Dec. 19, 1944. A. NOVICK 2,365,211

ENVELOPE MACHINE

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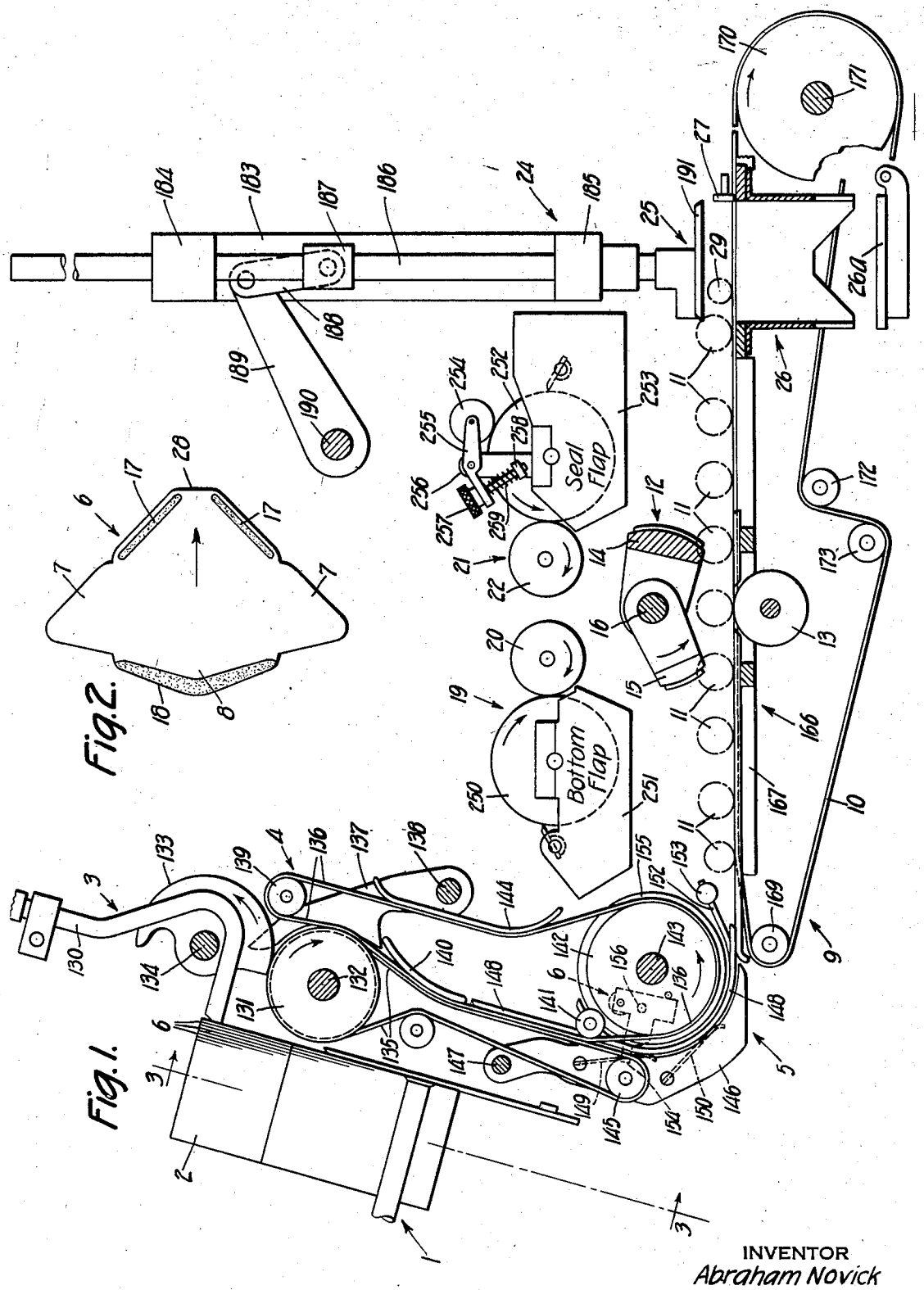


Fig. 1.

Fig. 2.

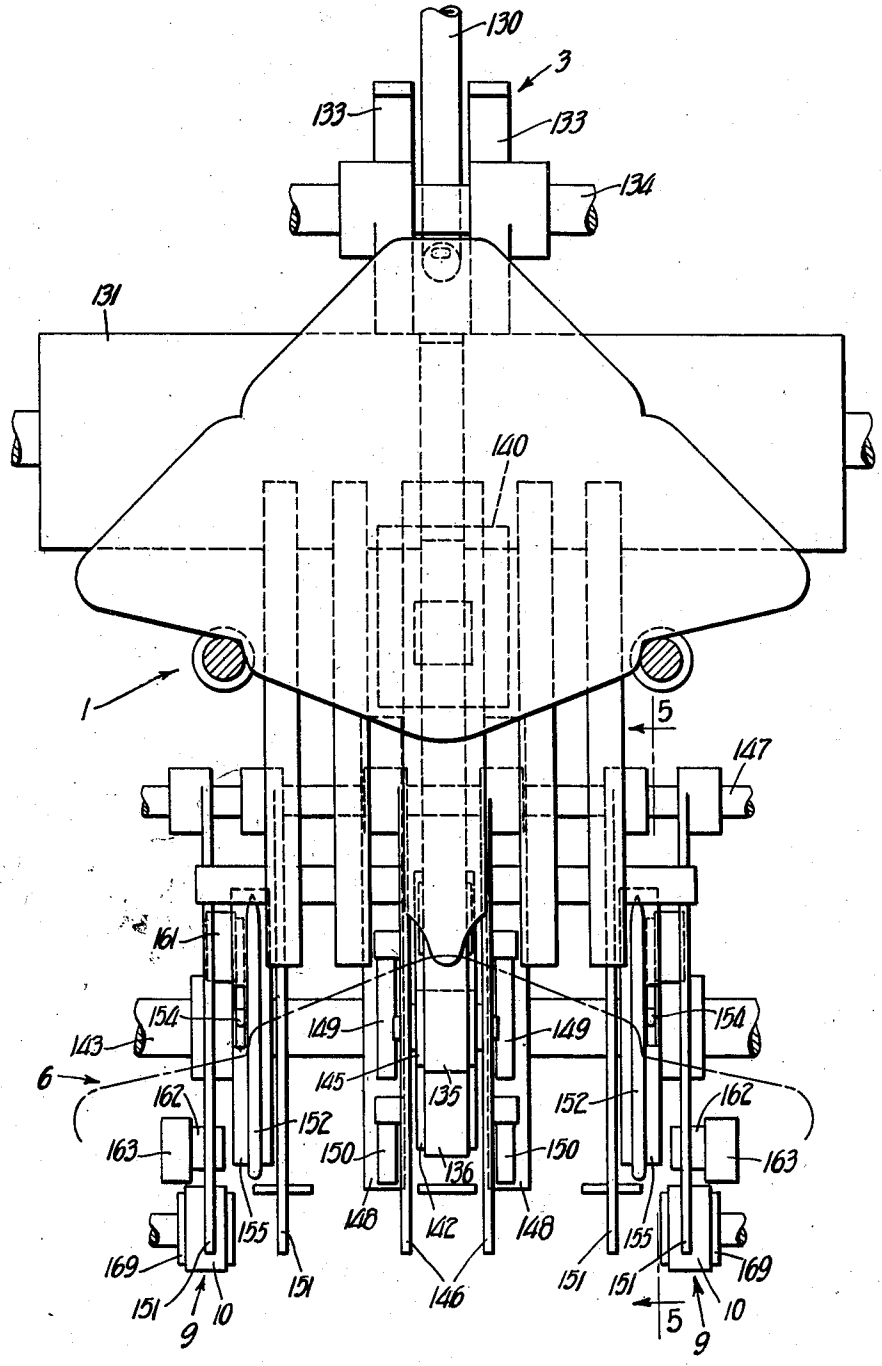
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Fig. 3.



