

Oct. 4, 1938.

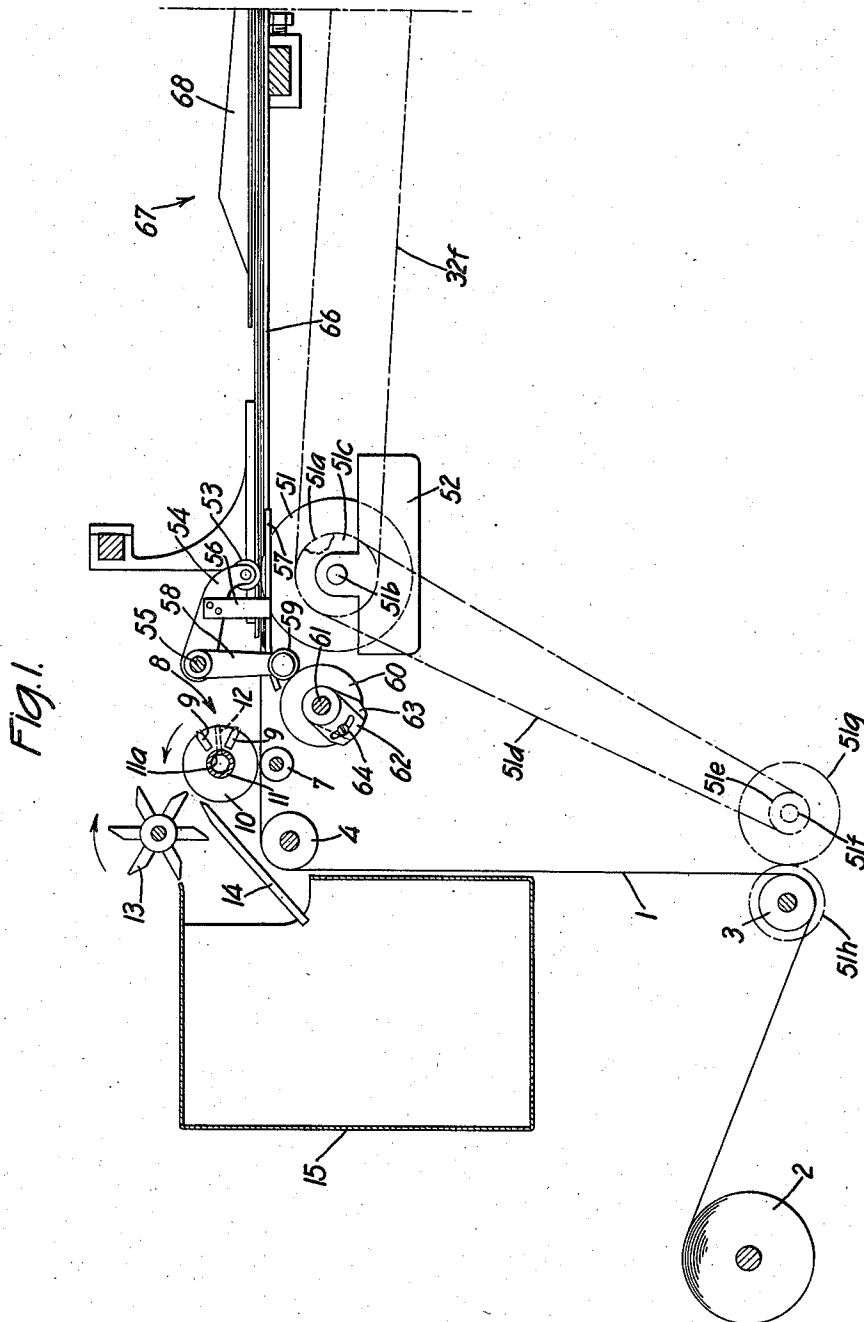
A. NOVICK

2,131,748

ENVELOPE MACHINE

Original Filed May 21, 1935

5 Sheets-Sheet 1



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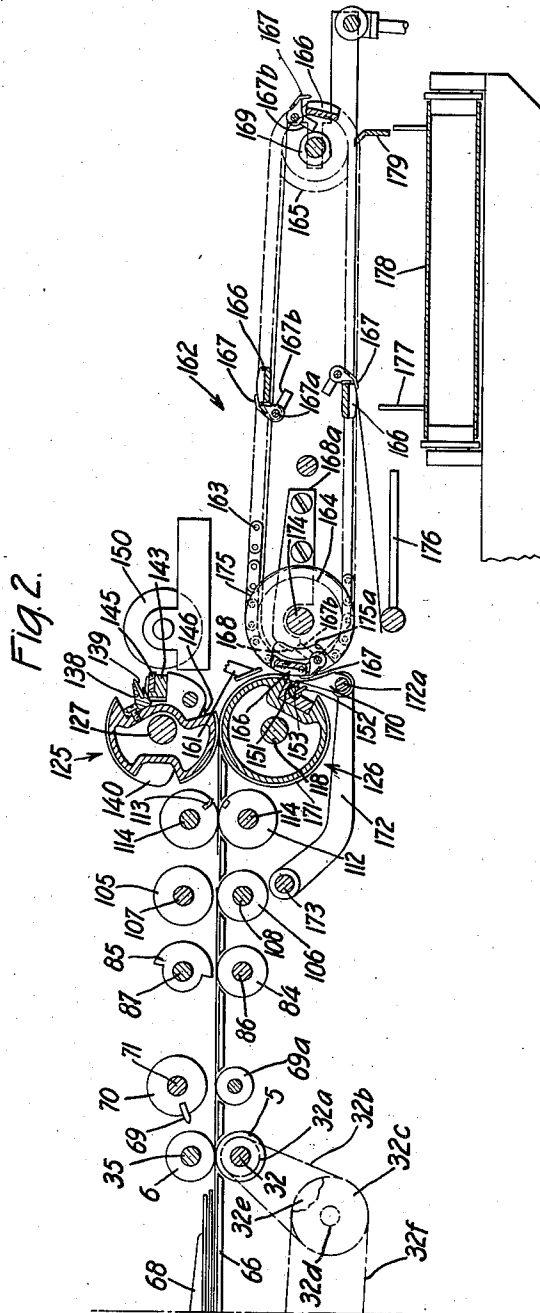
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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

Fig. 4.

