March 17, 1931. W. H. RIFE 1,796,723

METHOD AND MECHANISM FOR MAKING ENVELOPES

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Fig. 1.

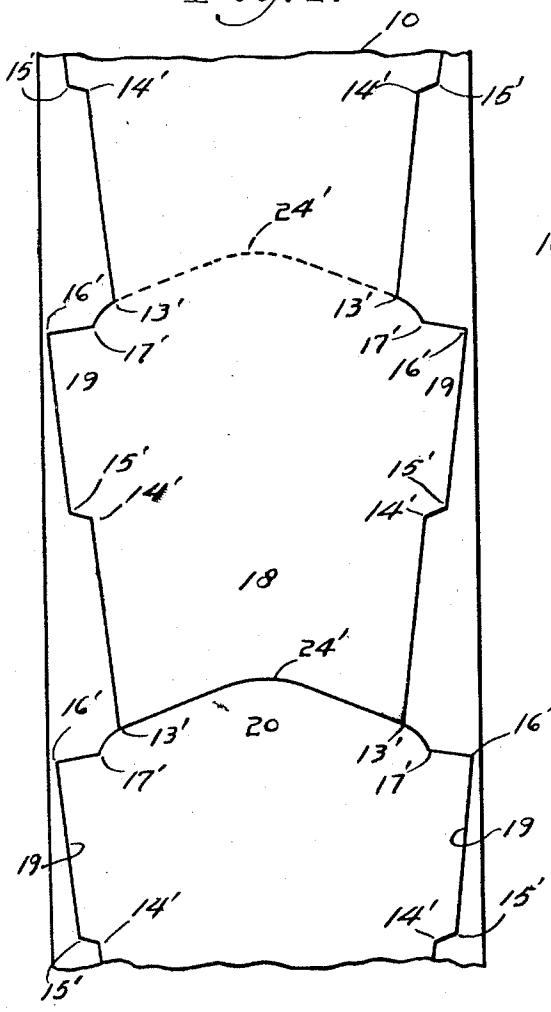


Fig. 2.

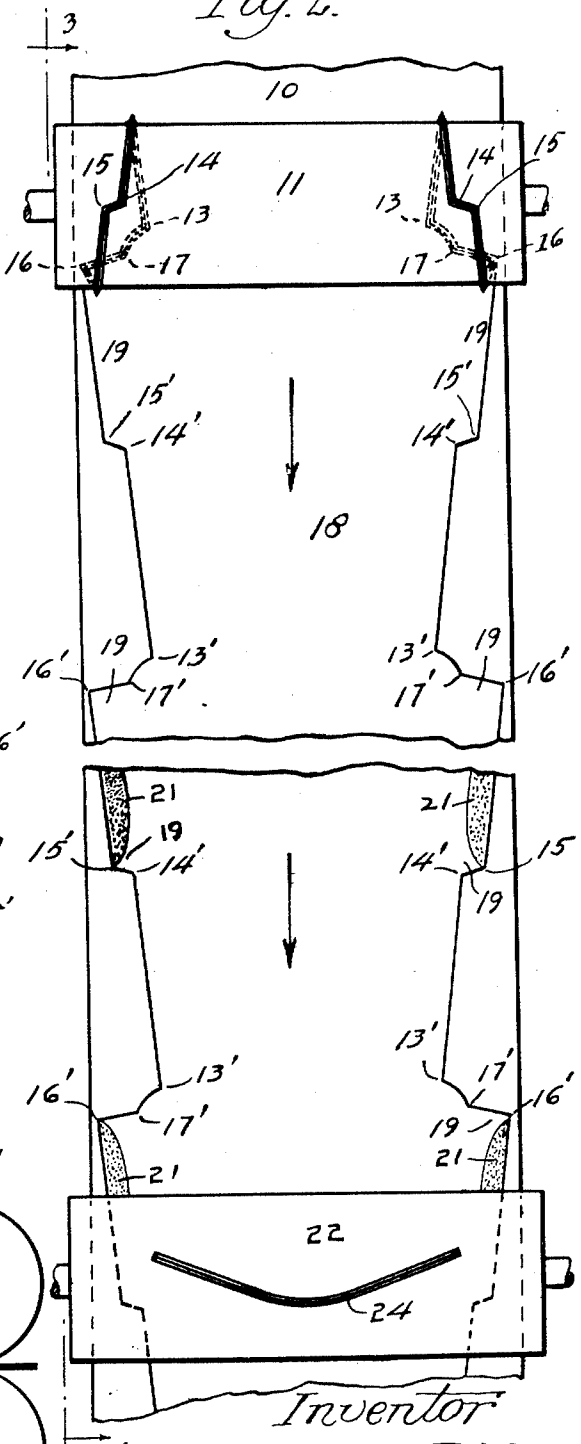
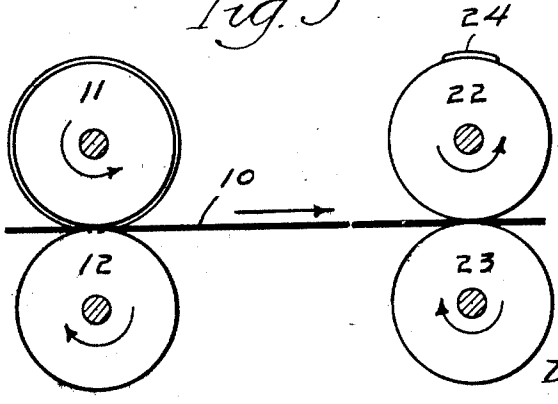