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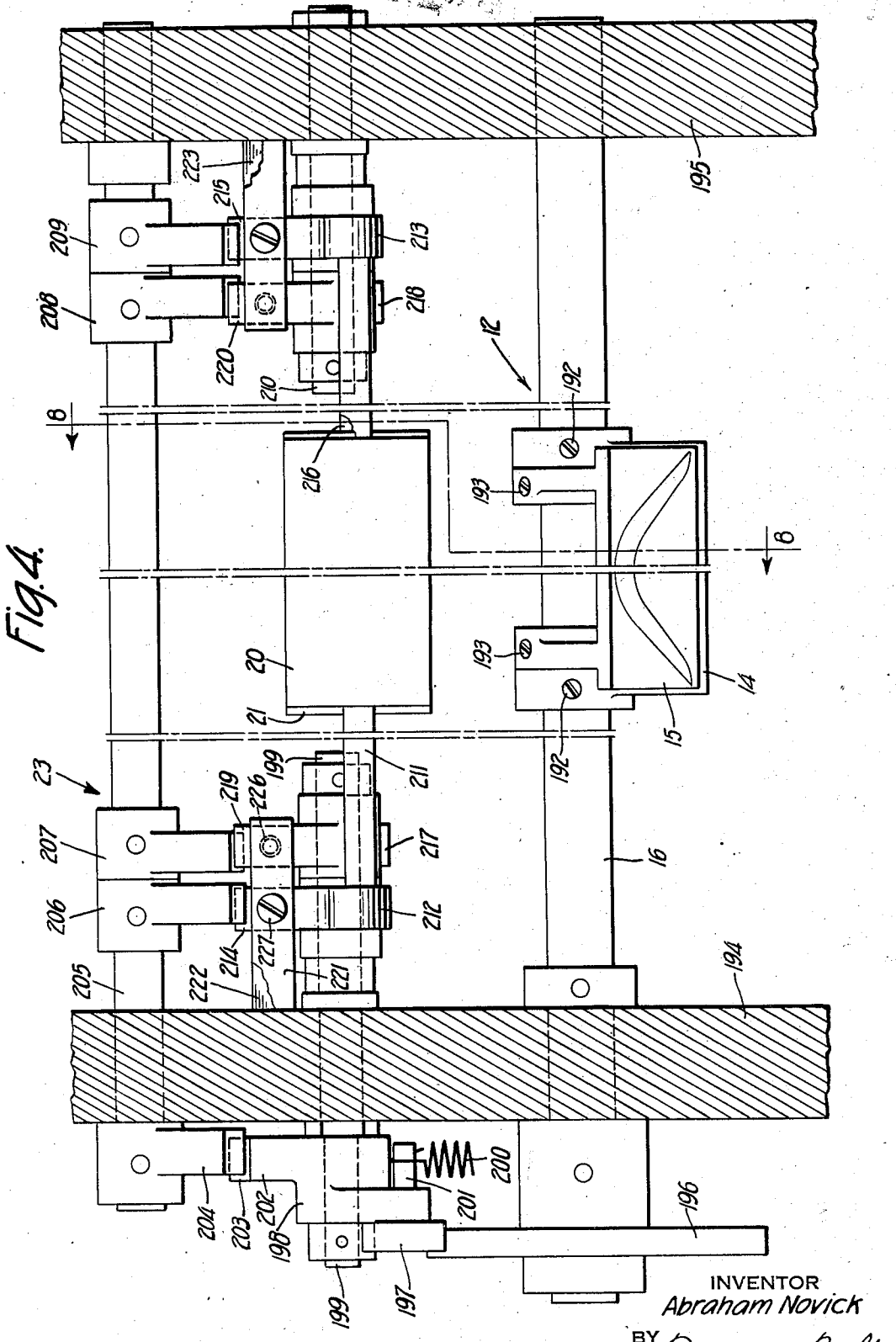


Fig. 4.

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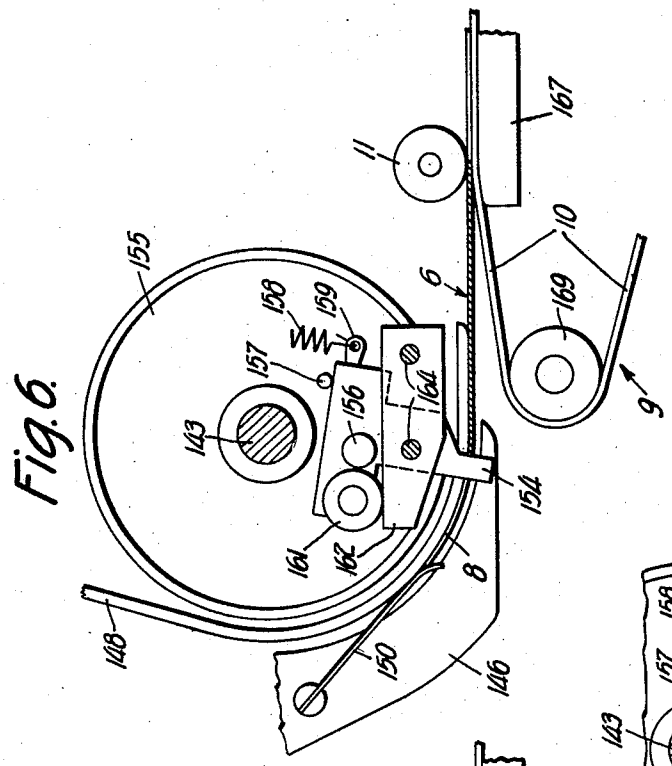


Fig. 6.

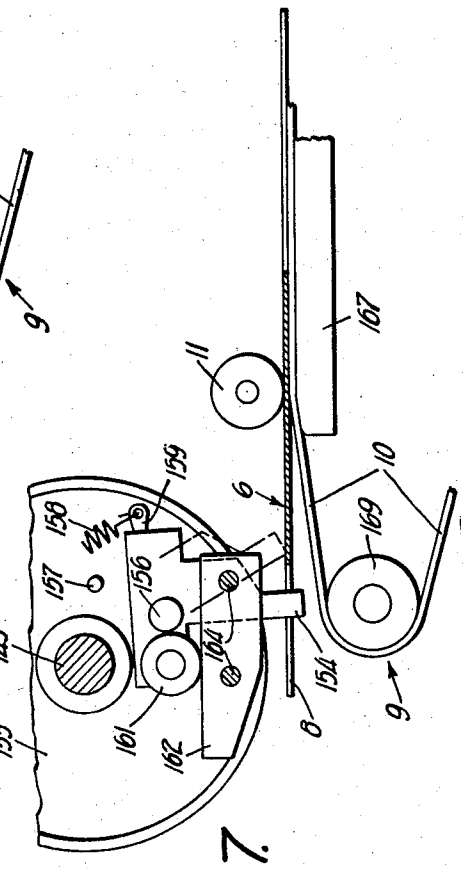


Fig. 7.