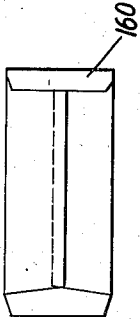
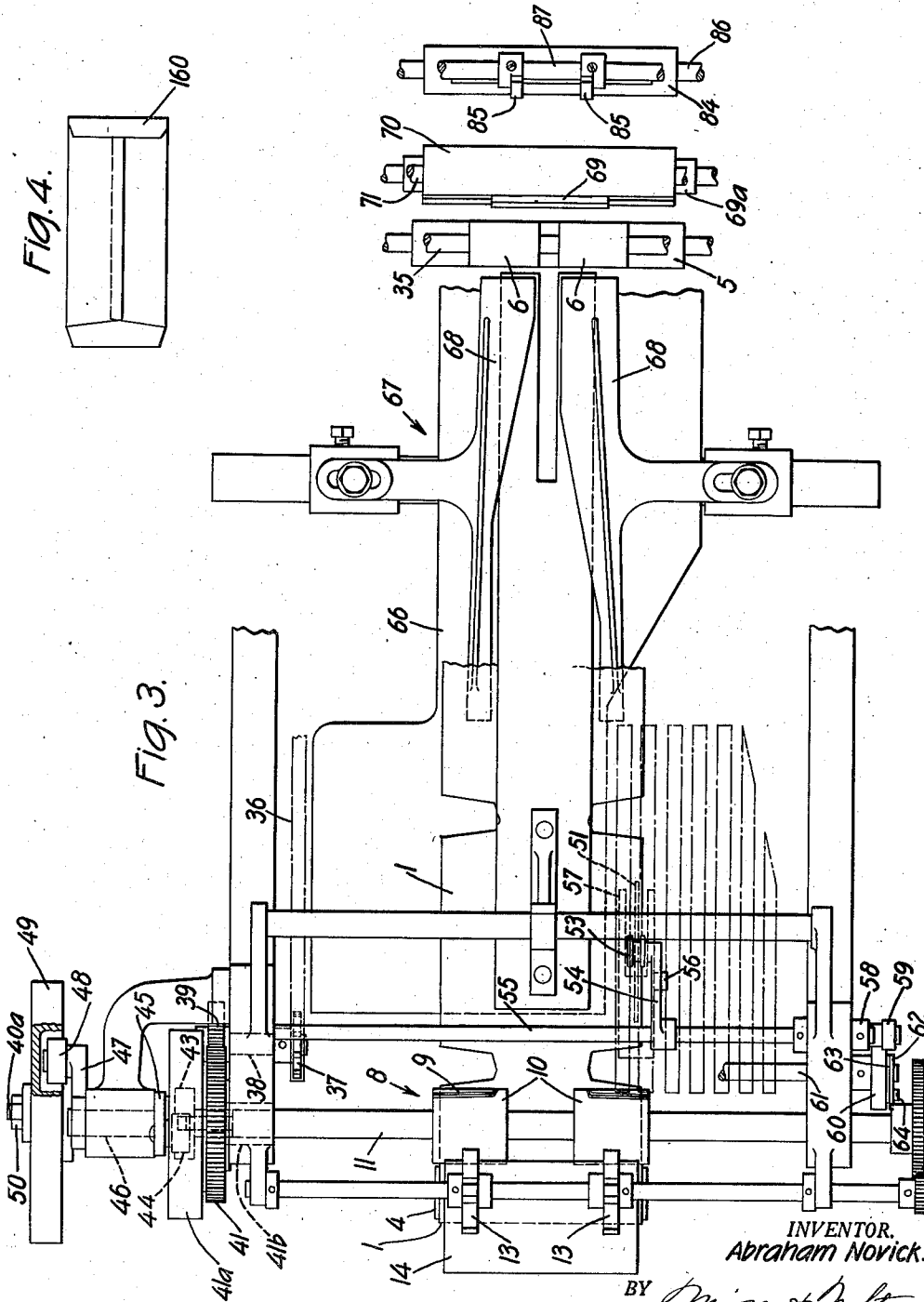


Fig. 3.



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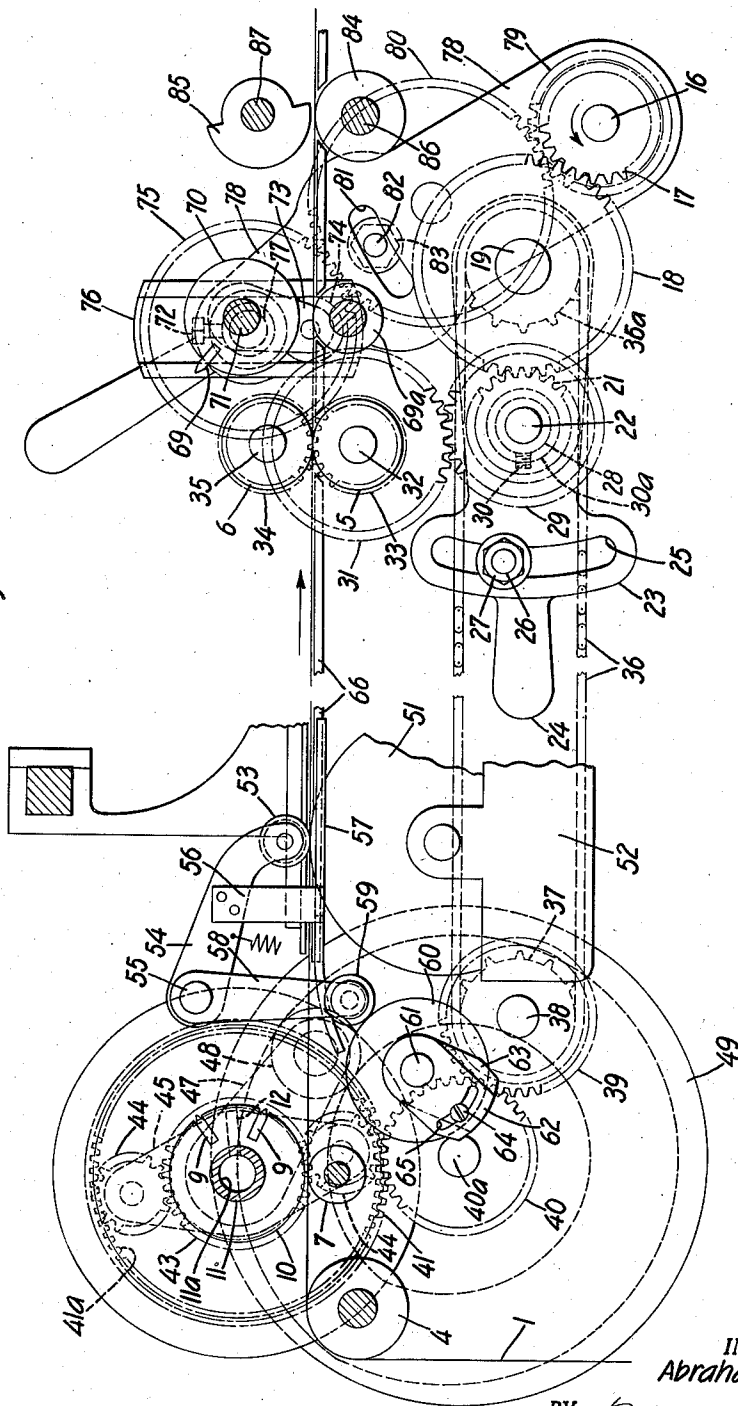
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Fig. 5.



