cam **320** is positioned relative to the rear stud **208***a* and adjusting nuts **321** and **322** on bar **208** so as to permit bar **208** to remain in its rear position.

Cam **320** comprises cylindrical collar **330** eccentrically mounted on shaft **127**, ball bearing assembly **332** on collar **330** and outer collar **331** on bearing assembly **332**.

Frame member extension **323** extends upwardly from frame member **128** forwardly of frame member extension **222**. Bearing block **324** is fixed to member **323**. Bearing member **324** is elongated and is slightly forwardly downwardly inclined. Rod **325** extends slidably through a bore in block **324**, bearing downwardly biased by means of internal spring **326** in block **324**. The lower end of rod **325**, below block **324**, carries a head **327** which frictionally abuts the periphery of cam **320**. In the start position, head **327** engages the periphery of collar **331**

at a point designed to exert leverage (FIG. 5*a*) so as to tend to turn the assembly **320** in the desired direction (arrow **320***a*,) spring **326** being extremely powerful. When boss **301** is released by the appropriate movement of lever **235**, the assembly **320** and shaft **127** are moved sufficiently so as to clear cam **310** from wedge **308**. Cam **300** is now free to turn in unison with pulley **131**. This is shown in FIG. 7. During the next part of the cycle of movement of the clutch, cam assembly **320** engages nut **322** and drives bar **208** forwardly so as to place the stop on the tape.

Next, as shown in FIG. 8, and while bar **208** is still being urged forwardly, boss **301** engages and drives forwardly a longitudinal rod **340**. Said rod **340** is journaled in a longitudinal bore of a bearing box **341** shown in FIG. 26 and fixed to the frame by any suitable means (not shown). Forwardly of box **341**, shaft or rod **340** carries a fitting or bracket **342**. Longitudinal screw stud **343** is fixed adjustably into the front end of bracket **342** by means of adjusting nut **344** and carries a front head **345**. In the forward movement of rod **340** (arrow **346**), the head **345** engages the previously mentioned stud **171** on member **170**, and turns member **170**, against the action of spring **172**. As previously mentioned, the effect of this is to release the rearward tension on the pin **164** which extends through the slider blank. Now, if a stop has been inserted in place, the pin **164** is located just about at the position of the stop (FIG. 19). Accordingly, the stop can ride over the rounded bottom rear corner **165***a* of member **164**, so that the movement of the web can begin again. On the other hand, if no stop was presented to be inserted in place, then the pin **164** has been pushed all the way into the slot **204** and the web cannot move.

During operation of the one revolution clutch, pin **290** on the shaft **127** engages against and depresses the front end of lever **239** (FIG. 8), so as to elevate bar **232** and prevent the clutch from being actuated again. This is necessary to insure that the clutch will not be actuated again in case the bar **138** does not return to its front position, for instance if a stop is not applied. In that case, of course, upon continued rearward movement of the drive assembly, the control mercury switch **141** is opened and the operation of the machine is stopped; but in the meantime, the clutch should not be actuated again.

Summary of Operation

While the detailed operation of the machine will be apparent from the foregoing, the operation may be summarized as follows:

The zipper blank is initially threaded over the anvil between the rollers **118** and **119** of the drive assembly **100**. Plate **187** and its flanges **191** bear under tension against the blank to hold it in position. Pin **164** bears against the front spaces of the scoops. The one revolution clutch mechanism is in its position of FIG. 6. FIG. 16 shows the starting position of pin **164**.

Upon starting the machine, the zipper blank is moved forwardly by the rollers **118** and **119**. When pin **164** enters a slit in the zipper blank and reaches the trailing end thereof, the zipper blank can no longer move forwardly. Rollers **118** and **119** continue to turn, and the result is that the pivoted drive assembly moves frictionally upon the blank to its broken line position of FIG. 1. FIGS. 17 and 18 show the location of pin **164** extending through the slit first at the leading end and then, at the trailing end thereof. Pin **164** extends between the legs of the lowermost stop and against the head.

As the result of the rearward movement of the drive assembly, bar **138** moves rearwardly, between frame member **128** and member **227**, thereby swinging plate **225** and hence pivoting lever **235**, so that the front end of lever **235** clears cam projection **301** on cam member **300**. The force of rod **325** on cam member **320** causes rotation of shaft **127**, which is permitted since cam projection **301** is no longer blocked. As a result, cam **310** clears cam **308**, as shown in FIG. 7. This permits movement of slide member **303** from its rest position of FIG. 14 to its engaging position of FIG. 15, whereby the clutch is engaged. Accordingly, shaft **127** is turned in a positive manner.

The resulting rotation of cam member **320** causes bar **208** to be moved forwardly. Hence, as shown in FIG. 18, the stop is moved toward the anvil. This is also shown in FIG. 23. FIGS. 19 and 24 show the stop secured in place, in the usual way, upon the zipper blank.

During operation of the one revolution clutch, lever **239** maintains lever **232** in elevated position so that bar **235** returns to its normal position and the one revolution clutch cannot be tripped again at the conclusion of a revolution thereof.

Also during operation of the one revolution clutch, after the stop is mounted upon the zipper blank, cam projection **301** strikes rod **340**, and moves it forwardly, so that plate **159** releases the tension upon pin **164**. Cam **320** clears head **322**, so that bar **208** may be returned rearwardly by its spring, thereby causing bar **195** to be moved rearwardly. As shown in FIG. 20, the stop can ride over the rear end of pin **164**, and movement of the zipper blank can continue. This forward movement of the zipper blank is facilitated by the forward movement of the drive assembly **100**, there being thereby two components of force acting upon the zipper blank so as to move it forwardly. The motion of the one revolution clutch stops when it returns to its initial position.