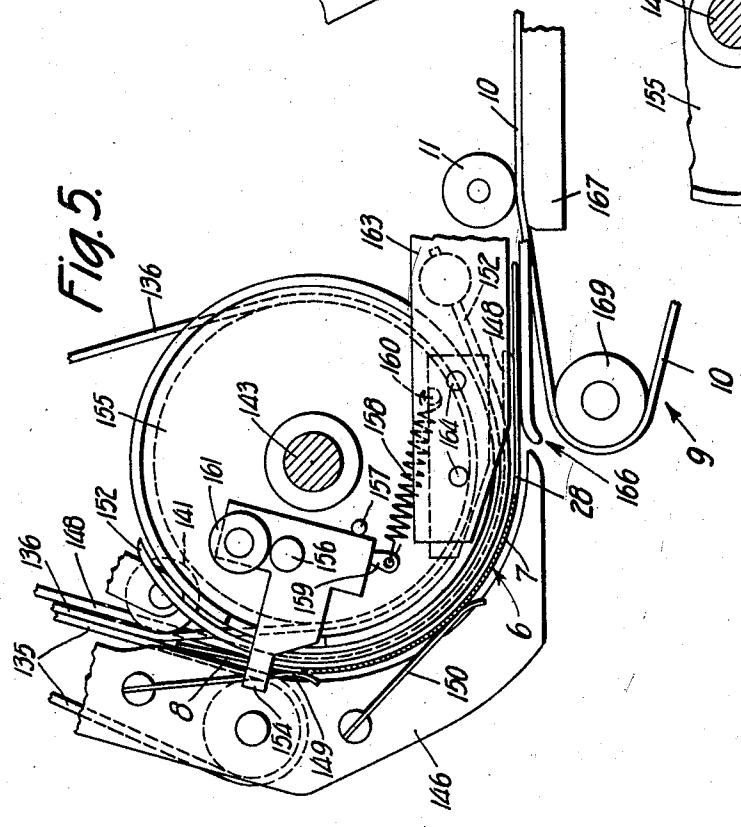


Fig. 5.

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Fig. 9.

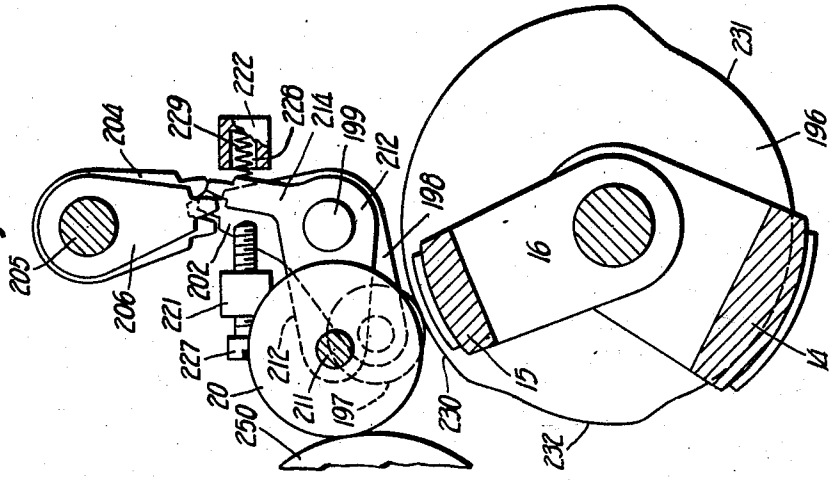


Fig. 10.

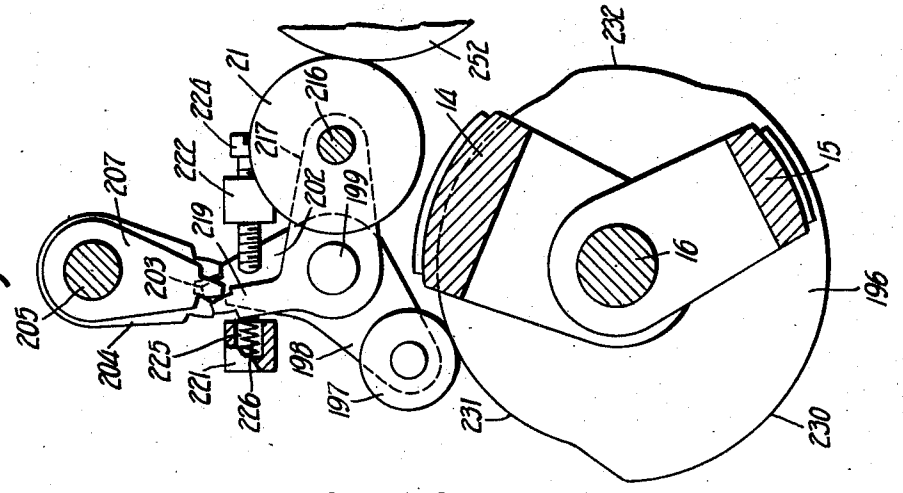
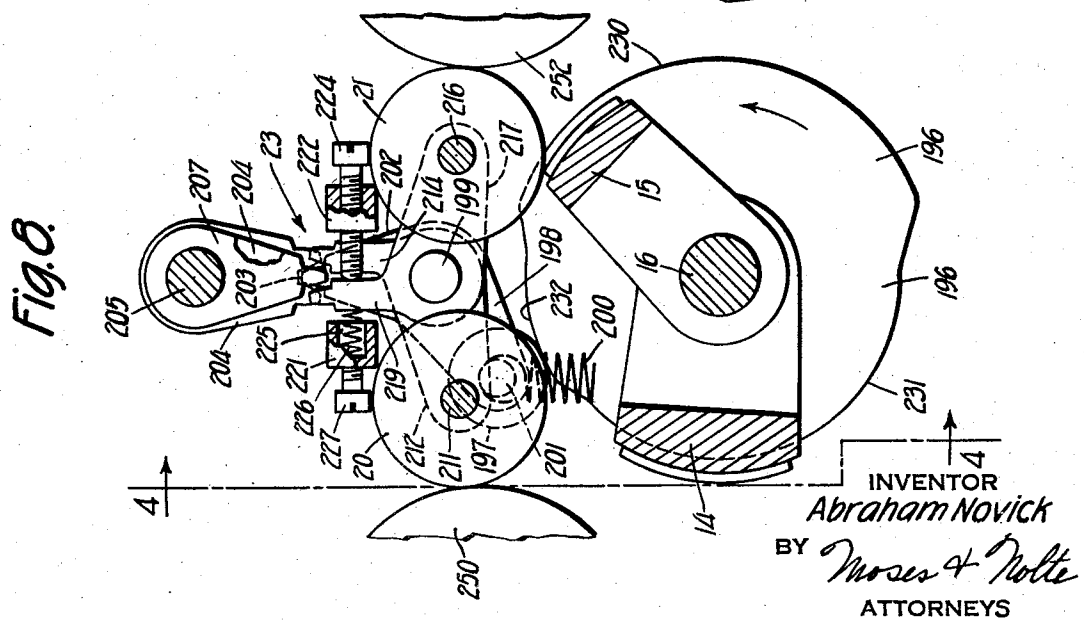


Fig. 8.



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Fig. 11.