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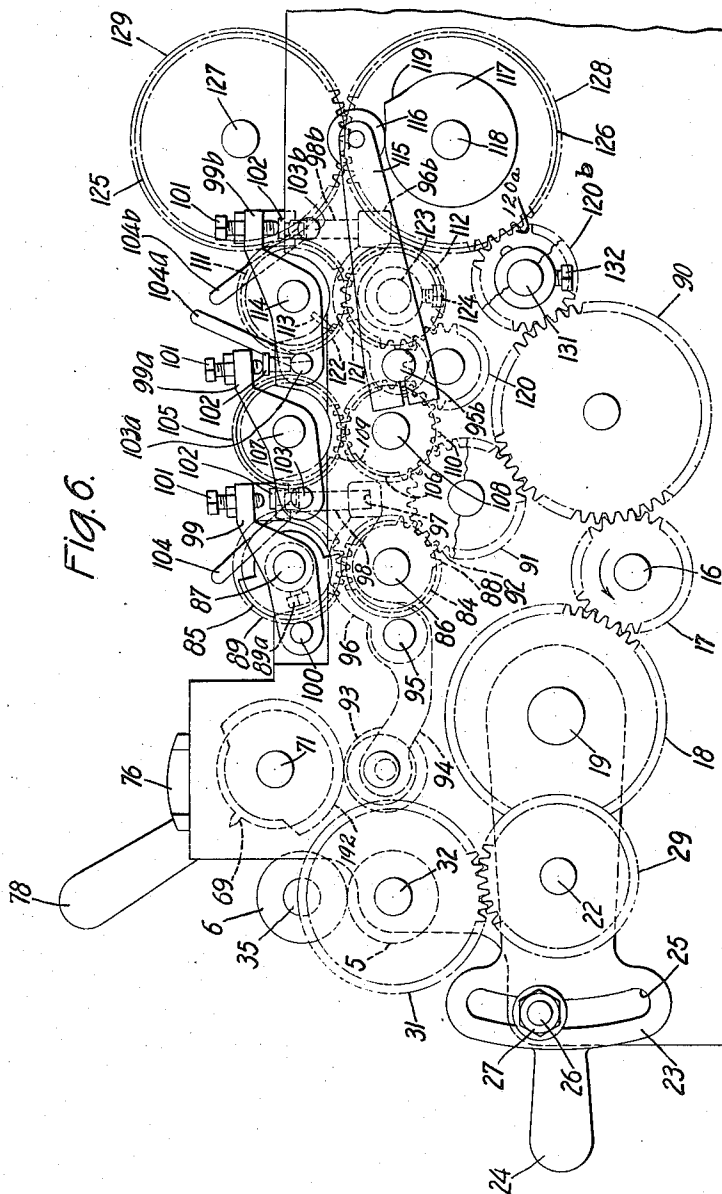
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ENVELOPE MACHINE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,131,748

ENVELOPE MACHINE

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

Application May 21, 1935, Serial No. 22,527. Renewed November 20, 1937. In Canada April 23, 1935

26 Claims. (Cl. 93—63)

This invention relates to envelope machines and more particularly to machines for making open end envelopes of the center seam type.

In the manufacture of such envelopes in accordance with the present invention the paper or other envelope material is supplied in continuous web form. The web is drawn past a notching cutter which cuts notches of substantial width and depth in the opposite margins, thence through a gumming and folding mechanism for folding over, lapping and adhesively uniting marginal portions of the web. The web is then thrust past a transverse severing cutter which cuts individual blanks from the leading end of the web. The individual blanks are then advanced more rapidly to bottoming mechanism which scores, gums, folds and irons the bottom flaps. The finished envelopes are then carried forward by grippers and dropped on to a transverse conveyor which carries them in overlapped relation away from the operating instrumentalities.

It is desirable that the machine be adapted for making envelopes of various sizes and that the rate of production of envelopes be the same independently of the size of the envelopes which are being produced. Since a longer envelope requires more web material, provision is made for increasing the rate of web feed or for diminishing it in proportion to the length of blank used for making an envelope. This is a simple matter of gear changing and results in the web being advanced at a new uniform speed. The mechanism for notching the web, however, is required to make one revolution for each blank length of web which passes it and hence it is required to operate at a uniform average speed regardless of the speed of web feeding. This means, however, that the average speed of the notching cutter is different from the rate of linear feed of the web for all envelope sizes but one. Provision is accordingly made for driving the notching cutter at variable speed so that it may be caused to travel in unison with the web throughout the substantial part of each revolution during which the cutter engages the web.

One longitudinal margin of the notched web is run between a gumming roller or disc and a co-operating pressing roller and, since this margin has already been notched before it reaches the gumming roller, provision is made for intermittently lifting the pressing roller to cause it to jump the notches. In this way the application of gum to the pressing roller is avoided. The mechanism for control operation of the pressing

roller is made adjustable so that the interval of separation may be made to correspond in period and duration with the requirements of the particular work being done.

A further feature of the invention has to do with means for breaking the engagement of the web margin with the gumming roller just before a notch edge is reached, the purpose being to avoid applying gum right up to the edge of the blank and also to overcome the tendency of the gumming roller to adhere to the web margin and carry the margin down out of the plane of web feeding.

The web is next drawn through folding mechanism of conventional construction and is thrust to a transverse rotary cutter which acts to sever envelope blanks from the web.

With reference to the transverse cutter a problem is involved which is similar to that affecting the notching cutters and provision is, therefore, made for driving the transverse cutter at variable speed. In this instance, however, it is only necessary for the transverse cutter to move in unison with the web at the instant of web severance so that a simpler form of feeding mechanism may be utilized.

After a blank has been severed from the web, it is advanced more rapidly than the web so that the blanks are caused to reach the subsequent operating instrumentalities in spaced out relation. One feature of the present invention has to do with the means whereby transfer to the faster feeding means is effected. To this end provision is made of a fast feeding couple comprising separable feeding elements one of which is held away from the other so that the web may be thrust forward between them until the moment of severance. At the moment of severance the feeding couple becomes effective to seize the severed blank and advance it quickly to other feeding mechanism which operates at the same speed.

Since the blanks may be varied in length provision must be made for taking care of the varying extents to which the web is caused to pass the transverse cutter prior to severance. The trailing edge of a blank would be properly timed with reference to the subsequent operating instrumentalities without adjustment but since it is the leading edge which is primarily to be operated upon by the subsequent instrumentalities there is variation and provision is accordingly made for adjustment to time the subsequent instrumentalities to the arrival of the leading ends of the blanks. To this end it is a feature that a

gear interposed in the driving train of the bottom plate gumming and folding mechanism and of the gripper conveyor which carries the envelopes from such mechanism is made adjustable in phase to simultaneously effect a phase adjustment of all of the parts driven through it.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification,

Figure 1 is a sectional side elevation of the introductory end of an envelope machine embodying features of the present invention;

Figure 2 is a view similar to Fig. 1 and forms a continuation of Fig. 1;

Figure 3 is a fragmentary plan view, partly broken away, which shows substantially the same part of the machine shown in Fig. 1;

Figure 4 is a view showing the back of an envelope made upon the present machine and in accordance with the present invention;

Figure 5 is a fragmentary view in sectional side elevation on a larger scale than the preceding figures, and illustrates particularly the notching and transverse cutters, the view being broken away intermediate its ends for compactness of illustration;

Figure 6 is a fragmentary view in side elevation illustrating particularly the transverse cutter, the immediately following feeding mechanism, and the drive therefor.

