

Oct. 2, 1962

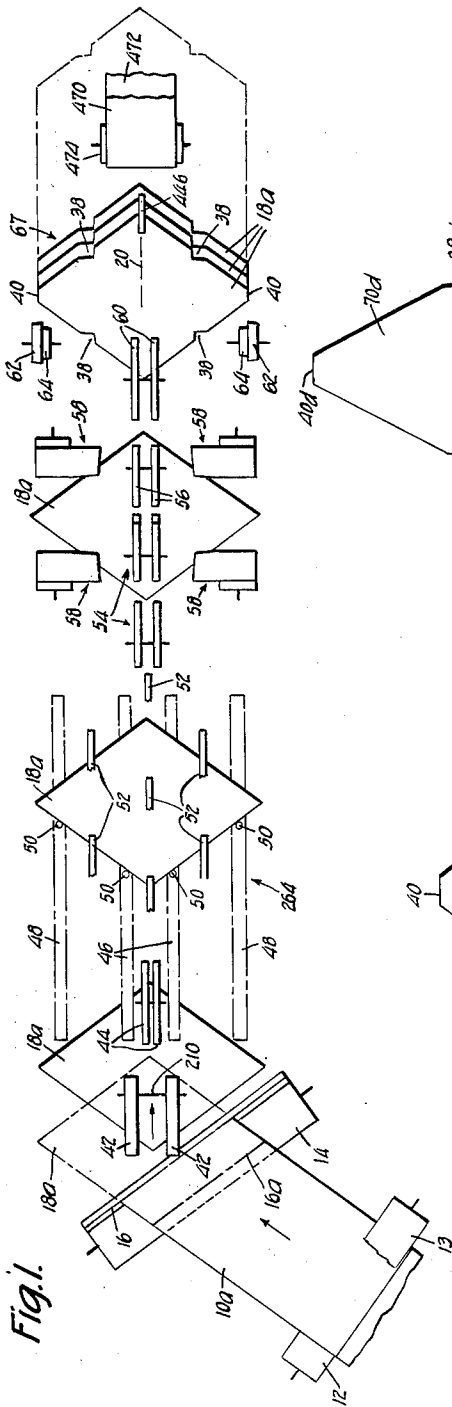
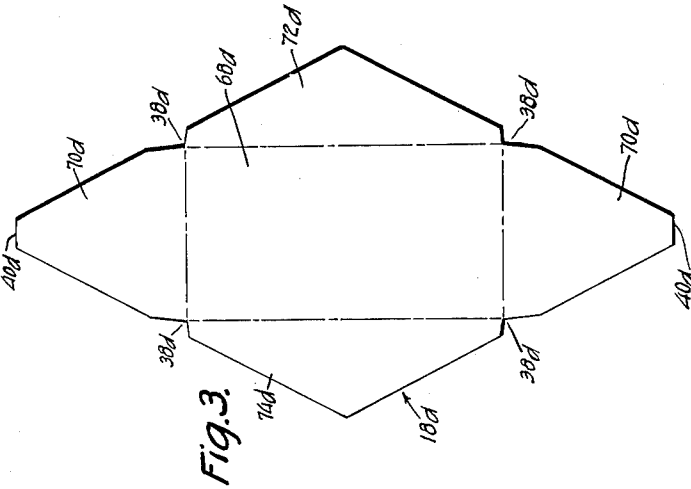
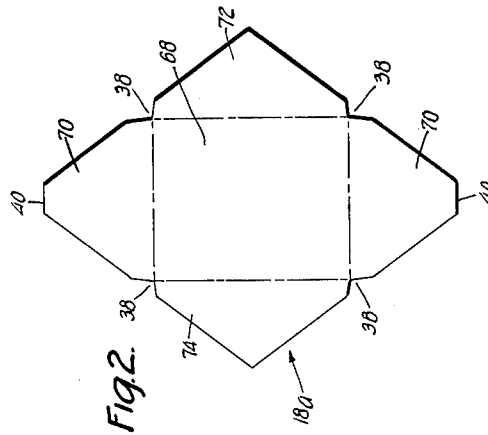
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3,056,322

WEB FED ENVELOPE MACHINE

Filed March 25, 1953

10 Sheets-Sheet 1



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Fig. 5.

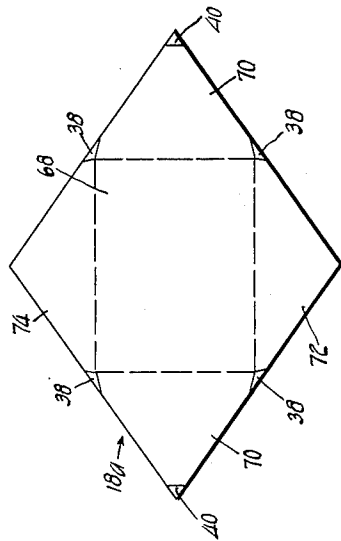


Fig. 6.

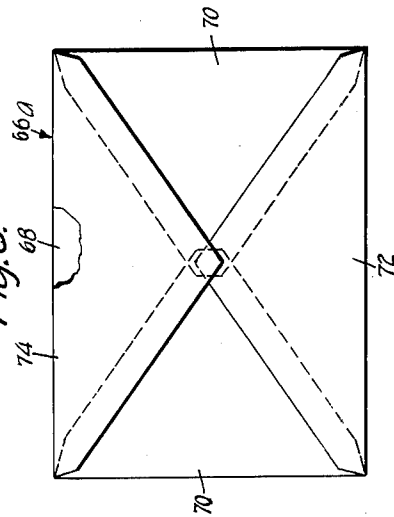
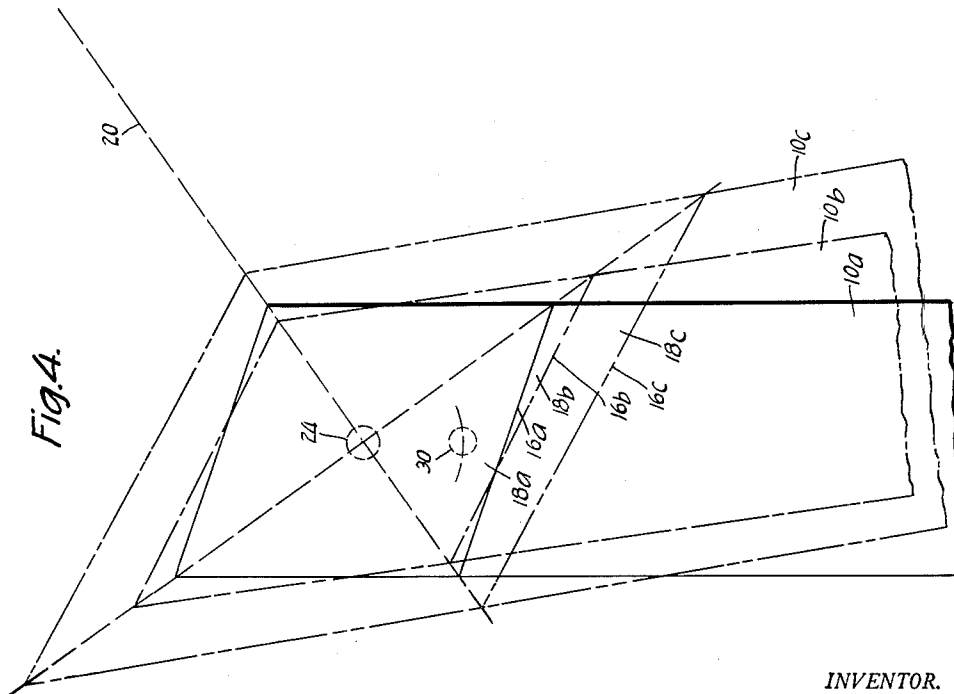


Fig. 4.