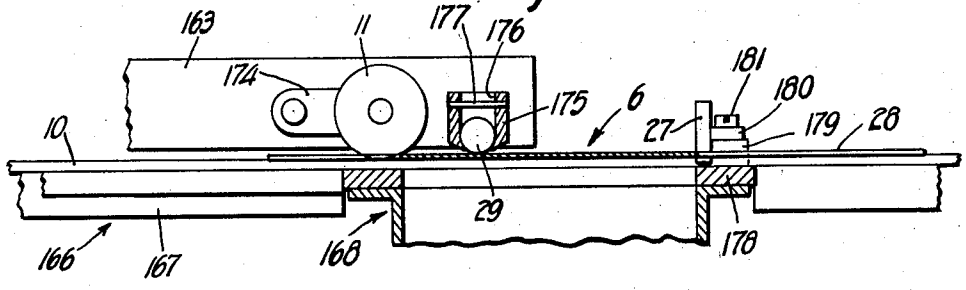
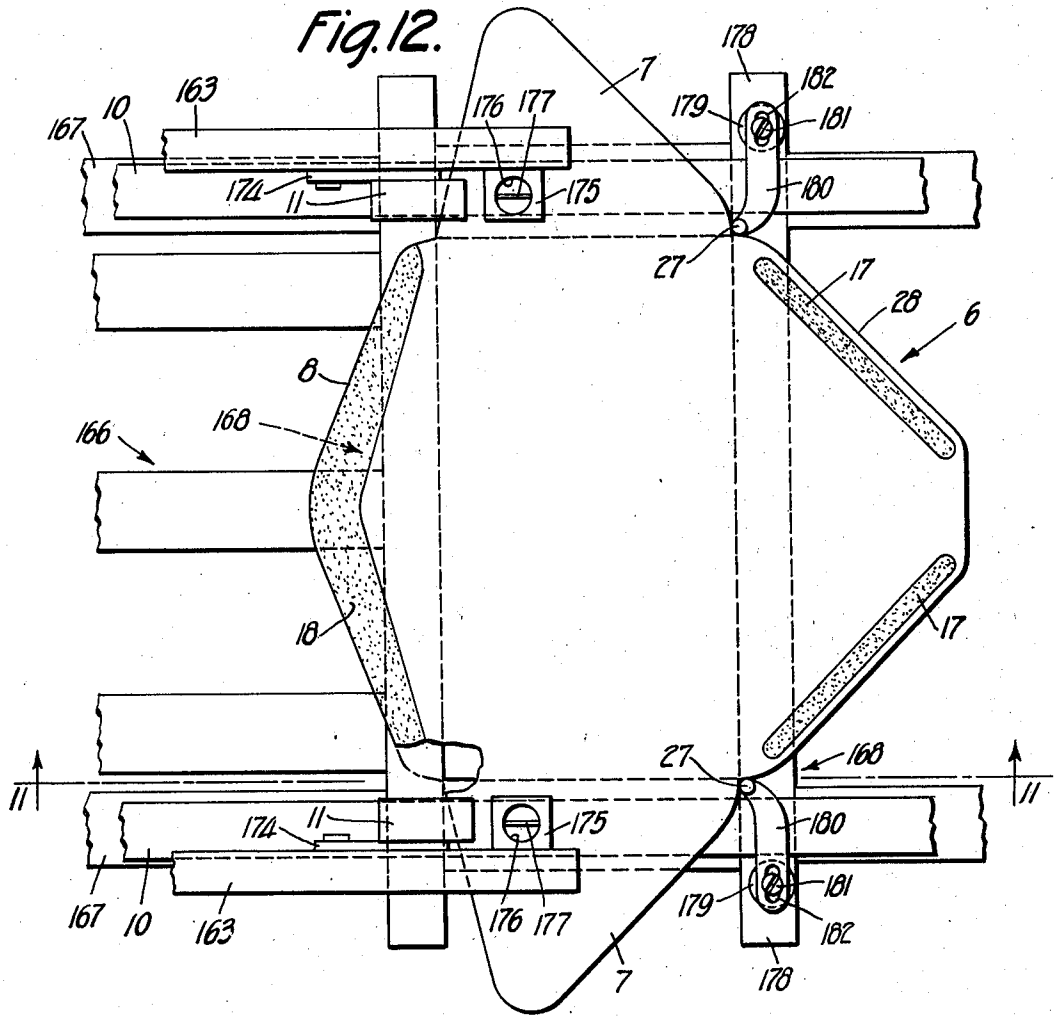


Fig. 12.



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Fig. 13.

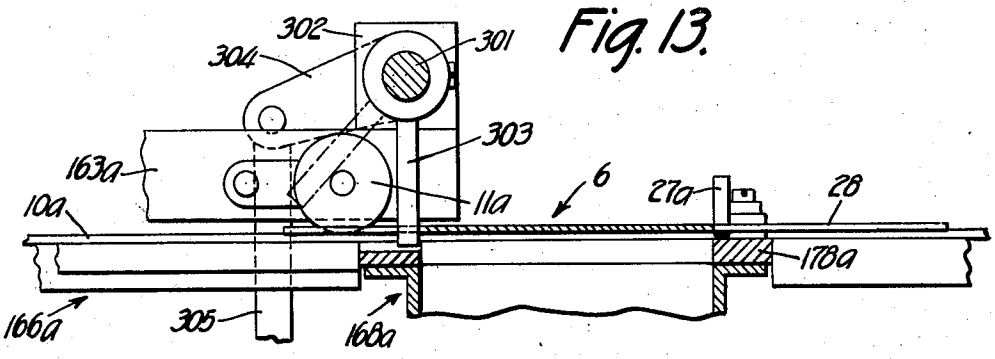
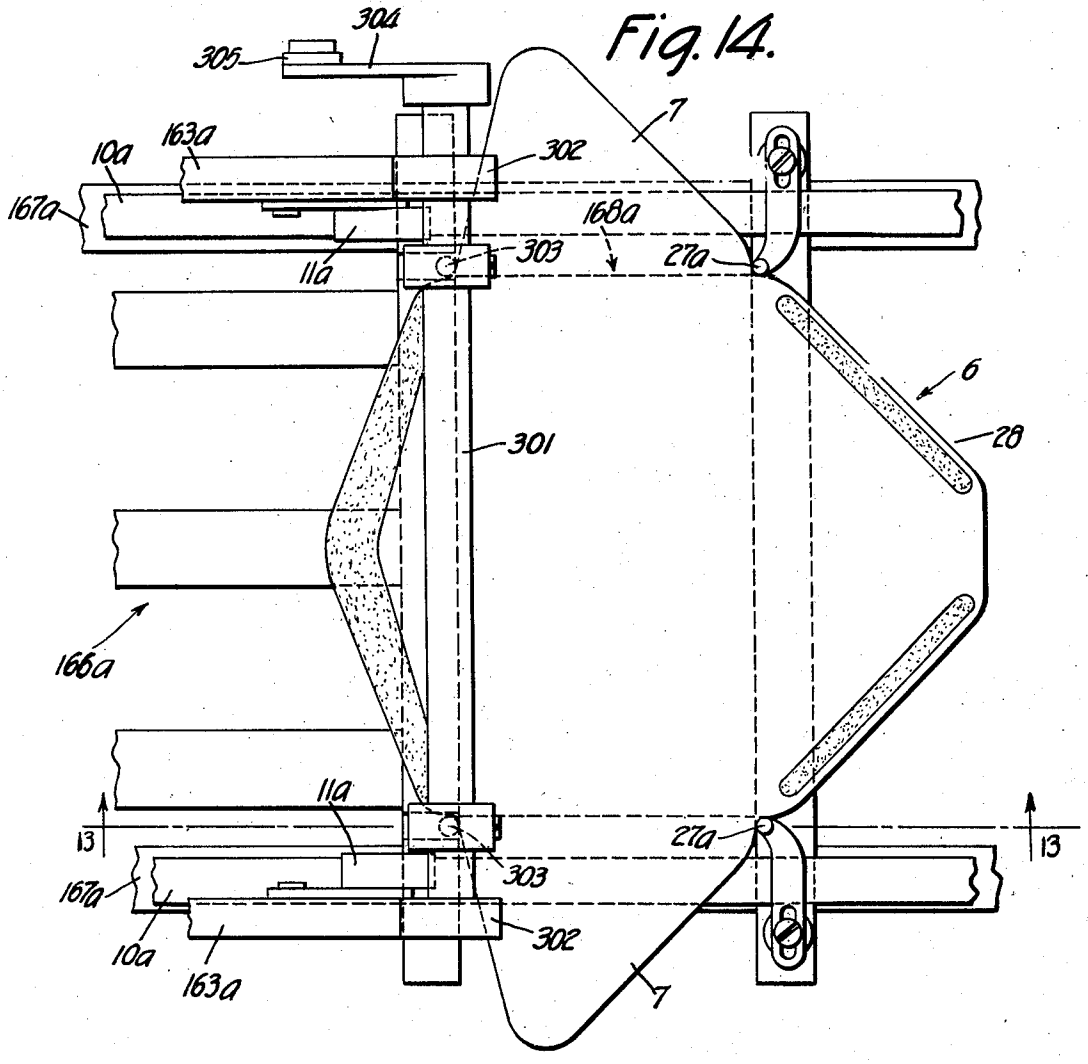


Fig. 14.