A web 1 is drawn from a reel 2 around guide rollers 3 and 4 by cooperating feed rollers 5 and 6. The feed rollers 5 and 6 are constantly effective and operate at uniform speed for any selected length of blank. After passing the guide roller 4 the web passes between a bed roller 7 and a notching cutter 8, the latter comprising cutting knives 9. The knives 9 are set into cylinders 10 which do not engage the web 1, or at least not with sufficient force to effect the feeding thereof. Each cylinder 10 is fast upon a shaft 11 which has a bore 11a therethrough in communication with a source of suction. The bore 11a communicates with the surfaces of the cylinders through radial passages 12 which are disposed between the blades 9. When the blades cut a chip from the web the suction holds the chip to the cylinder 10 causing it to be carried around with the cylinder and away from the web. Paddle wheels 13 rotate at higher speed than the cylinders 10 in close proximity thereto and are effective to blow and knock the chips off of the cylinders and cause them to fall down a chute 14 into a waste receptacle 15. The suction is cut off just when the chip reaches a position to be knocked away by a blade of the paddle wheel and is reapplied at about the time when the passage 12 comes opposite the bed roller 7. The suction may be accurately controlled, notwithstanding the variable rate at which the cylinder 10 is operated, by means of cooperating valve plates, one fixed upon the shaft 11 and the other stationary and mounted in juxtaposition to the first.

The machine is driven from a main shaft 16 which rotates counter-clockwise as seen in Fig. 5. A pinion 17 fast on the shaft 16 drives a gear 18 fast on a shaft 19. The gear 18 meshes with a pinion 21 mounted on a shaft 22 carried by an adjustable arm 23. The arm 23 is rockably mounted upon the shaft 19 and is provided with a handle 24 and with an arcuate slot 25, the slot being concentric with the axis of the shaft 19. A threaded stud 26 fixed on a stationary part of the machine frame extends through the slot 25, and

a nut 27 is threaded on the stud. The arm 23 may be locked in adjusted position by turning the nut 27 on the stud 26 to tighten the nut into clamping engagement with the arm, and it may be released for adjustment by turning the nut 27 in the opposite direction. The pinion 21 has a hub 28 upon which a gear 29 is removably secured as by a set screw 30 threaded in a hub 30a of said gear. The gear 29 meshes with a gear 31 fast upon a shaft 32 of feed roller 5 so that the described train is effective to drive the feed roller 5 at predetermined speed. Meshing pinions 33 and 34 upon the shaft 32 and upon the shaft 36 of feed roller 6 cause the roller 6 to be driven in unison with the roller 5. With the setting illustrated in Fig. 5 the web will be driven at a predetermined uniform speed. When it is desired to make envelopes of a different length, however, it is necessary to change the rate of feed of the web. When it is desired to increase the rate of web feed the arm 23 is adjusted downward and a larger gear is substituted for the gear 29, and when it is desired to reduce the speed a smaller gear is substituted with corresponding adjustment of the arm. The pinion 21 always remains in place and since it is mounted upon a shaft carried by the arm 23 and the arm 23 is mounted upon the shaft 19 of the gear 18 the pinion 21 is always held in proper mesh with the gear 18. The notching cutter is unaffected by the substitution of a new gear for the gear 29. The shaft 19 has fast upon it a sprocket 36a which, through a chain 36, drives a sprocket 37 mounted upon a shaft 38. A gear 39 fast on the shaft 38 drives a gear 40, and the gear 40 in turn drives at uniform speed a gear 41 having secured thereto an internal gear 41a. The gear 41 is rotatably mounted upon the end of shaft 11 by a hub 41b said shaft having the notching cutter and a gear 43 fast upon it. Motion is transmitted from the gear 41 to the gear 43 through a pair of pinions 44 and the gear 45 which is fast on a shaft 46, Fig. 3, coaxial with the shaft 11. So long as the pinions 44 are not permitted to move bodily the gear 43 is rotated at uniform speed by them.

In order to introduce a desired variation of speed, however, the shaft 46 is provided with a crank arm 47 which carries a cam follower 48. A track cam 49 fast on the shaft 40a acts at the appropriate time in each revolution to turn the rocker 45 so as to change the speed of the notching cutter to the speed of the web and maintain it at that speed throughout the period of engagement of the notching cutter with the web. The cam 49 is slidably keyed to the shaft 40a and is held to the shaft by a nut 50 so that it may be readily removed from the shaft and replaced by a cam of different contour whenever the gear 29 is changed to change the uniform speed of the web. The variable speed operating means in the notching cutter which has just been described is disclosed and claimed in my application Serial No. 692,553, filed October 7, 1933, now matured into Patent No. 2,060,821, patented November 17, 1936, for Manufacture of envelopes, bags, etc.

After passing the notching cutter the web travels over a gumming disc 51 which engages a margin of the notched web near a longitudinal edge thereof. The gumming disc 51 runs in a gum pot 52. A pressing roller 53 cooperates with the gumming disc to assure contact of the web with the gumming disc. The pressing roller 53 is a channeled roller and the channel of the roller is disposed opposite the gumming disc so as

to avoid contact of the roller with the disc when no web is present.

The margin of the web which runs over the gumming roller has already had notches cut in it and, aside from the possibility of gum being accidentally transferred from the gumming disc to the pressing roller, it is desirable that contact of the web with the gumming disc be broken a little before a notch edge is reached and that it be reestablished a little after the trailing notch edge has passed the effective part of the gumming disc.

To this end provision is made of an arm 54 fast on a rock shaft 55 for carrying the pressing roller 53. The arm 54 also serves through a bracket 56 fast upon it to carry a web lifting plate or shoe 57. The plate 57 is slotted to receive the disc 51 and extends beneath the margin of the web, being supported from outside the lateral bounds of the web.

The shaft 55 has fast upon it a crank 58 which carries a cam follower 59 for lifting and lowering the roller 53 and the plate 57. The cam follower 59 is spring pressed and runs upon a roller 60 fast upon a shaft 61, and upon a pair of cam plates 62 and 63 on the shaft 61. One of the plates 63 is fixed in position by means of a bolt 64 extending through it and threaded into an end of the roller 60. The bolt 64 also passes through an arcuate slot 65 in the plate 62. The plate 62 is loose on the shaft 61 and may be adjusted and then fixed in place by tightening of the bolt 64, so as to adjust the period during which the roller 53 and the plate 57 are held up. The shaft 61 is driven at the same rotary speed as the shaft 40a, or in other words it makes one revolution for each revolution of the notching cutters. The lifting of the roller 53 and the plate 57 not only leaves the notched edges free of gum, which is to be desired, but it also serves to overcome the tendency of the web margin to adhere to the gumming disc 51 and prevent its being drawn by the gumming disc downward out of the plane of web feeding.