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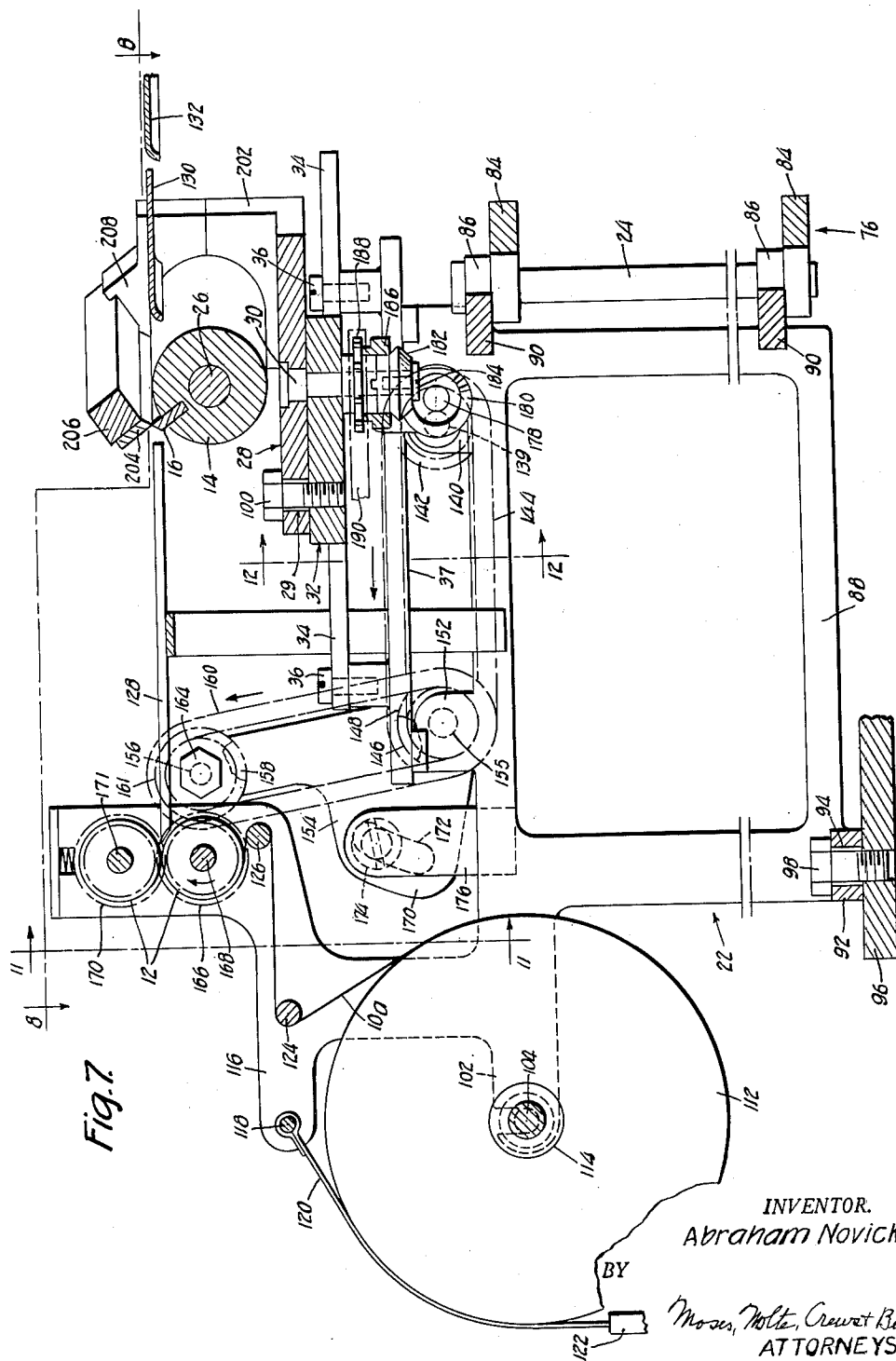
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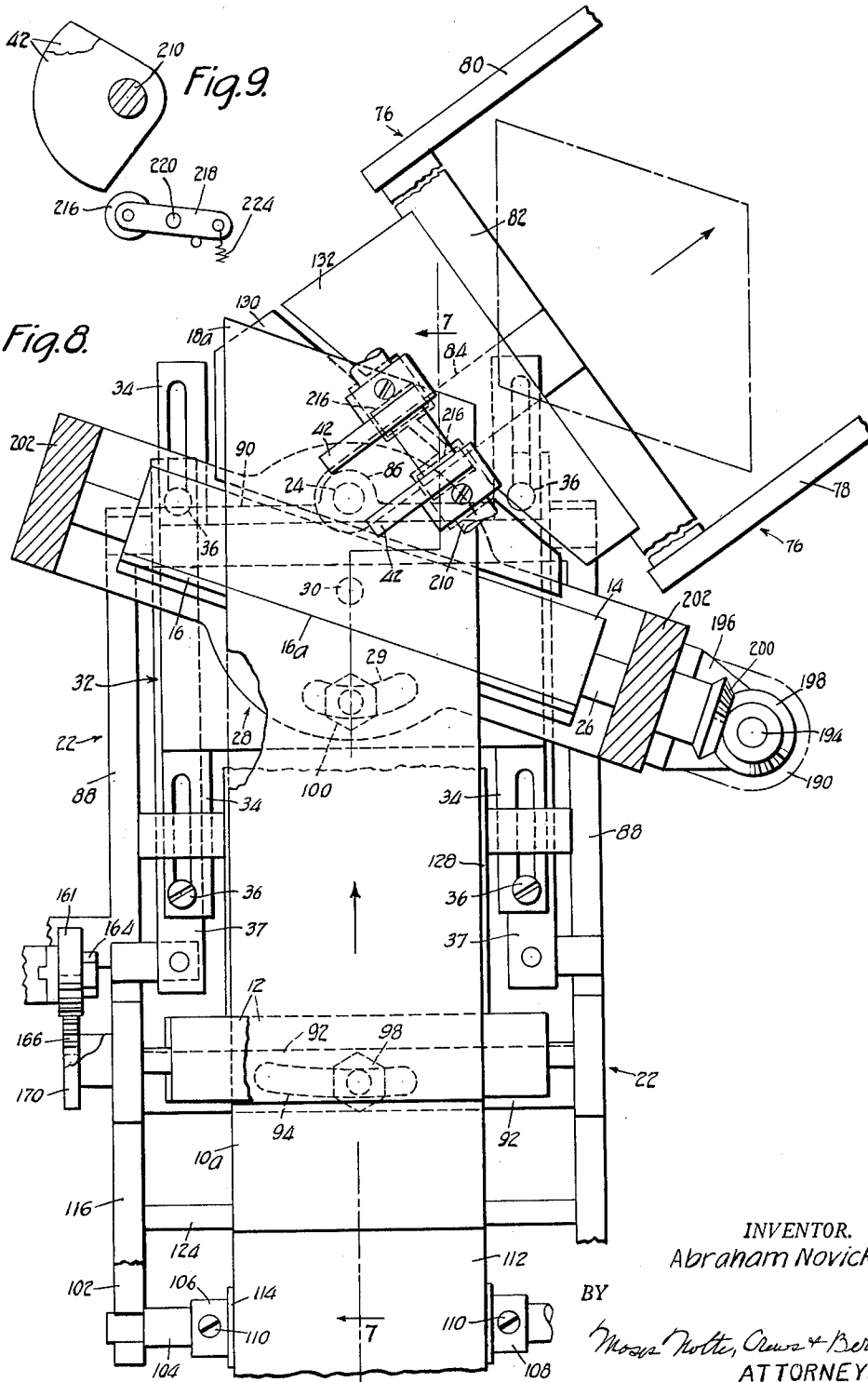
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10 Sheets-Sheet 4