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Patented Dec. 19, 1944 2,365,211

UNITED STATES PATENT OFFICE

2,365,211

ENVELOPE MACHINE

Abraham Novick, Flushing, N. Y., assignor to F. L. Smithe Machine Co., Inc., New York, N. Y., a corporation of New York

Application April 20, 1940, Serial No. 330,646

2 Claims. (Cl. 93—66)

This invention relates to improvements in mechanism for feeding, gumming and folding sheet material, more specifically to envelope making machinery, and in its most specific aspect to envelope making machinery of the plunger type. Although certain features of the invention have utility apart from the making of envelopes, the invention is illustratively disclosed herein as embodied in an envelope making machine of the plunger type. The illustrated machine is an improvement upon the machine disclosed in United States Letters Patent No. 2,111,317 to D. G. Dreher.

It is an important object of the invention to provide an envelope machine of the plunger type having, in combination, means for separating envelope blanks singly from a stack of blanks, and means for accurately aligning and timing the separated blanks and delivering them to a frictional conveyor, together with a frictional conveyor for advancing the blanks into position to be folded by the plunger folding mechanism.

It is a further object of the invention to provide, in an envelope machine, the combination of a rotary gummer and a plunger folding mechanism with a frictional conveyor for carrying the envelope blanks past the rotary gummer and into folding position.

It is a further object of the invention to provide, in an envelope machine, the combination with means for separating blanks singly from a stack of blanks and for feeding them downward, of means defining an arcuate path for the blanks, rotary blank pushing elements for transmitting the blanks through said arcuate path, and frictional conveyor means running tangent to the arcuate path of receiving each blank as it is delivered by the pushing elements.

It is a more specific object of the invention to provide means for causing the pushing elements to be shifted in anti-blank-feeding direction relative to the rotary support of the pushing elements, and to be maintained in such shifted condition, as the pushing elements are withdrawn from the blank path.

In Patent #2,113,317 a plurality of gumming segments are provided upon a common shaft for applying different kinds of gum to the bottom flap and to the seal flap of an envelope blank. Separate transfer rollers are provided for delivering gum to the respective segments, and means are provided for oscillating the transfer rollers in timed relation with the rotation of the segments to cause each roll to deliver gum to its proper segment, but to escape engagement with the other segment. The present machine embodies this principle of operation. It is a further object of the present invention to provide improved means for controlling the oscillations of the gum transfer rollers.

It is still another object of the invention to provide an envelope machine of the plunger type in which the envelope blanks are accessible to, and within arm's reach of, an operator stationed at the introductory end of the machine up to the time when they have passed to and through the forming box of the plunger mechanism, the purpose being to enable a jam to be quickly and conveniently cleared up. This object is attained by virtue of a combination of several features. The blanks are first fed downward away from the stack. They are timed and aligned while traveling through an arcuate path, and, therefore, are required to travel in a direction away from the operator only for a distance sufficient to carry them past the rotary gummer into folding position. In the gummer, as has been pointed out, the two gum segments have a common axis of rotation which enables the frictional conveyor to be made very short. The frictional conveyor consists of rotary members which act continuously and unidirectionally upon the side flaps of the blanks. The space between and below the rotary conveyor members is substantially free from obstruction.

In accordance with a practical and advantageous embodiment of the invention, it is an important feature that provision is made, in combination with a plunger folding mechanism, of a frictional conveyor for carrying envelope blanks into folding position, together with cooperative feeding and arresting means which cause the blanks to be yieldingly advanced and accurately placed in folding position by the action of the conveyor without interrupting the movement of the conveyor.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification:

Fig. 1 is a fragmentary view in sectional, side elevation of a portion of an envelope making machine of the plunger type which embodies features of the invention;

Fig. 2 is a plan view of a gummed envelope blank upon which the machine is adapted to operate, the view showing particularly the disposition of the seal flap and bottom flap gum;

Fig. 3 is a fragmentary, sectional view taken upon the line 3—3 of Fig. 1 looking in the direc-

tion of the arrows, the view being upon a larger scale than Fig. 1;

Fig. 4 is a fragmentary detail, sectional view taken upon the line 4—4 of Fig. 8 looking in the direction of the arrows;

Fig. 5 is a fragmentary, detail, sectional view taken upon the line 5—5 of Fig. 3 looking in the direction of the arrows;

Fig. 6 is a view generally similar to Fig. 5, but showing the parts at a different stage of the operation, a number of the parts being omitted for clearness of illustration;

Fig. 7 is a further view similar to Figure 5, but showing the parts at still another stage of the operation, a number of the parts being omitted for clearness of illustration;

Fig. 8 is substantially a fragmentary, sectional view taken upon the line 8—8 of Fig. 4 looking in the direction of the arrows, but with the parts at a different stage in the cycle of operations;

Fig. 9 is a view similar to Fig. 8, but with certain parts shown in Fig. 8 omitted and with the mechanism illustrated at a later point in the cycle of operations;

Fig. 10 is also a view similar to Fig. 8 with certain of the parts illustrated in Fig. 8 omitted and with the parts shown at a point in cycle of operations subsequent to that of Fig. 9;

Fig. 11 is a fragmentary, sectional view taken upon the line 11—11 of Fig. 12 looking in the direction of the arrows;

Fig. 12 is a fragmentary view of the folding box and associated parts.

Fig. 13 is a fragmentary view in sectional side elevation of a modified embodiment of the invention, the section being taken upon the line 13—13 of Figure 14 looking in the direction of the arrows; and

Figure 14 is a fragmentary plan view of the mechanism illustrated in Figure 13.

Before a detailed description of the machine is undertaken, the principal instrumentalities will first be briefly described in their relation to one another so as to afford a comprehensive view of the general functioning of the machine.

Supports 1 are provided for a stack 2 of envelope blanks. The supports maintain the stack at a slight inclination to the horizontal, and the blanks are removed singly from the lower end of the stack by separator mechanism 3 of the kind disclosed in my application for patent filed concurrently herewith and entitled Sheet feeding mechanism, Serial No. 327,967. The blanks are withdrawn from the stack at uniform time intervals and are transmitted in a generally downward direction by belt conveyor mechanism 4, which runs continuously. The blanks are delivered by the conveyor mechanism 4 to inert guide means designated generally by the reference numeral 5, which define an arcuate path for the blanks.

Rotary pusher means 6 are caused to traverse the arcuate path defined by the guide means 5 and to engage each envelope blank 6 at the junction of the side flaps 7 with the sealing flap 8 of the blank to push it forward in accurately timed and aligned relation to frictional conveyor mechanism 9, which defines a blank feeding path tangent to the arcuate path defined by the guide means 5. The conveyor desirably comprises a pair of parallel belts 10 which act upon the side flaps 7 of the blanks and outside the bounds of the body portion of the blank. Holddown rollers 11 opposed to the belts 10 cause the blanks to be advanced by the conveyor mechanism 9 past a gumming device 12, which comprises a bed roller 13 and a pair of gumming segments 14 and 15.