After passing the gumming disc 51 the web travels on a table 66 through a side folding mechanism 67 which may be of conventional construction and which comprises laterally adjustable folding plates 68.

The web passes thence between the web feeding rollers 3 and 6 and to the severing cutter.

The shaft 32 of the feed roller 5 carries a sprocket 32a, Fig. 2, through which the gumming roller 51 and the feed roller 3 are driven. As a consequence the changing of the gear 29 produces a corresponding change in the speed of the gumming disc, causing it to run at a peripheral speed slightly greater than the speed of the web, and in the speed of the feed roller 3, causing it to run at a speed slightly greater than the speed of the web. The sprocket 32a acts through a chain 32b to drive a sprocket 32c fast on a shaft 32d. The shaft 32d also has fast upon it a sprocket 32e which, through a chain 32f, drives a sprocket 51a, Fig. 1, fast on the shaft 51b of the gumming disc 51. A second sprocket 51c fast on the shaft 51b acts through a chain 51d to drive a sprocket 51e fast on a shaft 51f. A gear 51g fast on the shaft 51f acts through a gear 51h fast on the shaft of the feed roller 3 for driving said feed roller.

The gear ratios are such that the roller 3 always tends to feed the web a little faster than the feed rollers 5 and 6 feed the web. It will be observed, however, that the instant any slack is produced in the web the roller 3 will lose its

frictional grip upon the web and become temporarily ineffective. The roller 3, therefore, serves as a means for drawing the web off the reel 2 and for supplying it to the operating instrumentalities free from excessive tension, but at the same time it constitutes an automatic means for avoiding the over supplying of web to such instrumentalities, the web itself operating, in effect, as a slip clutch.

The severing cutter comprises a straight cutting blade 69 for cooperating with a bed roller 69a, the blade being carried by a roller 70 fast on a shaft 71.

As has been mentioned the severing cutter makes one revolution for each revolution of the notching cutter regardless of the speed of web feeding, and provision is made for driving the severing cutter at variable speed so that it will be traveling at the speed of the web at the instant of contact with the web. The shaft 71 has fast upon it a crank arm 73 which carries a roller 74. The shaft 71 is driven from a gear 75 through the crank arm 73 and through a plate 76 which is mounted on the gear shaft to be angularly adjusted relative to the gear and then be fixed to the gear. The plate 76 has a diametrical slot or channel for receiving the roller 74. The gear 75 is mounted on a sleeve portion of the plate 76, said sleeve portion being journaled on a stub shaft 77 of an arm 78. The roller 70, together with the blade 69, may be adjusted in its phase relation to the other parts by loosening a set screw 72 which holds the gear 75 fast to the plate 76. The adjustments are effected for different blank lengths.

The arm 78 is freely mounted upon the main drive shaft 16. The axis of the shaft 77 may be set into coincidence with the axis of the shaft 71, in which case uniform motion is imparted to the severing cutter. Adjustment of the arm 78 to locate the axis of the shaft 77 in any other position will result in the severing cutter being driven at variable speed, the amplitude of the variation depending upon the amount of separation of the axes of the shafts 71 and 77. The gear 75 is driven from a gear 79 fast on the shaft 16 through a gear 80 which is carried by the arm 78. The arm, when adjusted, carries the gears 75 and 80 with it about the axis of the gear 79 so that the proper meshing of the gears is in no way impaired. The arm 78 is provided with an arcuate slot 81 through which a threaded stud 82 extends. The arm may be adjusted with reference to an index, not shown, and is fixed in adjusted position by means of a clamping nut 83 which may be turned on the threaded stud 82 to clamp or release the arm as desired.

As has been pointed out the feeding mechanism which follows the transverse cutter operates to advance the individual blanks at a higher speed than that at which the web is advanced by the rollers 5 and 6. Since a severed blank cannot be thrust forward by the web feeding it is necessary that the first blank feeding means be located so as to cause the leading end of the web to pass it prior to blank severance. Since this blank feeding means, however, operates at higher speed than the feed rollers 5 and 6 provision is made to hold it ineffective until the instant of blank severance and then to make it immediately effective. The first blank feeding means comprises a feed roll 84 and cooperative feed sectors 85 mounted respectively upon shafts 86 and 87 which have meshing gears 88 and 89 fast upon them. The gear 88 is driven from the main

drive shaft 16 through gears 90, 91 and 92 the gear ratios being such that the sector 85 makes two revolutions for each revolution of the severing cutter. This arrangement of relative speed permits the disc 85 and the roller 84 to be made of small enough diameter to enable the parts to be arranged compactly, a feature of some importance in view of desirability for arranging the blank feeding means close to one another. The gear 89 is secured to the shaft 87 by a set screw 89a to permit phase adjustment of the sectors 85.

The purpose of the feeding sectors is to take control of the blank which would be rendered idle by severance and immediately advance it to other blank feeding means operating at the same speed as the sectors which are in continuously operative condition. It is not necessary, however, for the sectors to effect any very extensive advance of the blank.

The sectors are, therefore, made to extend through substantially 180° so that it may serve to advance the blank for approximately a half revolution. Since the sector is required to be effective only in that portion of its cycle which immediately follows the severance of blank and since it would be objectionable for it to be effective at any other time provision is made for rendering it ineffective at all times except when its operation is required.

To this end provision is made of a cam 192 fast upon the shaft 71 of the severing cutter 69. This cam has a cutout portion preceding and following the knife 69. A cam following roller 93 engages the cam, the roller being carried by a crank 94 fast upon a rock shaft 95. The rock shaft 95 also has fast upon it cranks 96 which are at opposite sides of the machine and which are provided with upwardly facing sockets 97 at their outer ends for receiving the lower ends of thrust rods 98. The upper ends of the thrust rods 98 extend into downwardly facing sockets formed on rocker arms 99 in which the shaft 87 is journaled. The rocker arms 99 are mounted on coaxial pivot pins 100. Whenever the high part of the cam 92 engages the cam follower 93 the rocker arms 99 are held upward and serve to hold the sector 85 away from blank engaging position. The lift is very slight, however, so that the gears 88 and 89 continue to mesh with one another, the rotation of the sector being continuous and uniform.