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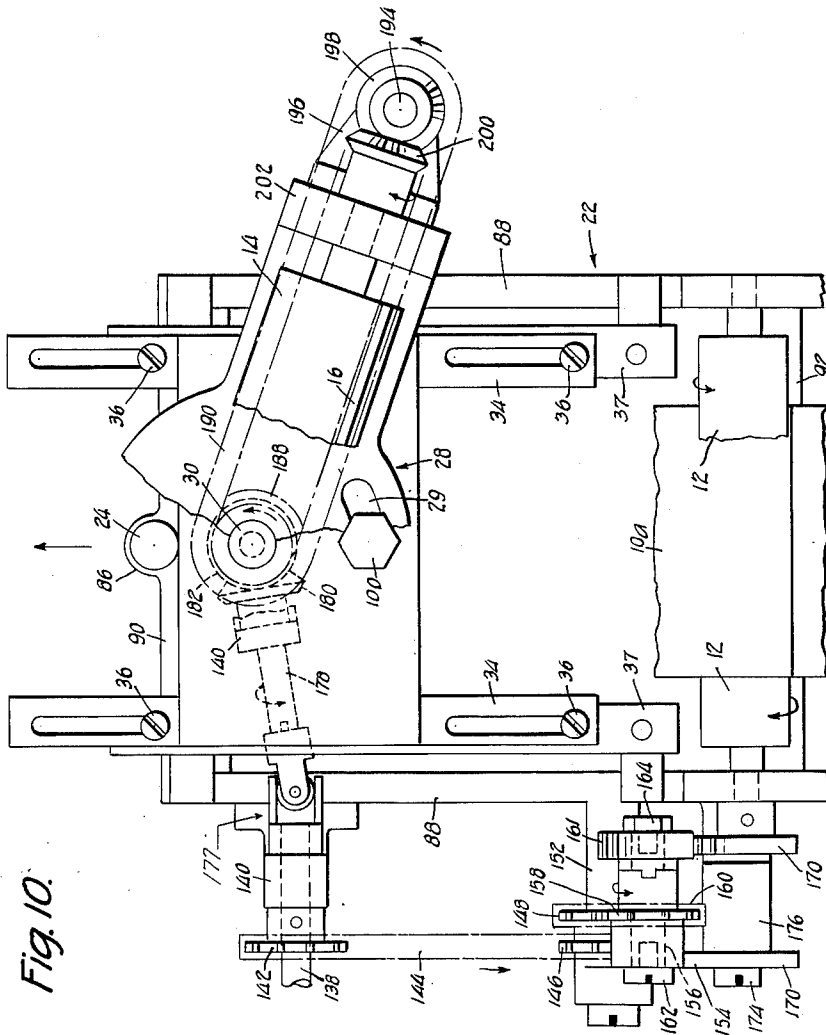


Fig. 10.

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Fig. 11.

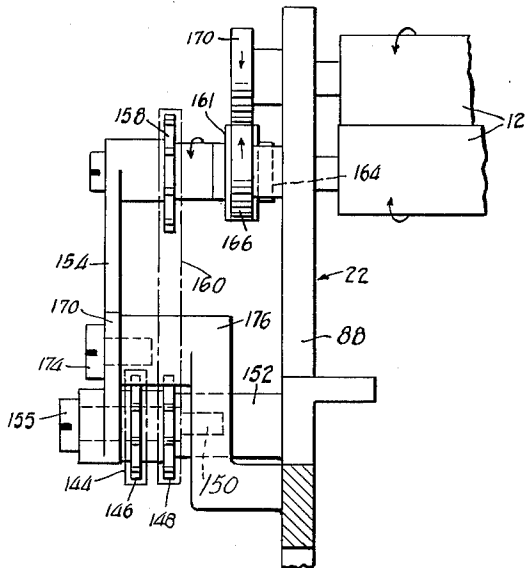


Fig. 12.

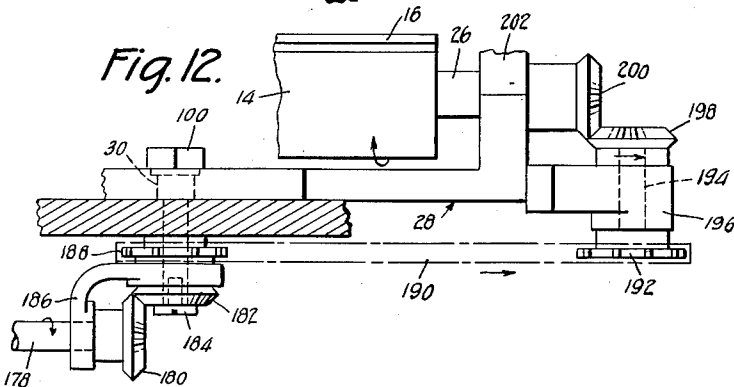
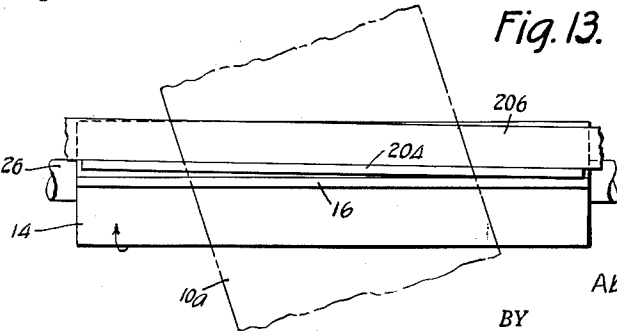


Fig. 13.



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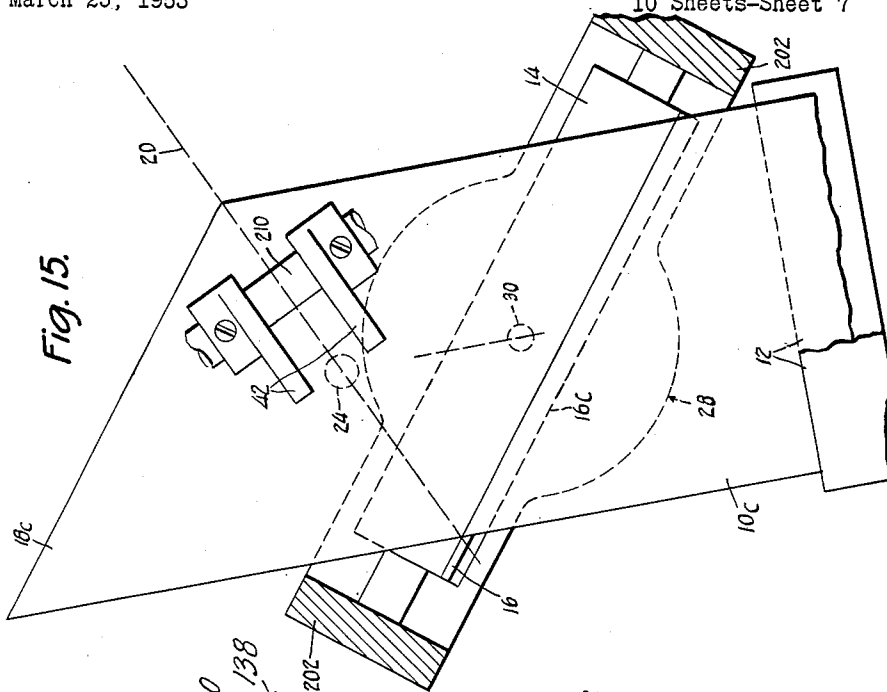


Fig. 15.