Fig. 3



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Fig. 4.

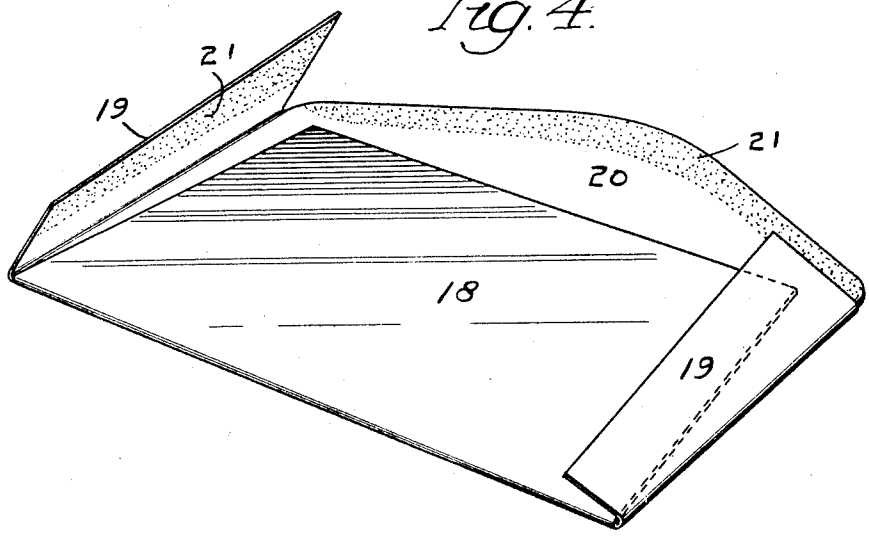
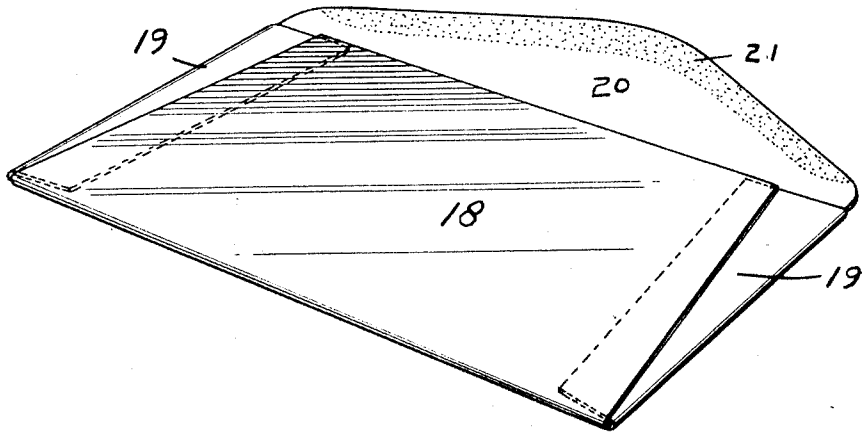


Fig. 5.



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Fig. 6.