Prior to the arrival of the knife 69 in position to sever a blank the follower 93 rides off the high part of the cam 92, permitting the rocker arms 99 to drop down. The rocker arms are provided with adjustable screws 101 which engage abutment plungers 102 mounted in fixed parts of the frame. The plungers 102 have cap or head portions which rest on the frame and which are engaged by the screw ends. The parts are so adjusted that the sector is supported in proper cooperative relation to the feed roller 84 when the screws 101 rest on the plungers 102, notwithstanding the fact that the sector is in an inoperative phase of its cycle at the time when the rocker arms 99 are lower. The rocker arms having been lowered as described, the sector is in condition to seize and advance the blank as soon as its feeding surface comes opposite the roller 84. The parts are timed to cause this to occur just at the instant when a blank is severed.

The feeding members 84 and 85 are of rather soft material and it is desirable to leave them disengaged over night to prevent them from taking on a deformed shape. For this purpose provision

is made of a shaft 103 mounted in the machine frame which has a flattened side for engaging the lower end of a plunger 102. The shafts 103, one at each side of the machine, are each provided with an operating handle 104. In the normal position of the shaft, as seen in Fig. 6, the lower side of the head of the plunger 102 rests upon the machine frame. When it is desired to disengage the segment 85 from the feed roller 84 at the end of the day the shaft 103, which is provided with a flat spot, is turned and cams the plunger upward until the plunger rests upon a concentric part of the surface of the shaft. The plunger acts against the screw 101 to lift a rocker arm and cause it to hold the sector up.

The next blank feeding means comprises a pair of feed rollers 105 and 106 which operate at the same peripheral speed as the sector 85. The feed rollers 105 and 106 are mounted on shafts 107 and 108 which carry meshing gears 109 and 110, the last mentioned gear being driven by the gear 90 through gear 91. When blanks are being cut which are not long enough to reach from the severing cutter to the bight of the rollers 105 and 106 the rollers 105 and 106 are permitted to run continuously in engagement with one another and the function of the sector 85 and the feed roller 84 is then to advance a blank into the bight of the rollers 105 and 106. If the blanks are of greater length, however, it is necessary to incapacitate the rollers 105 and 106, in which case the roller 84 and the sector 85 advance the longer blank to a subsequent pair of feed rollers 111 and 112 which run substantially continuously in engagement with one another. The shaft 107 of roller 105 is carried in rocker arms 99a which may be the same in construction as the rocker arms 99 and which may be lifted by mechanism which is a duplicate of the lifting handle 104 and the parts associated therewith. Corresponding reference numerals have accordingly been applied to the corresponding parts with the subscript "a" added in each instance.

After passing rollers 105 and 106 the blank reaches the rollers 111 and 112. The roller 112 carries a cross scoring blade 113. Since these rollers also make two revolutions for each revolution of the severing cutter, it would be objectionable to have the scoring blade engage the blank at every revolution and provision is accordingly made to lift the roller 111 briefly at alternate revolutions. To this end the shaft 114 of roller 111 is journaled in rocker arms 99b which are adapted to be lifted automatically by cranks 96b fast on a shaft 95b. The lifting train and the parts mounted on and associated with the rocker arm are the same as those described with reference to rocker arm 99. The same reference numerals have been applied to corresponding parts, therefore, with the subscript "b" added.

A crank 115 fast on the rock shaft 95b carries a roller 116 which runs upon a cam 117. The cam 117 is fast on a shaft 118 which is driven through gears 119 and 120 at half the angular speed of the rollers 111 and 112. The cam has a high part 119 which serves to lift the roller 111 once in every alternate revolution at the time when the blade 113 is opposite the roller 112.

The rollers 111 and 112 are driven from the gear 110 through a gear 120 and through gears 121 and 122 fast on the shafts 123 and 114 of the rollers. The gear 121 is secured to the shaft 123 by means of a set screw 124 which may be backed out to release the gear from driving engagement with the shaft and permit phase adjustment of

the knife 113 relative to the other operating parts. The rocker arms 99b are also equipped with overnight throwout means of the same kind described with reference to rocker arms 99. The same reference numerals have, therefore, been applied to corresponding parts with the subscript "b" added.

The blank passes from the rollers 111 and 112 to a pair of bottoming cylinders 125 and 126. The cylinder 126 is fast on the shaft 118 and the cylinder 125 is fast on a shaft 127. The shafts 118 and 127 have meshing gears 128 and 129 fast upon them for driving the shaft 127 from the shaft 118. The gear 128 is driven by a gear 120a pinned to a shaft 131. Said shaft has secured thereto by a set screw 132 another gear 120b which is driven by the gear 90. When readjustment of the phase relation of the cylinders 125 and 126 relative to the other operating parts is required they may be adjusted in unison by temporarily releasing the set screw 132 and then tightening it again after the desired adjustment has been made.

The bottoming cylinders and the subsequent conveying mechanism are the same as the corresponding parts shown and described in my pending application Serial #701,948, filed December 12, 1933, for Envelope or bag making machinery. A brief description of these parts will, therefore, suffice. The cylinder 125 has fixed upon it a bar 138 which pivotally and yieldingly supports a tucking bar 139. The cylinder 125 also includes two adjustable segments 140 which may be fixed in various adjusted relations to the main portion of the cylinder by means of bolts and slots. A bar 143 is mounted in a radial slot formed in the segment 140 and is movable toward and from the center of the cylinder. A gummer bar 145 is mounted upon the bar 143. An actuating arm 146 is secured to a shaft mounted upon the segments 149 said shaft having forked arms (not shown) for oscillating the bar 143 toward and from the axis of the cylinder 125. The actuating arm 146 is cam operated. Oscillatory movement is imparted to the bar 143 for the purpose of projecting the gumming bar 145 beyond the periphery of the cylinder 125 at an appropriate point in the cycle to receive gum from a gum roller 150, which roller stands clear of the surface of the cylinder so as not to apply the gum thereto, and for retracting the gumming bar to a position substantially flush with the feeding surface of the cylinder 125 for engagement with the blank upon the periphery of the cylinder 126.

The cylinders 125 and 126 are so related that the tucking bar 139 acts to tuck a leading end portion of the blank between fixed and movable jaws 151 and 152. The jaw 151 is a fixed part of the cylinder 126 while the jaw 152 is carried upon a rock shaft 153, which shaft is cam operated to open position and spring operated to closed position.

When the blank has been tucked and gripped between the jaws 151 and 152 it is carried forward by the cylinder 126, and the gumming bar 145 is caused to apply gum to a portion of the blank body which is to be covered by the blank flap 160. In the continued forward movement of the cylinder 126 the flap 160 is carried against a stationary folding plate 161 to fold said flap against the body. The flap then passes beneath said plate 161 and is pressed lightly against the gummed face of the blank body.