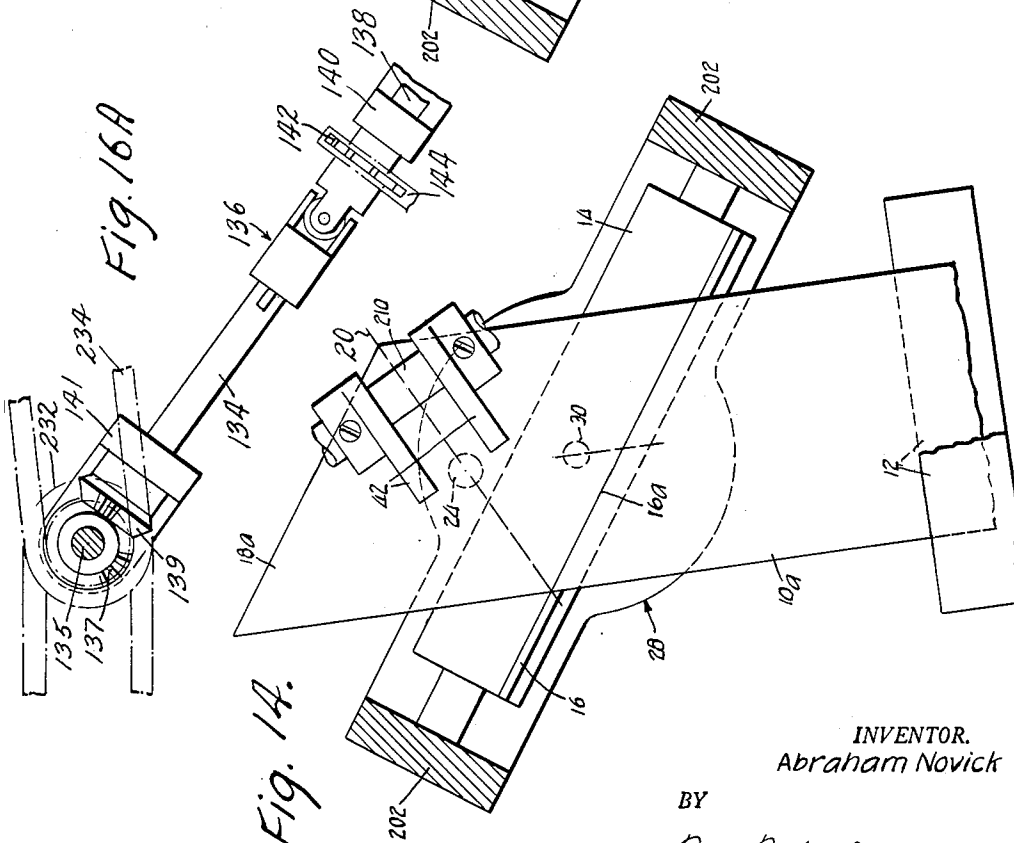


Fig. 14.

Fig. 16A

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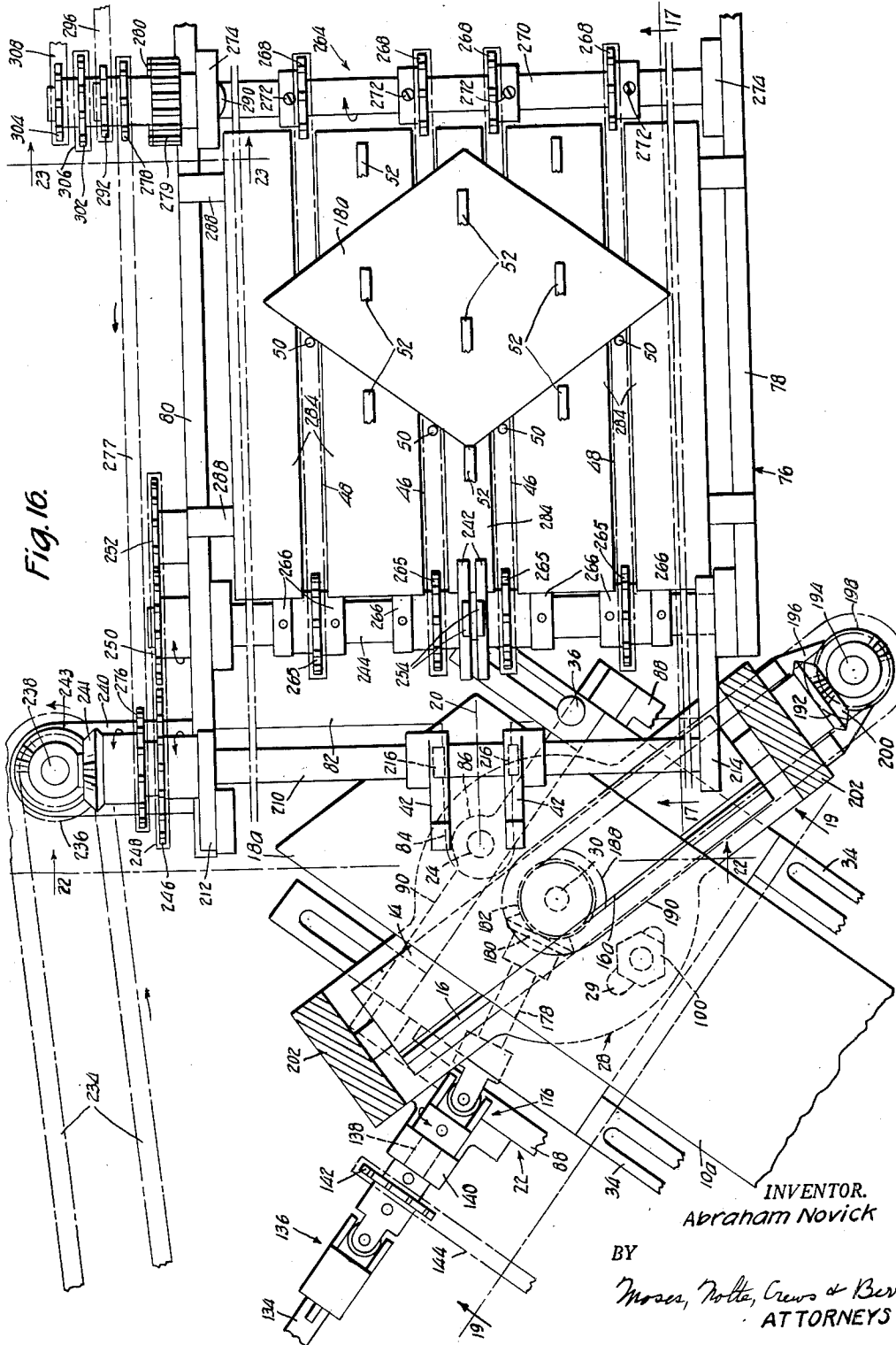
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WEB FED ENVELOPE MACHINE