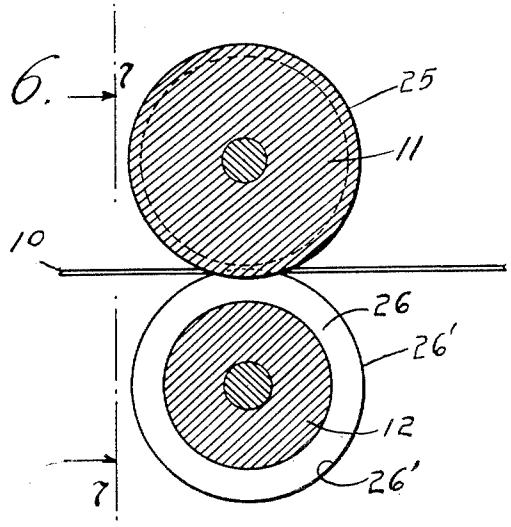
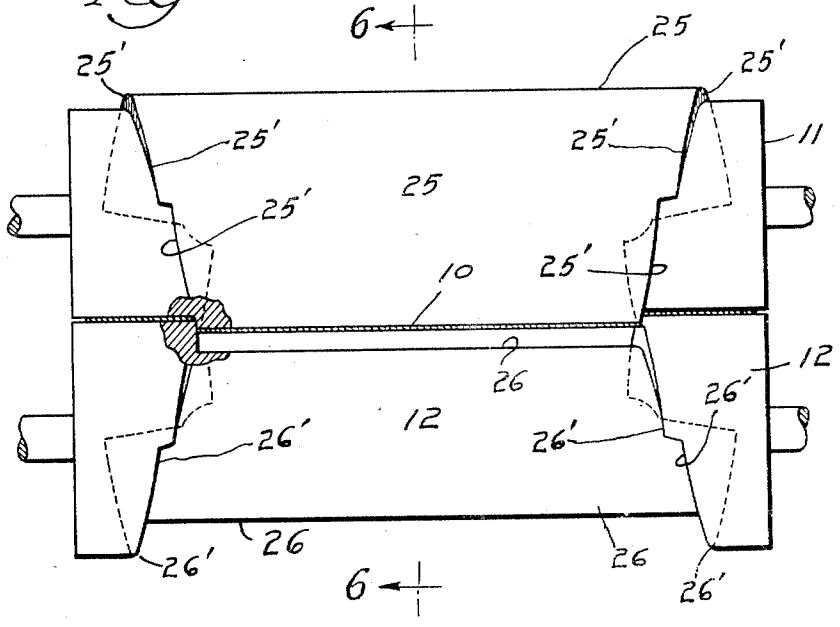


Fig. 7.



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UNITED STATES PATENT OFFICE

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METHOD AND MECHANISM FOR MAKING ENVELOPES

Application filed May 6, 1929. Serial No. 360,953.

The invention relates to improved methods and mechanisms for making envelopes and has for its primary object the provision of methods and means whereby envelopes of certain designs may be produced with great speed and, therefore, economically.

Another object of the invention is the provision of methods and means whereby side seam envelopes having diagonal or oblique seams may be produced by the operation of rotary cutting members and therefore with great speed and economy.

Heretofore, the only envelopes produced practically and economically at high speed by rotary cutting members have been what are termed and known as side seam envelopes in which short end flaps are formed with inner edges parallel with the sides of the envelope and adhesively secured to the back flap along corresponding seams parallel with the envelope sides. These end flaps may be secured either over or under the back flap, usually the former.

Such envelopes are open to several serious objections. The end flaps, owing to conditions of manufacture, are usually so small and short that they cannot receive sufficient adhesive; practically the entire backs of such envelopes are formed of an unreinforced back flap and therefore lack sufficient strength and stiffness to permit of their being fed rapidly and efficiently through canceling, sealing, or stamping machines; and such envelopes are not as attractive in appearance as the ordinary envelopes made with cross-seams.

Cross-seam envelopes have the seam or joint between the end and back flaps, extending diagonally or obliquely from the lower corners to or toward the upper middle of the back, and for this reason may be supplied with ample adhesive; are stiff and strong enough for feeding through canceling, sealing, or stamping machines; and are more attractive in appearance.

As far as I am aware, all cross-seam envelopes now being made are first cut or severed in the form of complete extended separate flat blanks and subsequently folded and secured in envelope form.. In this way, a desirable envelope is produced but at relatively high cost.

A further object of the invention is the production of envelopes having diagonal oblique seams or junctures between the end and back flaps, formed from a continuously advancing web and at great speed and economy.

Other objects will appear hereinafter.

The invention consists in the methods and mechanisms hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming part of this specification and in which—

Fig. 1, is a top plan diagrammatic view of a portion of a paper web upon which has been indicated diagrammatically the different cuts made in forming the envelopes;

Fig. 2, a partial top plan view of portions of the paper web and showing two sets of cutting rollers equipped with proper cutting elements for forming the envelopes in question;

Fig. 3, a partial sectional view taken on line 3—3 of Fig. 2;

Fig. 4, a perspective view of one of the envelopes formed by my improved method and mechanism;

Fig. 5, a perspective view of a slightly different form of envelope which may be also readily formed by my improved method and mechanism;

Fig. 6, a longitudinal sectional view, taken substantially on line 6—6 of Fig. 7, illustrating another form of cutting rollers which may be employed in the mechanism; and

Fig. 7, a view taken substantially on line 7—7 of Fig. 6.

The form of construction illustrated in Figs. 1, 2 and 3 comprises the usual paper web 10 ordinarily supplied in rolls and continuously fed or advanced through the machine in the direction of the arrows indicated in Figs. 2 and 3. The mechanism for continuously advancing or feeding the web 10 may consist of any of the usual or desired

mechanisms for this purpose, such, for example, as is illustrated in the patent to West, No. 1,043,278, dated November 5, 1912, and therefore requires no further illustration or description here.