After this has been accomplished, it is desirable to iron down the folded over flap and to convey

the blanks bodily away from the cylinder 126 in order that they may be delivered in an orderly relation to one another. Provision is made of a conveyor mechanism 162 which serves both to cooperate with the cylinder 126 in ironing down the folded flap and to conduct the blanks away from the cylinder 126 and deliver them in a predetermined relation to one another. The conveyor mechanism 162 comprises a pair of chains 163 which run upon sprockets 164 and 165 and which are connected with one another by rigid bars 166. The bars 166 present outer faces which are generally in the form of cylinder segments and which are adapted to cooperate with the cylinder 126 in ironing down the envelope end. Each bar also has pivotally mounted upon it gripper jaws 167. The gripper jaws 167 associated with each bar 166 are secured to a common rock shaft 167a and are controlled by cams 168 and 169, engaged by arms 67b to be secured to the rock shaft, the cams 168 being secured to end plates 168a of an auxiliary frame, and being effective to cause the gripper jaws to approach the cylinder 126 in an open condition. A return spring (not shown) causes the gripper jaws to close onto the leading end of the blank after such leading end has been fed between the gripper jaws 167 and the bar 166. The cam 168 is so shaped that the jaws 167 are not permitted to snap sharply against the bag material. This is a desirable construction since it prevents injury to materials such as Cellophane that might be damaged by a blow. The cross bars 166 occur along the conveyor at intervals equal in extent to the circumference of the cylinder 126, and the conveyor is driven at a linear speed equal to the peripheral speed of the cylinder 126.

A cam acts to operate the gripper jaws 152 to an open position as the leading end of the blank nears the point at which it is transferred to the bar 166 and the gripper jaws 167. Stripper fingers 170 run in grooves 171 of the cylinder 126 and serve to intercept the leading end of the blank and to deflect it away from the periphery of the cylinder 126. The deflecting fingers 170 are mounted upon a shaft 172a supported by arms 172 carried by a rockable shaft 73. The arms 172 are normally held in position shown in Fig. 1 by means of a spring and stop (not shown), but may be swung downward to afford access to the other parts when desired.

The shaft 174, upon which the sprockets 164 are mounted, also has fast upon it a series of notched disks 175 which coact with the cylinder 126 in guiding and feeding the blank. The notches 175a of the discs 175 are so located and timed that they provide grooves for the bars 166 when the bars travel around the axis of the sprockets 164.

As viewed in Fig. 2 the cylinder 126 rotates in a clockwise direction and the sprockets 164 in a counter-clockwise direction. The blanks are accordingly carried away from the cylinder 126 in the lower stretch of the conveyor 162. A series of rods 176 forms a table for supporting the depending trailing ends of the blanks. The blanks are carried forward over guides 177 and above a transverse conveyor 178. The blanks are released and permitted to drop down away from the conveyor 162 when the gripper jaws 167 are moved to open positions by the cam 169. Stripper fingers 79 assist in separating the leading end of the blank from the cross bar, the cross bar being grooved to accommodate said

fingers. The transverse conveyor 178 runs upon pulleys one of which is driven through reducing gearing to run at a slower speed than the conveyor 162. The blanks are accordingly carried away in overlapped relation.

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. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter, means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, means for folding the web longitudinally, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and the folding means and to thrust it past the severing cutter, blank feeding means for seizing the severed blanks and advancing them at higher speed than the speed of web feeding, and means adjustable to cause the blank feeding means to become effective substantially simultaneously with the severance of a blank.

2. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter, means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, means for folding the web longitudinally, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and the folding means and to thrust it past the severing cutter, blank feeding means for seizing the severed blanks and advancing them at higher speed than the speed of web feeding, and means for adjusting the blank feeding means to change the amount to which the web can extend in advance of the point of severance without being seized and pulled forward by the blank feeding means.

3. In an envelope making machine, in combination, means for feeding a web uniformly at a selected speed, a notching cutter operating at uniform frequency but at variable speed so that it runs in unison with the web throughout the substantial period of its engagement with the web, means for folding the web longitudinally, a severing cutter operating at uniform frequency but at variable speed so that it runs in unison with the web at the instant of web engagement, blank feeding means for seizing a severed blank and advancing it at higher speed than the rate of web feeding, and means for controlling the

blank advancing means to hold the same ineffective until a blank has been severed.

4. In an envelope making machine, in combination, means for feeding a web uniformly at a selected speed, a notching cutter operating at uniform frequency but at variable speed so that it runs in unison with the web throughout the substantial period of its engagement with the web, means for folding the web longitudinally, a severing cutter operating at uniform frequency but at variable speed so that it runs in unison with the web at the instant of web engagement, blank feeding means for seizing a severed blank and advancing it at higher speed than the rate of web feeding, and means for controlling the blank advancing means to hold the same ineffective until a blank has been severed, said controlling means being mounted to operate in unison with the severing cutter.

5. In an envelope making machine, in combination, means for feeding a web uniformly at a selected speed, a notching cutter operating at uniform frequency but at variable speed so that it runs in unison with the web throughout the substantial period of its engagement with the web, means for holding the web longitudinally, a severing cutter operating at uniform frequency but at variable speed so that it runs in unison with the web at the instant of web engagement, blank feeding means for seizing a severed blank and advancing it at higher speed than the rate of web feeding, and means for controlling the blank advancing means to hold the same ineffective until a blank has been severed, and cooperative bottoming cylinders to which the blanks are fed, said cylinders including means for gumming and folding the envelope bottoms.

6. In an envelope making machine, in combination, means for feeding a web uniformly at a selected speed, a notching cutter operating at uniform frequency but at variable speed so that it runs in unison with the web throughout the substantial period of its engagement with the web, means for folding the web longitudinally, a severing cutter operating at uniform frequency but at variable speed so that it runs in unison with the web at the instant of web engagement, blank feeding means for seizing a severed blank and advancing it at higher speed than the rate of web feeding, means for controlling the blank advancing means to hold the same ineffective until a blank has been severed, cooperative bottoming cylinders to which the blanks are fed, said cylinders including means for gumming and folding the envelope bottoms, and means for adjusting the phase of the cylinders relative to the other parts of the machine.

7. In an envelope making machine, in combination, means for feeding a web uniformly at a selected speed, a notching cutter operating at uniform frequency but at variable speed so that it runs in unison with the web throughout the substantial period of its engagement with the web, means for folding the web longitudinally, a severing cutter operating at uniform frequency but at variable speed so that it runs in unison with the web at the instant of web engagement, blank feeding means for seizing a severed blank and advancing it at higher speed than the rate of web feeding, means for controlling the blank advancing means to hold the same ineffective until a blank has been severed, cooperative bottoming cylinders to which the blanks are fed, said cylinders including means for gumming and folding the envelope bottoms, and means for

simultaneously adjusting the phase of the cylinders relative to the other parts of the machine.

8. In an envelope making machine, the combination with web feeding means for advancing a web uniformly at a selected speed, of a severing cutter operating at predetermined frequency to sever blanks from the web, the length of a blank being controlled by the speed of web feeding, blank feeding means effective to seize a severed blank and advance it more rapidly than the web, and means for holding the blank feeding means ineffective until after a blank is severed.