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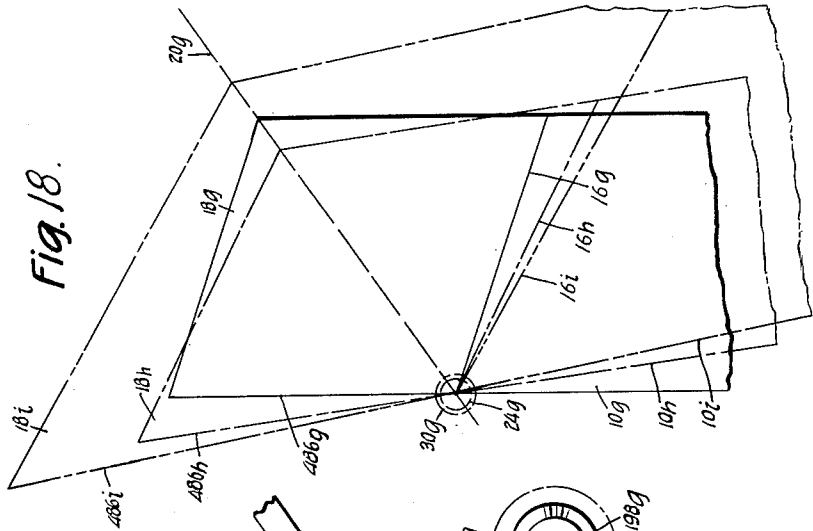
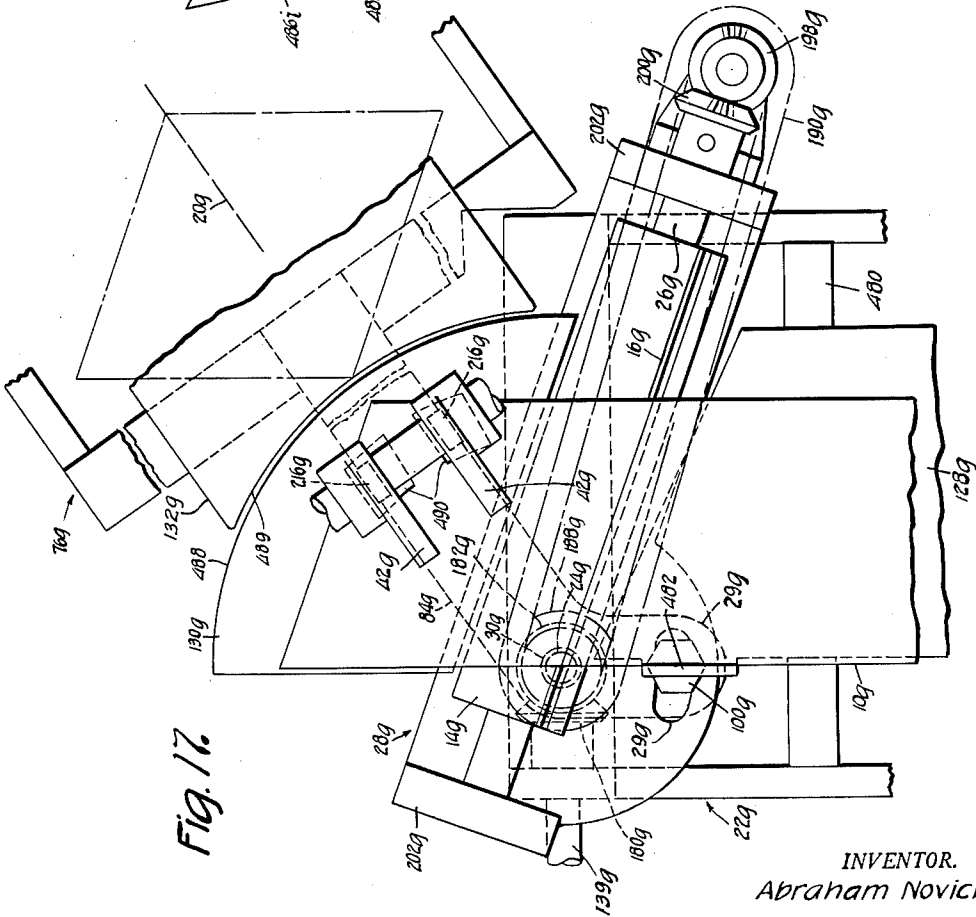
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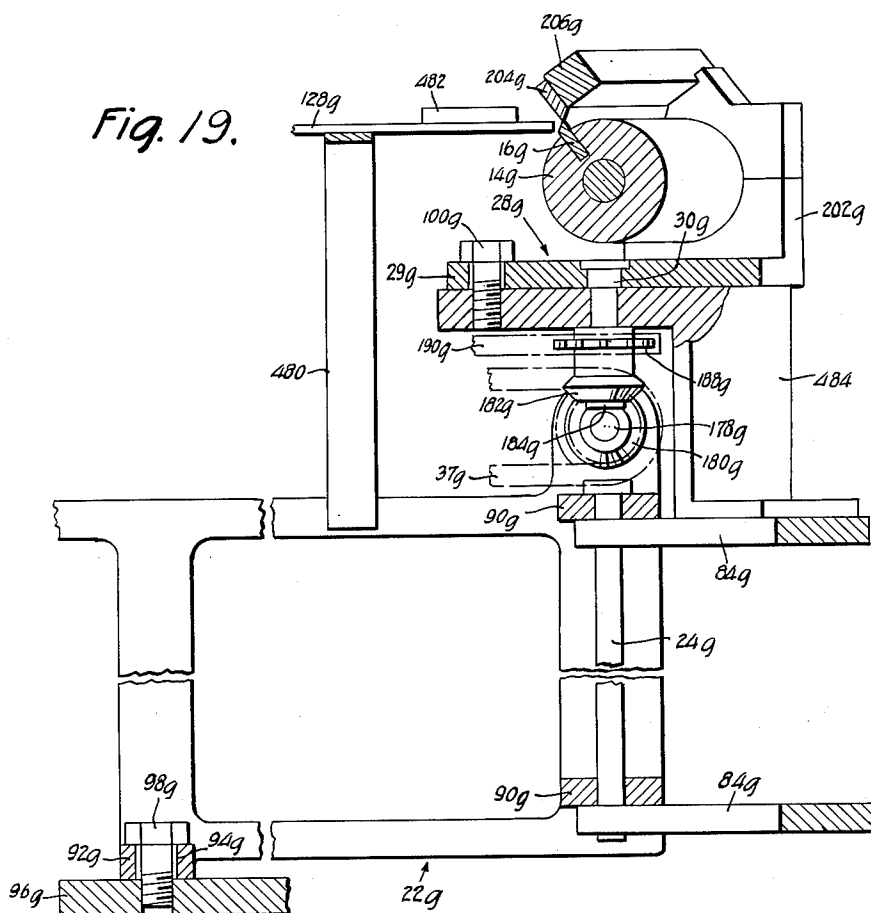
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3,056,322

WEB FED ENVELOPE MACHINE

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Filed Mar. 25, 1953, Ser. No. 344,572

2 Claims. (Cl. 83-301)

This invention relates to envelope machines and particularly to machines of the class which transforms a continuous web of paper into envelopes or envelope blanks.

It is old in the art to feed a web of paper from a reel, to cut the paper diagonally so as to divide it into rhombic blanks, and thereafter to advance the blanks in a new direction of feed to and through envelope making instrumentalities.

Prior machines, however, have lacked flexibility and versatility, being limited in variety of output and being expensive and awkward to maintain in service.

It is a primary object of the present invention to provide a machine in which a wide variety of sizes and shapes of envelopes can be made.

To this end it is a feature that provision is made of cutting mechanism capable of being set obliquely of the web to cut the blanks at any desired angle within a wide range, in combination with means for changing the feed to a predetermined direction at the instant when the cut is completed.

It is further feature of the invention that the web cut is made by straight knife blades. Straight knife blades, in contrast with the conventional spiral knives, can be maintained in service easily and efficiently by the average machine maintenance man. This represents an important advance over the usual pinch cut spiral knife mechanism. A given spiral blade can cut at only one angle and must run at the speed of the web. The spiral blade is extremely difficult to make and is easily destroyed because of the spiral structure. When reground the spiral knife changes diameter and this results in the production of a different size blank. A given spiral blade, moreover, can cut at only one angle, the web must run at the speed of the knife. A single pair of straight knives can take the place of a multiplicity of spiral knives. The combination of straight knives can cut the web obliquely without requiring the web to travel at the speed of the movable blade. By adjusting the rate of web feed a variety of blank sizes can be obtained.

It is a further important feature that provision is made for adjusting the direction of web feed, for adjusting the direction of the cut, and for adjusting the rate of web feed, all while assuring that the blank as cut will be caused to have its shorter diagonal extent along a predetermined control feed line.

In accordance with the present invention the blank is first cut and is then carried forward to instrumentalities which notch the blanks. It is necessary that the blank alignment and timing for notching be substantially perfect.

It is a feature of one form of embodiment of the invention that the web cutting and web feeding mechanisms are made relatively adjustable about a common axis which intersects the feed path of one edge of the web. This obviates the need for bodily adjusting the cutting mechanism while assuring the location of the shorter blank diagonal along a prescribed central feed line in preparation for the feeding of the blank along each line.

A broad feature of the invention has to do with the procedure which involves feeding and obliquely cutting a web along straight lines to produce rhombic blanks.

A further broad feature has to do with the provision, in combination, of means for feeding a web of envelope

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material, means for obliquely cutting the web along straight lines to produce rhombic blanks.

Other objects and advantages will hereinafter appear.