In the event that pin **164** is not opposed by a stop after it enters the zipper blank slit, the pin moves rearwardly into slot **201**, and the zipper blank cannot advance. The drive assembly **100** continues to move rearwardly until switch **141** opens, thereby opening the circuit of the machine motor and stopping the machine.

The hopper is continuously agitated, and as stops are fed into the track **38**, **39**, they fall by gravity into position to be mounted upon the zipper blanks.

While I have disclosed a preferred embodiment of my invention, and have indicated various changes, omissions and additions which may be made therein, it will be apparent that various other changes, omissions and additions may be made in the invention without departing from the scope and spirit thereof.

What is claimed is:

1. A machine for applying bottom stops to a zipper blank, said zipper blank comprising elongated side-by-side tapes and scoops, said tapes having scoop intervals wherein said tapes respectively have said scoops secured thereto with the scoops of one tape interlocking with the scoops of the other tape, said tapes also having scoop interruption intervals in which they are free of scoops; said machine comprising an anvil, means for drawing said blank over said anvil and through said machine, means mounting said draw means and said anvil so that one is movable relative to the other, said anvil having a through slot opposite said blank, a pin slidably received within said slot, spring means urging one end of said pin against said blank and into a scoop interruption interval, means responsive to the engagement of the trailing end of said scoop interruption interval against said pin for causing relative movement of said draw means and said anvil, and means responsive to said relative movement of said draw means and said anvil to apply a bottom stop to said blank against said anvil, said stop thereby striking and retracting said pin, said pin being shaped for resulting sliding movement of said bottom stop and said scoops over said end of said pin for resumption of movement of said blank.

2. A machine for applying bottom stops to a zipper blank, said zipper blank comprising elongated side-by-side tapes and scoops, said tapes having scoop intervals wherein said tapes respectively have said scoops secured thereto with the scoops of one tape interlocking with the scoops of the other tape, said tapes also having scoop interruption

intervals in which they are free of scoops; said machine comprising an anvil, means for drawing said blank over said anvil and through said machine, said draw means comprising a lever, means pivotally mounting said lever on said machine ahead of said anvil so that said lever is movable toward and away from said anvil, means biasing said lever away from said anvil, a pair of draw rollers mounted on said lever to draw said blanks forwardly between said rollers, and means for turning said rollers, said anvil having a through slot opposite said blank, a pin slidably received within said slot, spring means urging one end of said pin against said blank, and into a scoop interruption interval, the turning of said draw rollers against said blank being in a direction to pivot said lever toward said anvil when said blank stops moving as the result of the engagement of the trailing end of said scoop interruption interval against said pin, and means to apply a bottom stop to said blank against said anvil, said stop thereby striking and retracting said pin, said spring means being stretched and placing said pin under tension, said pin being shaped for resulting sliding movement of the said bottom stop and said scoops over said end of said pin for resumption of said movement of said blank, said stop applying means having actuating means including said lever and being actuated by said movement of said lever.

3. A machine according to claim 2, said machine also comprising means relieving the tension upon said pin when said bottom stop is applied to said zipper blank.

4. A machine according to claim 2, said means for applying said bottom stop to said blank including a normally disengaged one revolution clutch having engaging means actuated by said lever, a push rod driving said stop against said anvil, and cam means coupling the driven member of said one revolution clutch to said push rod for actuation thereof upon actuation of said one revolution clutch.

5. Machine for applying bottom stops to zipper blanks, said zipper blanks comprising elongated side-by-side tapes and scoops, said tapes having scoop intervals wherein said tapes respectively have said scoops secured thereto with the scoops of one tape interlocking with the scoops of the other tape, said tapes also having scoop interruption intervals in which they are free of scoops; said machine comprising an anvil, means for drawing said blank over said anvil and through said machine, said anvil having a through slot opposite said blank, a pin slidably received within said slot, spring means urging one end of said pin against said blank and, into a scoop interruption interval, normally inactive means for applying a bottom stop to said blank against said anvil, said stop thereby striking and retracting said pin, said spring means being stretched and placing said pin under tension, and means responsive to the movement of the tape feed means for actuating said stop applying means.

6. Machine according to claim 5, said machine also comprising means relieving the tension on said pin when said stop is applied to said blank, said pin being shaped for resulting sliding movement of said bottom stop and said scoops over said end of said pin for resumption of said movement of said blank.

7. Machine for applying bottom stops to a zipper blank, said zipper blank comprising elongated side-by-side tapes and scoops, said tapes having scoop intervals wherein said tapes respectively have said scoops secured thereto with the scoops of one tape interlocking with the scoops of the other tape, said tapes also having scoop interruption intervals in which they are free of scoops; said machine comprising an anvil, means for drawing said blank over said anvil and through said machine, said anvil having a through slot opposite said blank, a pin slidably received within said slot, spring means urging one end of said pin against said blank and into a scoop interruption interval, means for positioning a bottom stop opposite said pin and said anvil in position to be applied to said blank, a normally retracted pusher movable against said bottom stop to drive it upon said anvil and into said blank and thereby retract said pin, said pusher having a further slot in the end thereof which receives said pin in the event that there is a failure to supply said bottom stop to its application position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,601,442	Havener	Sept. 28, 1926
1,859,101	Lyons	May 17, 1932
2,631,638	Levine	Mar. 17, 1953
2,685,948	Freeman	Aug. 10, 1954
2,723,011	Havir	Nov. 8, 1955
2,766,452	Hansen	Oct. 16, 1956