The gumming segments 14 and 15 are mounted upon a common shaft 16, and hence the peripheries of the segments travel in a common circular path. One of the segments 14 is caused to apply the bottom flap gum 17 to a blank, and the other segment 15 is caused to apply the seal flap gum 18 to a blank. These gums are of different character, and hence provision is made for causing one kind of gum to be delivered to the segment 14 and another kind of gum to be delivered to the segment 15. Briefly, this is accomplished by providing gum supply means 19, including a transfer roller 20, to deliver gum to the segment 14, and gum supply means 21, including a transfer roller 22, for delivering gum to the segment 15.

Provision is made of mechanism indicated generally at 23, Figures 4 and 8, for oscillating the gum transfer rollers 20 and 21 in timed relation with the rotation of the gum segments 14 and 15, to cause the transfer roller 21 to engage the segment 15, but to escape engagement with the segment 14, and to cause the transfer roller 20 to engage the segment 14, but to escape engagement with the segment 15.

The conveyor mechanism 9 acts continuously and unidirectionally to carry the blanks frictionally past the gumming mechanism 12 and into position to be folded by plunger mechanism 24 which comprises a folding plunger 25 and a folding box 26. The folding box is disposed between the belts 10 and beneath the plane of the upper or active stretches of the belts 10, and the plunger 25 reciprocates into and out of the folding box, delivering the partially folded blanks onto a pivoted suction trap 26a for the completion of the folding operations. The present invention is not concerned with further details of the folding and drying of the envelopes, and hence such further folding means may be of any suitable and conventional construction, as disclosed, for example, in Letters Patent of the United States No. 1,631,146.

The blanks are advanced to folding position against stop pins 27, Figures 11 and 12, which serve to intercept the oncoming blanks by engagement in the angles formed at the junction of the bottom flap 28 with the side flaps 7. The pins 27 serve both to arrest the blanks and to realign them accurately for the folding operation.

In order that this arresting and realigning may occur, provision is made for causing the final advance of a blank toward and into engagement with the stop pins 27 to be effected with a light yielding force. To this end provision is made at each side of the machine of a universally revoluble ball 29 which bears lightly upon a side flap of the blank in opposition to one of the belts 10. The balls function very advantageously in this connection, both because they cause a blank to be carried against the stop pins with a light, yielding force. and because they offer no substantial opposition to the subsequent drawing of the side flaps, transversely of the direction of blank feeding, toward and into the folding box.

As will be observed from Fig. 1, each of the stacked envelope blanks is supported on edge and stands in a generally upright attitude, but somewhat inclined toward the right. The right-hand end of the stack is, therefore, the lower end of the stack. The mechanism 3 comprises a suction picker 130 which is caused to reciprocate between a position like that illustrated in Fig. 1 and a po-

sition for deflecting the upper marginal portion of the lowermost blank into the space between a roller 131 which is fast on a shaft 132, and a pair of feed segments 133, see Figure 3 also, which are fast upon a shaft 134. The suction picker 130 acts in timed relation to the rotation of the segments 133, so that each deflected blank is caused to be seized between the segments 133, on the one hand, and the roller 131 on the other and pulled away from the stack.

The roller 131 is formed with a central groove in which an endless belt 135 travels. An endless belt 136 is opposed to the belt 135 and coacts with the belt 135 to feed the blanks downward away from the roller 131. Guide members 137 mounted upon a rod 138 serve to guide the leading end of the blank in conformity with the periphery of the roller 131 until the blank becomes gripped between the belts 135 and 136.

The belt 136 runs around an end pulley 139, thence downward into bearing engagement with the belt 135, upon a portion of the grooved periphery of the roller 131. The belt 136 then travels downward over a curved guide 140, around a guide roller 141, and onto a pulley 142, which is fast upon a shaft 143. From the pulley 142 the belt 136 travels upward against a curved guide 144 and onto the end pulley 139.

The belt 135 travels downward from the roller 131 in bearing engagement with the belt 136 as far as the guide roller 141, but from that point downward the belts 135 and 136 diverge, the belt 135 continuing straight or substantially straight to an end pulley 145 which is carried by a pair of guide arms 146 mounted upon a rod 147.

Flat guide members 148, Figures 1 and 3, extend downward alongside the belt 136 in parallelism with the belt for a considerable distance, or until the guide roller 141 is reached. Just below the guide roller 141 the guides 148 continue straight downward for a short distance, crossing the belt 136. The guides 148 continue arcuately around the axis of the shaft 143 as a center and terminate in straight, substantially horizontal end portions. The guides 146 have their faces, which are toward the shaft 143, formed upon arcs concentric with the shaft. The guides 148 and 146 together define an arcuate path for the blanks, concentric with the shaft 143. The guides 146 carry spring fingers 149 and 150 for pressing the blanks against the guides 148. Additional guides 151, similar to the guides 146, are supported upon the rod 147. The inner faces of the additional guides 151, that is, the faces toward the shaft 143 are of equal curvature with the inner faces of the guides 146 and at the same distance from the axis of the shaft 143. Additional guide rods 152 carried by supporting rods 153 extend arcuately around the axis of the shaft 143 with their outer faces in substantial circumferential coincidence with the outer faces of the arcuate portions of the guides 148.

It will be seen that the blanks are delivered into the arcuate guide formed by the members 148 and 152, on the one hand, and by the members 146 and 151 on the other hand, by the conveyor belts 135 and 136, but that after the trailing edge of a blank has cleared the guide roller 141, the belts have no further tendency to drive the blank.

Provision is made of rotary blank pushing means 6, Figures 1, 3 and 5, for timing and aligning the blanks and for pushing them through the arcuate guide. The pushing means comprises two pushing members 154, each carried by a wheel 155 fast on the shaft 143. The pushing members extend across the arcuate path defined by the guides, and since the arcuate path is of larger radius than the pulley 142 upon which the belt 136 travels, the feed of the blanks through the arcuate guide is somewhat faster than the feed imparted to the blanks by the belts 135 and 136.

Each blank desirably comes to rest at least momentarily after clearing the grip of the belts 135 and 136. The pushing members are arranged to engage in the angles formed at the junctions of the seal flap 8 with the side flaps 7 of a blank to drive the blank forward. The guides 152 extend around the peripheries of the wheels 155 so that the blanks are definitely held out of engagement with the wheels and must depend for their advance upon the action of the pushing members 154. The function of the pushing members is to deliver the blanks in accurately timed and aligned relation to the frictional conveyor mechanism 9.

The blank feeding path defined by the conveyor mechanism 9 is a straight continuation of the arcuate path defined by the guides 148, 152, 146 and 151, and the point at which the straight and arcuate paths merge may, therefore, be referred to as a point of tangency of the straight path with the arcuate path.

As the pushing members 154 near the point of tangency, the conveyor mechanism 9 takes over control of the blank being delivered, the speed of the conveyor mechanism 9 being substantially the same as the travel of the pushing members along the arcuate path.

The pushing members may be permitted to travel in unison with their carrying wheels up to or nearly to the point of tangency, but must be retarded from that point onward in order to prevent the pushing members from gaining on a blank and mutilating the rear edge of the blank.