In the drawing forming part of this specification:

FIGURE 1 is a diagrammatic plan view which indicates the mechanism and the sequence of operations performed prior to the actual formation of the blanks into envelopes;

FIGURE 2 is a plan view of an envelope blank of one size and shape which the machine is capable of producing;

FIGURE 3 is a plan view of an envelope blank of different size and different shape which the machine is capable of producing;

FIGURE 4 is a diagram showing blanks of different sizes and shapes as cut from webs of different widths, with the cuts made at different angles, the purpose being to show how the direction and extent of web feed and the direction and location of the cut are adjusted to cause the cut blank always to be initially with its shorter diagonal on a common central feed line;

FIGURE 5 shows the blank of FIGURE 2 before the notches have been cut and before the tips of the side flaps have been clipped;

FIGURE 6 is a rear view of the folded envelope which is formed from the blank of FIGURES 2 and 5;

FIGURE 7 is a fragmentary, vertical, longitudinal, sectional view showing the web feeding and cutting mechanism, the section being taken upon the line 7-7 of FIGURE 8, looking in the direction of the arrows;

FIGURE 8 is a fragmentary plan view of the mechanism shown in FIGURE 7, together with means for initiating the feed of the severed blank away from the severing position;

FIGURE 9 is a fragmentary detail sectional view showing blank feeding members which are utilized in feeding a severed blank away from the severing position;

FIGURE 10 is also a fragmentary plan view of the mechanism shown in FIGURE 7, but in this instance the emphasis is on the driving means for the web feeding rollers and for the cutting knife;

FIGURE 11 is a fragmentary vertical sectional view taken upon the line 11-11 of FIGURE 7, looking in the direction of the arrows;

FIGURE 12 is a fragmentary vertical sectional view taken upon the line 12-12 of FIGURE 7, looking in the direction of the arrows;

FIGURE 13 is a fragmentary detail view showing the relation of the rotary and stationary knives at the beginning of a cut;

FIGURES 14 and 15 are fragmentary plan views illustrating, respectively, large and small blanks just at the instant of completion of the cut;

FIGURE 16 is a fragmentary plan view showing the cutting mechanism, and timing and aligning mechanism in the act of advancing a blank toward the notching and corner trimming means;

FIGURE 16A is a fragmentary plan view of certain gearing connected with the main shaft;

FIGURE 17 is a fragmentary plan view of another embodiment involving an improved arrangement of web feed and cutting, and blank feeding means;

FIGURE 18 is a diagrammatic view similar to FIGURE 4 but with reference to the modified form of mechanism; and

FIGURE 19 is a fragmentary view in sectional elevation of the form of the invention shown in FIGURE 17.

In order to afford a comprehensive idea of what the machine of FIGURES 7 to 16 is designed to accomplish, reference will first be made to diagrammatic FIGURES 1 and 4, and to FIGURES 2, 3 and 5. In FIGURE 1 a web 10a of paper (supplied from a reel which is not shown in the figure) is shown as having been ad-

vanced by continuously operating feed rollers 12 into blank cutting position. The web is fed forward beneath a diagonally disposed stationary cutting blade (not shown in FIG. 1) and over a roller 14 which carries a protruding knife blade 16. A blank 18a is shown slightly away from the leading end of the web as having been severed therefrom.

It will be observed that the blank 18a is substantially a perfect rhombus, having its opposite sides parallel and all four of its sides equal. It is also disposed at the instant when the cut is completed with its shorter diagonal in coincidence with the longitudinal central feed line 20 of the mechanism which follows it. These features characterize blanks of all sizes and shapes which the machine is capable of producing. All blanks are cut in rhombic form and every one of them has its shorter diagonal in coincidence with the line 20 at the completion of cutting regardless of variations of shape and size which may be given to the blanks.

Each blank is of prescribed size and shape so that the length of its sides, the magnitudes of its angles, and the length of its altitude are known in advance. When a definite blank is to be made a web having a width equal to the known altitude of the blank is chosen. Since the angles made by the blank sides with the line 20 (shorter diagonal) are known, and two of these sides are formed by the opposite side edges of the web, the appropriate direction of web feed is known for a given blank. Since the web feed direction varies according to the blank shape, the web supply and feeding mechanism is carried upon a frame 22 (FIGS. 7 and 8) which is adapted for horizontal adjustment about a fixed vertical shaft 24.

The cut made by the blade 16 extends parallel to the axis 26 of its supporting roller 14, and since the cut edges and the side edges of the blank are required to make equal but opposite angles with the line 20, provision is made of a supporting frame 28 for the knife members which may be adjusted horizontally about a vertical shaft 30. (See FIGS. 7 and 8.) It is an important point that the cutting mechanism admits of angular adjustment of the cut relative to the direction of web feed.

Regardless of the size of the blank the shorter blank diagonal must coincide with the line 20. With the frames 22 and 28 mounted and related as they are in FIGURES 7 and 8, the adjustments which have been described may result in displacement of the short blank diagonal to one side or the other of the line 20. Provision is accordingly made for adjusting the cutting mechanism longitudinally of the frame 22 (in the direction of web feed) after the other adjustments have been completed. For this purpose the frame 28 is pivotally supported from the frame 22 through a longitudinally adjustable frame 32 (see FIGS. 7 and 8). The frame 32 has longitudinally extending, slotted side bars 34. Headed screws 36 have their shanks passed downward through the slots and threaded into bars 37 of the frame 22.

The versatility of the mechanism is illustrated in FIGURE 4 in which a narrow web 10a is shown fed in a first direction to produce a comparatively small blank 18a, a second narrow web 10b is fed in a second direction to produce a longer and narrow blank 18b, and a third comparatively wide web 10c is fed in a third direction to produce a large blank 18c. The same cutting mechanism is utilized for all three blanks and many more. For the three blanks the cutting mechanism has three different angular settings as illustrated by 16a, 16b and 16c (FIGS. 4, 14 and 15), and it has three different bodily settings, also as illustrated by 16a, 16b and 16c. In every instance the settings are chosen to cause the short diagonal of the blank to coincide with the central feed line 20.

After the blank 18a has been cut to rhombic form as illustrated in FIGURE 5, it has notches 38 cut in it to divide the side flaps from the bottom and sealing flaps

as shown in FIGURES 2 and 5, and it has the tops of the side flaps trimmed off along the trim lines 40, also as shown in FIGURES 2 and 5.

The severance of every blank is completed at precisely a predetermined instant in the cycle of the roller 16. At that instant the blank is seized by segments 42 and advanced along the line 20 to feed rollers 44 which drive the blanks forward and deposit them over four conveyor chains which comprise two inner chains 46 and two outer chains 48. The four chains are driven in unison at a somewhat slower speed than the peripheral speed of the feed rollers 44, which corresponds to the peripheral speed of the segments 42. The chains carry pins 50 at uniform intervals. Jointly, they form a novel pin conveyor which is capable of timing and aligning the blanks or of preserving correct timing and alignment even though the blanks, when acted upon by the pins, are unnotched.

After a blank has passed the feed rollers 44 it is retarded by hold-back fingers 52. The pins 50 with the help of the hold-back fingers 52 serve to time, align and center the blanks. The chains 46 and 48 may be adjusted independently of one another but relative to their common driving shaft to relatively position the pins with reference to the particular blank to be operated upon. All four pins should be capable of simultaneously engaging and pushing a properly centered blank as shown in FIGURE 1.

After the blanks leave the pin conveyor they are delivered to variable speed feed devices 54. The devices 54 take each blank from the conveyors 264 while the blank is travelling at normal constant speed, bring it to rest instantaneously for the action of the four rotary notching cutters 58, accelerate it to normal speed once more, and deliver it to constant speed segments 56. The segments 56 pass the blanks into constant speed feed rollers 60.

As the blank is carried forward by the sectors 60 the ends of the side flaps are fed through rotary corner trimmers 62, 64. The blanks upon passing the trimmers are ready to be manufactured into finished envelopes 66a of the kind illustrated in FIGURE 6. They may accordingly be delivered by the sectors 60 to mechanism which arranges them into a fanned-out formation 67 preparatory to passing them through a fan-out seal flap gummer of a wide range rotary machine of the kind illustrated, for example, in Patent No. 1,808,706. From that point on the manufacturing operations are conventional. The finished envelope comprises a body panel 68 (FIG. 5), side flaps 70, a bottom flap 72 and a gummed seal flap 74.