9. In an envelope making machine, the combination with web feeding means for advancing a web uniformly at a selected speed, of a severing cutter operating at predetermined frequency to sever blanks from the web, the length of a blank being controlled by the speed of web feeding, blank feeding means effective to seize a severed blank and advance it more rapidly than the web, and means for holding the blank feeding means ineffective until after a blank is severed, said means for holding the blank feeding means ineffective being controlled from the severing means and timed to cause the blank feeding means to become effective simultaneously with the severing of a blank.

10. In an envelope making machine, the combination with web feeding means for advancing a web uniformly at a selected speed, of a severing cutter operating at predetermined frequency to sever blanks from the web, the length of a blank being controlled by the speed of web feeding, blank feeding means effective to seize a severed blank and advance it more rapidly than the web, and means for holding the blank feeding means ineffective until after a blank is severed, additional blank feeding means operating at the speed of the first blank feeding means, said additional blank feeding means including provision for adjustment to alter the extent to which the web may pass the severing cutter without being affected by said additional blank feeding means.

11. In an envelope machine, the combination with a cutting roller and a cutting knife carried by the roller and adapted to engage and operate upon a web at intervals in the rotation of said roller, a coating roller against which the cutting knife operates, and means for driving said cutting knife roller comprising a variable speed gearing whereby the speed of said knife during the period of engagement with the web may be varied without varying the period of its rotation, said means comprising a pivot arm having a slot therein concentric with the pivot of the arm, means extending through the slot for securing the arm in any desired position, a rotary member rotatably mounted on the arm and adapted to be supported by the arm in a position concentric with the center of the cutting roller or in positions eccentric thereto and having a diametric face groove, a crank arm secured to the cutting roller, and a roller carried by the crank arm and engaging the diametric groove.

12. In an envelope machine, the combination with web cutting rollers, of blank feeding rollers, and means for separating the blank feeding rollers apart during the web cutting operation and for engaging the blank feeding rollers to carry the cut blank away from the web.

13. In an envelope machine, the combination with web cutting rollers, of blank feeding rollers, means for holding the blank feeding rollers apart to permit the web to pass freely between them prior to the web cutting operation and for per-

mitting them to engage one another to carry the cut blanks away from the web, such means comprising a cam revolving with the cutting rollers, a rocking rod pivotally supported on the main frame, upwardly movable bearing members for the blank feeding roller, means operated by the cam for rocking the rod, and means for raising the bearing members by the rocking of the rod.

14. In an envelope machine, in combination, means for feeding a web, means for cutting notches in side margins of the web, the longitudinal continuity of the web being still maintained, a gummer for applying gum to a margin of said continuous web after the same has been notched, a presser for holding the web margin against the gummer, and means for lifting the presser away from the gummer intermittently in time with the arrival of the notches, said various means being co-ordinated in a unitary machine structure.

15. In an envelope machine, in combination, means for feeding a web, means for cutting notches in side margins of the web, the longitudinal continuity of the web being still maintained, a gummer for applying gum to a margin of said continuous web after the same has been notched, a presser for holding the web margin against the gummer, and means for lifting the presser and the web away from the gummer a little before a notch reaches the gummer and for lowering the presser and the web toward the gummer a little after the notch has passed the gummer, said various means being co-ordinated in a unitary machine structure.

16. In an envelope machine, in combination, means for feeding a web, means for cutting notches in side margins of the web, a gummer for applying gum to a margin after the same has been notched, a presser for holding the web margin against the gummer, and means for lifting the presser and the web away from the gummer a little before a notch reaches the gummer and for lowering the presser and the web toward the gummer a little after the notch has passed the gummer, said lifting means being adjustable to determine the duration of the lifting operation.

17. In an envelope machine, in combination, means for feeding a web, means for cutting notches in side margins of the web, a gummer for applying gum to a margin after the same has been notched, a presser for holding the web margin against the gummer, and means for lifting the presser and the web away from the gummer a little before a notch reaches the gummer and for lowering the presser and the web toward the gummer a little after the notch has passed the gummer, said lifting means being adjustable to determine the duration of the lifting operation, and comprising a cam composed of relatively adjustable overlapping sections.

18. In an envelope machine, in combination, a main feed roller for feeding a web uniformly at a selected speed, a feed roll driving gear, a main shaft, a driving train between the main shaft and the feed roll driving gear including means for facilitating readjustment to drive the gear at different selected speeds, a gumming disc, a web unreeling roller frictionally driving the web to relieve the web of tension, and means connecting the main feed roller driving gear to drive the gumming disc at the speed of the web and to drive the unreeling roller at a speed a little greater than that of the web.

19. In an envelope machine, in combination, main feed rollers for feeding a web uniformly at a selected speed, a main shaft, operating instru-

mentalities driven from the main shaft, a changeable operating train running from the main shaft to the main feed rollers for operating them and including means for facilitating gear substitution to change the speed of the main feed roller, a gumming disc running in engagement with the web, an unreeling feed roller frictionally driving the web, and means for driving the gumming disc and the unreeling roller through said changeable train whereby the speeds of the main feed roller, the gumming disc and the unreeling roller are always uniformly related.

20. In an envelope making machine, in combination, a web supply reel, main feed rollers for feeding a web, an auxiliary unreeling roller interposed between the reel and the main feed rollers for relieving the web of tension, said unreeling roller running in frictional engagement with the web, and means for driving the unreeling roller and the main feed roller, the former at a little greater peripheral speed than the latter.

21. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter, means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and to thrust it past the severing cutter, and blank feeding means for seizing and advancing the severed blanks.

22. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter, means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, means for folding the web longitudinally, a severing cutter, means for driving the serving cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and the folding means and to thrust it past the severing cutter, and blank feeding means for seizing and advancing the severed blanks.

23. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed

of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and to thrust it past the severing cutter, and blank feeding means for seizing the severed blanks and advancing them at higher speed than the speed of web feeding.

24. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter, and to thrust it past the severing cutter, blank feeding means for seizing the severed blanks and advancing them at higher speed than the speed of the web feeding, and means adjustable to cause the blank feeding means to become effective substantially simultaneously with the severance of a blank.

25. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and to thrust it past the severing cutter, blank feeding means for seizing the severed blank, and means adjustable to cause the blank feeding means to become effective substantially simultaneously with the severance of a blank.

26. In an envelope making machine, in combination, means for feeding a web uniformly at one of a variety of optional speeds, a notching cutter means for driving the notching cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the notching cutter in a cycle to cause it to operate at the speed of the web throughout the substantial portion of the cycle during which it engages the web, means for folding the web longitudinally, a severing cutter, means for driving the severing cutter at predetermined frequency independently of the speed of the web, means for varying the speed of the severing cutter in a cycle to cause it to operate at the speed of the web while in engagement with the web, the web feeding means being arranged to draw the web past the notching cutter and the folding means and to thrust it past the severing cutter, and blank feeding means for seizing the severed blanks and advancing them at higher speed than the speed of web feeding.