Provision is made for retardation of the pushing members at the appropriate time. Each pushing member 154 is supported upon its carrying wheel 155 by means of a pivot pin 156, and is held normally in engagement with a stop pin 157 affixed to the wheel 155 by means of a tension spring 158 which is connected at one end to an ear 159 of the pushing member, and at the other end to a pin 160 affixed to the wheel 155. Each pushing member is in the form of a three-armed lever, one arm being designed for engaging the blank, a second being connected to the spring 158 and being engageable with the stop 157, and the third being provided with a cam engaging roller 161. A stationary cam 162 is secured to a supporting bar 163 by means of pins 164 in position to intercept the roller 161 and to cause the pushing member to be rocked away from engagement with the pin 157 and in anti-blank-feeding direction as it approaches the point of tangency, see Figure 7. The cam 162 is so located that the rocking of the pushing member 154 begins substantially at the instant when control of the blank has been taken over by the conveyor mechanism 9. After the point of tangency is reached by the pushing member, the pushing member traverses a straight or tangent portion of the blank path, and hence the portion of the pushing member which extends across the blank path is progressively nearer the outer end of the pushing member and of progressively increasing effective radius as the pushing member travels upward and forward to clear the blank path. The cam is so constructed and arranged that the rocked or retracted condition of the pushing member is maintained until the tip of the pushing member has

cleared the tangent portion of the blank path. After the blank path is cleared by the pushing member 154, the cam permits the spring 158 to return the pushing member into engagement with the stop 157, so that the pushing member is in its proper normal position for acting upon the next following blank at the appropriate time.

The conveyor mechanism 9 comprises an appropriate table structure 166, Figures 1, 11 and 12, which includes side rails 167 upon which the belts 10 are supported in their upper or active stretches. The table 166 provides an appropriate gap, as will be well understood, for accommodating the bed roller 13 of the gumming mechanism. The table structure also includes a rectangular frame 168 which constitutes the mouth portion of the folding box 26.

Each of the belts 9 runs upon an end pulley 169 at the introductory end of the conveyor 9 and an end driving pulley 170 at the delivery end of the conveyor, the pulley 170 being fast upon a drive shaft 171. In the lower stretch of the conveyor provision is made of tensioning rollers 172 and 173 for eliminating slack from the belts 10.

Side rails 163 at opposite sides of the machine carry pivoted bearing arms 174 upon which the holddown rollers 11 are mounted for pressing the side flap portions of the blanks firmly but with yielding pressure against the conveyor belts 10. The conveyor belts 10, in cooperation with the rollers 11, serve to advance each blank continuously past the gumming mechanism 12 and substantially up to the folding position. The side flaps 7, however, clear the final rollers 11 shortly before the blank arrives in folding position.

For the purpose of advancing a blank against the pins 27 with light, yielding force, each side bar 163 is formed with an ear 175 having a cylindrical bore 176 formed in it. Each bore 176 receives one of the balls 29. A cross pin or bolt 177 transfixes the ear 175 above the ball, and serves as a means for precluding any possibility of the ball's becoming accidentally dislodged from the ear.

The rectangular frame 168 is formed with extensions 178, each formed with an upstanding boss 179. A slotted arm 180 is adjustably mounted upon each boss, being held to the boss in adjusted position by means of a headed bolt 181 whose shank passes through the slot 182 of the arm. Each arm 180 carries at its free end one of the pins 27, the pin being desirably formed integral with the arm 180 and being located at the extreme tip portion thereof. By virtue of the bolt and slot arrangement, each arm is adapted for radial and pivotal adjustment.

The plunger mechanism comprises a frame member 183 having upper and lower guide ears 184 and 185 in which a plunger stem 186 is mounted for vertical reciprocation. A collar 187 fast on the plunger stem 186 is connected through a link 188 with an operating arm 189 fast on a rock shaft 190. The plunger carries at its lower end a forming plate 191, which substantially conforms in contour and dimensions with the folding box 26. The shaft 190 is operated in properly time relation with the arrival of the blanks in folding position.

The gumming mechanism is best illustrated in Figures 1, 4 and 8 to 10, inclusive. The shaft 16, upon which the gumming segments 14 and 15 are secured by means of set screws 192 and 193, respectively, is rotatably mounted in frame members 194 and 195, see Figure 4.

The shaft 16 has fast upon it a cam 196 for causing the gum transfer rollers 20 and 22 to be oscillated in properly timed relation with the rotation of the gumming segments to cause the roller 21 to engage the segment 15, but to escape engagement with the segment 14, and to cause the roller 20 to engage the segment 14, but to escape engagement with the segment 15.

The cam 196 engages a cam follower roller 197 which is carried by a bell crank lever 198 oscillatably mounted upon a shaft 199. The shaft 199 is supported in the frame member 194. A tension spring 200 is connected at one end to a pin 201 carried by the bell crank lever 198, and at the other end to a fixed frame member for maintaining the follower roller 197 in engagement with the cam 196. The bell crank lever 198 includes an upstanding arm 202 which is formed at its upper end with a single tooth 203 for engaging between two teeth of a two-toothed gear segment 204, which is fast upon a rock shaft 205. The shaft 205 extends completely across the machine and is supported in the frame members 194 and 195. The shaft 205 has fast upon it four single-toothed crank members 206, 207, 208 and 209 which, although made as separate elements for convenience of manufacture, operate as one.

A stub shaft 210 is mounted in the frame member 195 in axial alignment with the shaft 199 and cooperates with the shaft 199 in supporting bell crank levers whereby the transfer rollers 20 and 21 are carried. The roller 20 is fast upon a shaft 211, carried by a pair of bell crank levers 212, 213, which are rockably mounted, respectively, upon the shafts 199 and 210. The arms which support the shaft 211 extend leftward from the common axis of shafts 199 and 210 and these levers are, therefore, referred to in the claims as left-hand bell cranks. The bell cranks 212 and 213 include upstanding arms 214 and 215, Figure 4, respectively, each formed with a single tooth at its upper end. The cranks 206 and 209 are each formed with a single tooth at the lower end, and the teeth of bell cranks 212 and 213 lie behind the teeth of the cranks 206 and 209, as viewed in Figure 4.

Similarly, the roller 21 is fast upon a shaft 216 which is carried by rightwardly extending arms of bell cranks 217 and 218, which are rockably mounted, respectively, upon the shafts 199 and 210. The bell cranks 217 and 218 include, respectively, upstanding arms 219 and 220, each of which is formed with a single tooth at its upper end. The teeth of arms 219 and 220 lie to the left of the teeth of cranks 206 and 209 as viewed in Figure 8. The single teeth of all of the members 206, 207, 208 and 209 are constantly in coincidence with one another as viewed in Figure 8.

When the shaft 205 is rocked clockwise, the bell cranks 217 and 218 are rocked counter-clockwise to lift the roller 21 clear of the common circular path traveled by the peripheries of the segments 14 and 15. When the shaft 205 is rocked counter-clockwise, the bell cranks 212 and 213 are rocked clockwise to lift the roller 20 clear of the common circular path of the peripheries of the segments 14 and 15. Bars 221 and 222 are mounted on the frame member 194 to extend at opposite sides of the upstanding arms of the bell cranks 212 and 217. A similar pair of arms 223 is mounted upon the frame member 195 to extend at opposite sides of the upstanding arms of the bell cranks 213 and 218. Since this second pair of arms is a duplicate in construction and operation of the arms 221 and 222, a description

of the arms 221 and 222 and the elements carried by them will suffice to cover both sets of arms.

The arm 222 carries an adjustable screw 224, Figures 8 and 10, against which the upstanding arm 219 of bell crank lever 217 bears when the lever is not rocked counter-clockwise by the action of the shaft 205. The screw 224 constitutes a means for micrometrically adjusting the normal or free position of the roller 21. The bar 221 is formed with a socket 225 in which a compression coil spring 226 is housed. The spring 226 bears against the upstanding arm 219 of the bell crank 217, and urges the arm 219 into engagement with the adjustable screw 224. The set screw 224 is desirably adjusted to cause the roller 21 when free to extend very slightly across the circular path traversed by the peripheries of the segments 14 and 15. Thus, when the segment 15 comes into engagement with the roller 21, it cams the roller outward very slightly against the compression of the spring 226 so that the roller, while running in engagement with the face of the segment 15, bears with light spring pressure against the segment.