In FIGURE 3 a blank 18d, similar to the blank 18a of FIGURE 2, is illustrated. The blank of FIGURE 3, though of a markedly different size and shape, is also adapted to be cut and formed by the illustrative mechanism of FIGURES 7 to 16a. It has corresponding flaps, notches and trim lines. Corresponding reference numerals have been applied to corresponding parts with the subscript *d* added in each instance, and no detailed description will be given. The FIGURE 3 blank is merely illustrative of a wide range of available variations.

The machine of FIGURES 7 to 16a comprises a main frame 76 which comprises side members 78 and 80 and several cross connecting members, including upper and lower cross connecting members 82 (see FIGS. 7 and 8). The members 82 at one end of the main frame have tongues 84 through which pivotal connection is established with the web feeding and cutting frame 22. The frame 22 is formed with ears 86 which directly overlie the tongues 84. The pivot pin 24 is a headed pin whose shank extends downward through the ears 86 and the tongues 84 in alternation.

The frame 22 includes side members 88, cross connecting members 90 in which the ears 86 are formed, and a cross connecting member 92 in which an arcuate slot 94

is provided. The member 92 rests upon a stationary plate 96. A headed screw 98 is passed downward through the slot 94 and threaded into the plate 96. The slot 94 is concentric with the axis of the pivot pin 24. When the screw 98 is partially backed off, the frame 22 can be angularly adjusted. The screw may then be tightened to fix the frame 22 in the desired position of adjustment.

It will be remembered that the frame 22 supports a frame 32, having capacity for longitudinal adjustment, and that the frame 32, in turn, pivotally supports a frame 28 by which the cutting mechanism is carried. The cutting mechanism, therefore, participates in the adjustment of the frame 22, but is adjustable longitudinally and pivotally relative to the frame 22. The frame 28 includes a base portion through which an arcuate slot 29, concentric with the shaft 30 extends. A headed screw 100 has its shank passed downward through said base portion of the frame 28 and threaded into the frame 32. The screw 100 may be partially backed off when it is desired to adjust the frame 28 relative to the frame 32, and may be retightened to fix the frame 28 in adjusted position.

The side members 88 of the frame 22 have extension arms 102 formed with open, upwardly facing bearings in which a reel shaft 104 may be set. As illustrated, the reel shaft is formed with reduced ends which fit in the bearings, the larger shaft portions being shouldered and serving to retain the shaft against axial shifting. The shaft 104 is provided with two collars 106 and 108, each of which is removably and adjustably held in place by means of a set screw 110. The web reel 112 is wound on a hollow core 114. With the shaft out of the machine, one of the collars is removed from the shaft and the other one is adjusted in accordance with the known width of the web so that it will, through engagement with the collar, locate the reel in a desired position axially of the shaft. The other collar is then reapplied to engage the opposite end of the core, and is fixed in place.

Upper extension arms 116 carry a cross rod 118 to which a brake strap 120 is attached. The strap 120 hangs down against the reel to stabilize the feed thereof, and carries a weight 122 at its lower end.

The web 10a is drawn off the reel 112 around stationary guide rods or rollers 124 and 126 by the feed rolls 12, and is thrust forward over a table 128 which is carried by the frame members 88. The web travels from the table 128 over the roller 14 and onto table sections 130 and 132. The section 130 is supported by the frame 28. A series of variously shaped table segments 130 is provided to that substitution can be made to meet the varying requirements. The section 132 is supported from the main frame 76. A series of variously shaped table segments 132 is provided so that substitution can be made to meet the varying requirements.

The blade carrying roller 14 is driven at uniform rotary speed. This speed is not varied with change of blank size or shape. This is important because, regardless of size or shape, the cutting mechanism must furnish one blank for each cycle of the envelope making mechanism. It is necessary that synchronism be maintained between the furnishing of the blank and such operating instrumentalities as the notchers, the die gummings, the scorers, the bottom flap folders and the seal flap folders. When the blank dimensions are changed, however, it is necessary to change the length of web fed in a cycle. To this end provision is made of mechanism for driving the roller 14 in constant relation to the main drive, and of mechanism for varying the drive of the web feeding rollers 12.

The drive mechanism referred to is best illustrated in FIGURE 10 but is also shown in FIGURES 7, 8, 11, 12, 16, and 16a. A vertical main shaft 135 drives a shaft 134 at constant speed through bevel gears 137 and 139. The gear 139 is held toward the gear 137 by an L-shaped bracket 141 whose arms extend respectively around the shafts 135 and 134. The bracket 141 is free to turn about the shaft 135 to accommodate adjustment of the frame

22. The shaft 134 has a slidable keyed connection with a universal joint 136. The shaft 134 is connected through the universal joint 136 to drive a shaft 138 which is rotatably supported in a bearing bracket 140 of the frame 22.

A sprocket 142, pinned on the shaft 138, drives a chain 144. The chain 144 drives a sprocket 146, which sprocket 146 is unitary with a further sprocket 148 (FIGS. 10 and 11) and runs upon a pivot pin 150. The pivot pin 150 is headed and has a reduced end portion which is threaded into a spacer post 152. The spacer post extends laterally outward from one of the frame members 88 of the frame 22. The pin 150 also pivotally supports an arm 154 (FIGS. 7, 10 and 11) with capacity for rocking motion. The arm 154 supports at its free end a shaft 156. The shaft 156 supports a sprocket 158 which is driven from the sprocket 148 through a chain 160. A gear 161 is mounted on the shaft 156 alongside the sprocket 158 and has a rib and slot connection with the sprocket so that the gear is always positively driven in unison with the sprocket. The bearing portion of the arm 154, the sprocket 158 and the gear 161 are held together on the shaft 156 between headed screws 161 and 164 which are threaded into opposite ends of the shaft 156.

The gear 161 is caused to mesh with and to drive a gear 166 which is fast upon the shaft 168 of the lower feed roller 12. An equal gear 170 is fast upon a shaft 171 of the upper roller 12 and is driven by the gear 166. The arm 154 has an ear 170a in which an arcuate slot 172 is formed, the slot being concentric with the pivot pin 155. A headed screw 174 has its shank passed through the slot 172 and threaded into a bracket 176. The screw 174 normally clamps the arm 154 in position to hold the gear 161 properly engaged with the gear 166.

The arm 154 and the parts carried by it constitute a change speed unit. When it is desired to change the drive ratio to the web feeding rollers 12, the screw 174 is partially backed off, and the arm 154 is swung in a direction to carry the gear 161 away from the gear 166. The screw 164 is then backed out, the gear 161 is replaced by a gear of the desired size, the screw 164 is replaced, the new gear is swung into engagement with the gear 166, and the screw 164 is retightened.

The shaft 138 is connected through a universal joint 177 to a telescoping shaft 178, through which drive is transmitted to the knife carrying roller 14. A bevel gear 180 is affixed to the shaft 178. The gear 180 is in mesh with a bevel gear 182, the latter gear being rotatable on the vertical shaft 30 about which the frame 28 pivots. The bevel gear 182 is held on the lower end of the shaft 30 by a headed screw 184. Just above the gear 182 the horizontal arm of an L-shaped bracket 186 (FIG. 12) surrounds the shaft 30 and derives support from it. A vertical arm of the bracket 186 surrounds the shaft 178 and bears against the bevel gear 180 to hold the gear properly in mesh with the gear 182 and supports the inner end of the shaft 178.

Above the bracket 186 the shaft 30 has rotatably mounted upon it a sprocket 188 which is driven through a rib and slot connection from the gear 182 and which, through a chain 190, drives a sprocket 192. The sprocket 192 is made fast on the lower end of a vertical shaft 194. The shaft 194 is rotatably supported in a bearing bracket 196 which is affixed to the frame 28. A bevel gear 198, fast on the upper end of the shaft 194, drives a bevel gear 200 which is fast on the shaft 26 of the roller 14. The shaft 26 is mounted in upstanding arms 202 of the frame 28, and serves to support and drive the roller 14.

The telescoping shaft section 134 and the universal joint 136 enable the shaft 138 to be adjusted with the frame 22 while maintaining an operative driving connection to the shaft 138. The universal joint 177 and the telescopic arrangement of the shaft 178 enables an operative connection to be mounted to the gear 182 even when the gear is adjusted longitudinally of the frame 22

with the frame 32. Since the gear 182 is concentric with the shaft 30, about which the frame 28 is angularly adjusted, the angular adjustment of the frame 28 does not disturb the operativeness of the drive train to the roller 14.

The table segments 128, 130, 132 have their upper faces disposed in a horizontal plane which is substantially tangent to the roller 14 at the upper side thereof (FIG. 7). Although the knife 16 projects radially outward for some distance beyond the periphery of the roller 14, the cooperating stationary blade 204 is disposed in advance of the vertical axial plane of the roller 14 and at a level to cause the web to be cut substantially in the plane of the table top. The blade 204 is adjustably supported against a radially extending face of a rectangular supporting bar 206.

The bar 206 is supported in notches formed in triangular extensions 208 of the arms 202. The radial disposition of the blade 204 causes its left hand face to form an acute angle with the top of the table segment 128. Thus, when a cut has been completed, the tendency of the blade is not to block the freshly cut leading edge of the web but to cam the web downward into position to travel past the lower edge of the blade. The blade 16 always travels faster than the web.

It is desirable in a cutter of the kind illustrated to avoid having the cut effected instantaneously throughout the width of the web. In order that a progressive cut may be obtained, the blades 16 and 204 are disposed substantially as shown in FIGURE 13. The cutting edge of the blade 16 is disposed to extend parallel to the axis of the roller 14 but the blade 204 is arranged with one of its ends a little in advance of the other. Although the divergence of the blades is slight, as seen in FIGURE 13, a progressive cut is secured, and this results in a very substantial improvement of the cutting action. The difference of direction of the blades is so slight that the blades may be sharpened to provide straight cutting edges and will cooperate properly, adjusting themselves to one another in action.

In the embodiment of FIGURES 17 to 19, the adjusting axes for the frames 22g and 28g are relocated to coincide with one another. The parts are generally similar to those of FIGURES 7 and 8. Corresponding reference characters have been applied to corresponding parts with the subscript g added in each instance, and no general description will be given, but the specific differences will be pointed out and described and their purpose will be explained. Except for the parts specifically shown and described as changed, the mechanism may be the same as in FIGURES 7 to 16a.

The frame 22g is generally similar to the frame 22 of FIGURES 7 and 8 except for the fact that the rod 24g has been relocated. Tongues 84g of the main frame are extended to the new pivot location and the cross members 90g of the frame 22g have bores appropriately formed in them for alignment with the bores of the tongues 84g. The slot 94g is made concentric with the rod 24g and is used as before for fixing the frame 22g in various adjusted positions.

The frame 22g supports rigid brackets 480 upon which a table segment 128g is rigidly mounted. The table segment 128g includes a side guide 482 for engaging the left hand edge of the web 10g as it travels toward the knives. The axis of the pivot rod 24g coincides with the intersection of the central feed line 20g with the web edge feed line defined by the guide 482.

The need for the longitudinally adjustable frame 32 is obviated in this form of construction. The frame 28g is supported for horizontal pivotal movement upon a stationary bracket 484 which is affixed to tongue 84g of the main frame. A vertical headed pin 30g connects the frame 28g pivotally with bracket 484. The pin 30g is passed downward through the base of the frame 28g and a horizontal portion of the bracket 484. The pin

30g is disposed in axial alignment with the rod 24g so that the axis of adjustment of the frame 28g also coincides always with the intersection of the central feed line 20g and the web edge feed line defined by the guide 482. A headed screw 100g is passed downward through an arcuate slot 29g formed in the frame 28g and is threaded into the bracket 484 for the purpose of releasably retaining the frame 28g in its various adjusted positions. The common axis of the rod 24g to the pin 30g passes directly through the line of cut as well as through the central feed line 20g and the feed line of the left hand edge of the web 10a as defined by the side guide. In the cutting position one obtuse corner of the blank will necessarily lie in the central feed line 20g, and if the frame 22g and the frame 28g are adjusted to cause the line of web feed and the line of cut to make equal but opposite angles with the central feed line 20g the shorter diagonal of the rhombic blank will be caused to coincide with the central feed line 20g without resort to any bodily adjustment of the cutting mechanism.

FIGURE 18 shows three blanks 18g, 18h and 18i as having been cut from the respective webs 10g, 10h and 10i. The three cut lines are designated respectively 16g, 16h and 16i, while the corresponding edge feed lines are designated 486g, 486h and 486i. The lines 16g and 486g make equal but opposite angles with the central feed line 20g; the lines 16h and 486h make equal but opposite angles with the central feed line 20g; and the lines 16i and 486i make equal but opposite angles with the central feed line 20g. These relationships are brought about and maintained by the two adjustments which have been described.

The table segment 130g is, in this instance, supported from the frame 28g. It does not require to be replaced by other table segments. A straight edge of the table segment 130g stands parallel to the axis of the roller 14g and at a short, fixed distance from the roller. The table segment 130g also has a convex arcuate edge 488 disposed toward a complementary concave arcuate edge 48g of the table segment 132g. The table segment 132g is supported from the main frame 76g and may remain permanently in place. Arcuate slots 490 are formed in the table segment 130g so that the feed rolls 216g may bear upward through the table against the sectors 42g with the table in different positions of angular adjustment.

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.

What is claimed is:

1. In an envelope blank forming mechanism, in combination, means for advancing rhombic blanks with their shorter diagonals in substantial coincidence with a prescribed central feed line, a first frame, means on said frame for supporting, guiding and feeding a web of paper in a direction oblique to said central feed line, means supporting said frame with capacity for angular adjustment so that the line of web feed may be caused to make a desired angle with the central feed line, a second frame, web cutting means carried by the second frame including fixed and rotary straight knives, and means supporting the second frame with capacity for angular adjustment relative to the central feed line and to the first frame, so that the directions of web feed and the line of cut can be varied in setting to make various equal but opposite angles with said central feed line, and means supporting said second frame from the first with capacity for bodily adjustment in the direction of web feeding.

2. In an envelope blank forming mechanism, in combination, means for advancing rhombic blanks with their shorter diagonals in substantial coincidence with a pre-

scribed central feed line, a first frame, means on said frame for supporting, guiding and feeding a web of paper in a direction oblique to said central feed line, means supporting said frame with capacity for angular adjustment so that the line of web feed may be caused to make a desired angle with the central feed line, a second frame, web cutting means carried by the second frame including fixed and rotary straight knives, and means supporting the second frame with capacity for angular adjustment relative to the central feed line and to the first frame, so that the directions of web feed and the line of cut can be varied in setting to make various equal but opposite angles with said central feed line, means for driving the rotary knife at constant speed, means including a gear change unit for driving the web at various chosen constant speeds, and means supporting said second frame from the first with capacity for bodily adjustment in the direction of web feeding.

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References Cited in the file of this patent

UNITED STATES PATENTS

676,433	Hollerith	June 18, 1901
1,458,122	Cheetman	June 5, 1923
1,736,407	Labombarde	Nov. 19, 1929
1,990,944	Joachimczyk	Feb. 12, 1935
2,056,336	Wolff	Oct. 6, 1936
2,077,952	Novick	Apr. 20, 1937
2,119,951	Dunnebie	June 7, 1938
2,203,260	Hallden	June 4, 1940
2,204,067	Bruker	June 11, 1940
2,238,481	Van Derhoef	Apr. 15, 1941
2,567,634	Bosshard	Sept. 11, 1951
2,656,889	Kaplan	Oct. 27, 1953
2,694,351	Winkler et al.	Nov. 16, 1954
2,696,255	Heywood	Dec. 7, 1954
2,716,480	Dotta	Aug. 30, 1955
2,725,137	Muddiman	Nov. 29, 1955