Similarly, the bar 221 is provided with an adjustable screw 227, Figures 4, 8 and 9, for determining a similar normal or free position of the roller 20. The bar 222 is formed with a bore 228 in which is seated a compression coil spring 229 for bearing against the upstanding arm 214 of the bell crank lever 212 to urge the arm 214 against the adjustable screw 227. The normal setting of the roller 20 is similar to that described for the roller 22.

The cam 196, as will be evident, causes the bell crank lever 198 to be rocked clockwise as the cam forces the follower roller 197 away from the axis of the shaft 16, and the spring 200 causes the bell crank lever 198 to be rocked counter-clockwise as the cam permits the roller 197 to approach the axis of the shaft 16. Clockwise movement of the bell crank 198 produces counter-clockwise movement of the shaft 205, and counter-clockwise movement of the bell crank 198 produces clockwise movement of the shaft 205. As has already been made clear, clockwise movement of the shaft 205 raises the roller 21 clear of the segment path, while counter-clockwise movement of the shaft 205 raises the roller 20 clear of the segment path.

The cam 196 may be compared for descriptive purposes with a circular disc of a radius adapted to maintain the shaft 205 always in the position illustrated in Fig. 8, that is, in a position such that neither the roller 20 nor the roller 21 is rocked away from the path traversed by the segments 14 and 15. The radius of such a disc will be referred to as the normal radius of the cam.

In Fig. 8 the follower roller 197 is shown as bearing upon a cam portion of normal radius.

The segment 15 is just coming into engagement with the roller 21 in the Fig. 8 position. As the segment 15 traverses the roller 21 there is no portion of the cam of less than normal radius which will engage the follower roller 197. Hence, the roller 21 will not be affected by the cam while the segment 15 travels past the roller 21. As the segment 15 nears the roller 20, however, a high concentric cam portion 230 comes under the roller 197, see Figure 9, rocks the bell crank lever 198 in a clockwise direction, and carries the roller 20 outward clear of the segment path so that the segment 15 escapes engagement with the roller 20. After the segment 15 has passed the roller 20 and before the segment 14 has come opposite the roller 21, a cam portion 231 of less than normal diameter comes into engagement with the follower roller 197 and causes the bell crank 198 to be rocked counter-clockwise to a position like that shown in Fig. 10. This position is maintained until the segment 14 has passed clear of the roller 21. After the segment 14 has cleared the roller 21, and as the segment 15 approaches the roller 21, a cam portion 232 of normal diameter comes under the follower roller 197 to locate the parts in the positions illustrated in Fig. 8. This condition of the bell crank 198, as already pointed out, is maintained until the cam segment 15 has traveled across the roller 21.

The rollers 20 and 22, Figure 1, both turn in a clockwise direction. A gum supply roller 250 runs in a gum pot 251 for supplying gum to the transfer roller 20. The roller 250 also turns in a clockwise direction. The transfer roller 22 runs in engagement with a gum supply roller 252 which is mounted in a gum pot 253. The roller 252 runs in a counter-clockwise direction.

Suitable gearing, not shown, is provided for driving the rollers 250 and 20, and for driving the rollers 22 and 252 in the manner described. Since this gearing is substantially the same as for the corresponding rollers in Patent #2,111,317 it is not shown and will not be described herein, but reference may be had to the patent referred to for details of the roller drive.

A spreader roller 254 runs upon the periphery of the supply roller 252 to insure uniform application of the gum to the seal flap of the envelope blank. The roller 254 is carried by levers 255 which are fulcrumed upon standards 256. An adjustable bolt 257 is passed through the tail portion of one of the levers 255 and threaded into a stationary lug 258 on the standard 256. A compression coil spring 259 is interposed between the lug 258 and the tail of the lever 255 and surrounds the shank of the bolt 257.

Figures 13 and 14 illustrate a modified embodiment of the invention in which the hold-down balls 29 are replaced by jogger mechanism operated in timed relation with the blanks to position the blanks in proper folding position.

The mechanism of Figures 13 and 14 is for the most part identical with that of Figures 1 to 12, inclusive, and accordingly corresponding reference numerals have been applied to corresponding parts with the subscript *a* added in each instance. Only those parts which are directly concerned in the modification will be referred to in the ensuing description.

The final rollers 11*a* of Figure 13 stand a little farther away from the folding box than the final rollers 11 of Figure 1. A transverse shaft 301 is supported in bearing members 302 affixed to the side bars 163*a*. Jogging fingers 303 are mounted upon the shaft 301 and are adapted to be secured in position to engage in the angles of an envelope blank formed at the junctions of the sealing flap with the side flaps. A crank 304 fast on the shaft 301 is connected through a link 305 to suitable cam mechanism (not shown) which acts in timed relation with the arrival of the blanks at the folding station to rock the shaft 301 to and fro and thereby cause the jogging fingers 303 to be oscillated. As the trailing edge of a blank moves free of the rollers 11*a*, the jogging fingers are swung from the dot and dash line position illustrated in Figure 13 to the full line position to push the blank forward into engagement with the aligning pins 27*a*. As soon as the jogging pins have performed this function, they are swung back to their

dot and dash line positions so as to stand clear of the next oncoming blank.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. An envelope making machine comprising, in combination, means for supporting a stack of blanks in an inclined attitude, means for singly withdrawing envelope blanks laterally from the lower end of the stack, means for feeding the blanks downward a substantial distance below the stack, said feeding means being of an open construction, so that an operator can see through it, conveyor means for thereafter conveying the blanks in a substantially horizontal path in which the blanks can be seen from a point of observation below the stack by looking through the feeding means which feeds the blanks downward below the stack, said means for supporting said stack of blanks being located above said horizontal path, said conveyor means being confined substantially to longitudinal zones alongside the path traversed by the body portions of the envelope blanks, and engaging the blanks outside the lateral bounds of the body portions thereof, an envelope forming plunger mechanism at the end of said path, bottom flap gumming means for acting on the blanks as they travel along said path, and seal flap gumming means for acting on the blanks as they travel along said path, said bottom flap and seal flap gumming means being mounted with a common axis of rotation to minimize length requirements of such path, and said path being accessible through the conveyor means, and short enough so that all portions of said path are within arm's reach of an operator of usual size when seated at the introductory end of the machine with his head beneath the stack.

2. An envelope making machine comprising, in combination, means for supporting a stack of blanks in an inclined attitude, means for singly withdrawing envelope blanks laterally from the lower end of the stack, means for feeding the blanks downward a substantial distance below the stack, said feeding means being of an open construction so that an operator can see through it, conveyor means for thereafter conveying the blanks in a substantially horizontal path in which the blanks can be seen from a point of observation below the stack by looking through the feeding means which feeds the blanks downward below the stack, said means for supporting said stack of blanks being located above said horizontal path, said conveyor means being confined substantially to longitudinal zones alongside the path traversed by the body portions of the envelope blanks and engaging the blanks outside the lateral bounds of the body portions thereof, an envelope forming plunger mechanism at the end of said path, bottom flap gumming means for acting on the blanks as they travel along said path, and seal flap gumming means for acting on the blanks as they travel along said path, said bottom flap and seal flap gumming means being mounted with a common axis of rotation to minimize length requirements of such path, said plunger mechanism including a delivery trap which opens toward the introductory end of the machine, said trap being visible between the conveyor stretches to an operator of usual height when seated at the introductory end of the machine with his head beneath the stack, and said path and said trap being accessible to, and within arm's reach of, an operator so situated at the introductory end of the machine.

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