Arranged at one point of the travel of the said web 10 are two opposed cooperating rollers 11 and 12, the cutting roller 11 being arranged above the web 10 and the cutting roller 12 below the same, as indicated in Fig. 3. The cutting roller 11 is provided on its periphery with two similar symmetrically arranged cutting knives or blades. Said blades start at the points 13 corresponding with points well within the body of the web 10 and symmetrically positioned relative to the central medial line of the utilized portion thereof. Said blades extend from the points 13 helically and slightly divergently around the periphery of the roller 11 to the points 14. From the points 14 to 15, the said blades diverge sharply and helically. From the points 15 to 16, the said blades again diverge slightly and helically, and from the points 16 to 17 they converge sharply and helically. From the points 17 back to the starting points 13 the blades converge, as shown, along arched lines. The cutting blades thus provided cooperate with the lower roller 12 to perform cuts in opposite sides of the web 10 as said web passes between said rollers, as will be readily understood by those skilled in this art. The cuts performed in the web have been marked with numerals corresponding in general with the numerals employed on said blades. Thus the cuts performed by the portions 13—14 of the blades have been labeled on the web 13′—14′; those performed by the portions 14—15 of the blades have been labeled 14′—15′, and so on, so that the cuts performed by the portions of the blades may be readily identified.

As will be observed, a cutting means is thus provided which, starting simultaneously at two symmetrical points 13 well within the body of the web, will cut two rearwardly divergent straight cuts 13′—14′; then two sharply divergent cuts 14′—15′; then two slightly divergent cuts 15′—16′; then two sharply convergent cuts 16′—17′; and then two converging arched cuts 17′—13′ to the point of beginning. The cuts 13′—14′ thus produced outline oblique or diagonal edges for the back flaps 18 of the envelopes. The cuts 14′—15′—16′—17′ outline end flaps 19 for the envelopes, having also diagonal or oblique edges. The cuts 17′—13′ outline edge portions of the sealing flaps 20 of the envelopes.

As will be noted, the main cuts 13′—14′ and 15′—16′ are thus performed within the body of the web, starting and continuing simultaneously and symmetrically from two symmetrical points 13′ located well within the borders of the web, and continuing simultaneously and symmetrically to the points 16′ just slightly within the side edges or borders of the web, thus practically completing the entire side cuts for a single envelope unit. Owing to the fact that these cuts are made divergently, the effect of the cuts is to tend to stretch the web laterally, thus holding said web smooth and taut during the cutting operation and preventing wrinkling, distortions or tearing of the web during such cutting operations at high speed. Owing to the fact that the cuts are performed simultaneously, the resistance or reaction from each cut counterbalances that of the other, a result which is augmented by the fact that the cuts are performed symmetrically.

It is also to be noted that the cuts thus performed are performed well within the body of the web until the cuts for each envelope unit are practically completed, at which time the cuts closely approach the edges of the web. This has the effect of constantly maintaining the borders of the web intact during the main cutting operation and providing sufficient strength in the borders of the web to maintain them intact during these main cutting operations. It will be observed that when the cuts closely approach the borders of the web at the point 16′, the main cutting operations for the sides of the envelope units have been practically completed, so that there is less tendency to strain or break the narrowed border and less tendency for the broken border to entangle in the machine mechanism in case of an accidental break at the narrowed and consequently weakened portion. In this way, the tendency is to constantly maintain the tension in the web uniform during the main cutting operations. It is also to be noted that the cutters employed in the main cutting operations diverge from each other and therefore tend to free the web after the cutting operations have been completed, thus facilitating the operation of the mechanism at high speed.

After the web leaves the cutters 11—12, it passes through suitable mechanism of any usual or desired form, not shown, which applies adhesive 21 to the inner faces of the end flaps 19, as shown.

After receiving the adhesive 21, the web passes between a pair of cutting rollers 22 and 23, the roller 22 being equipped on its periphery with a curved cutting blade 24 adapted and arranged to cut a curved line 24′, indicated in Fig. 1, and connecting the points 13′ of each envelope unit, said knife 24 serving to sever each envelope unit from the web in the final operation of forming the envelopes.

From the rollers 22 and 23 the severed envelope units pass through the usual fold-

ing and forming mechanism which folds the units into the form indicated in Fig. 4 and applies adhesive to the sealing flap 20, as will be readily understood by those skilled in this art.

This forms envelopes with oblique or diagonally extending seams extending from the lower rear corners thereof diagonally and obliquely upwardly toward the central or middle portions of the backs. Obviously, by changing the forms of the cutting blades on the cutting rollers, the different flaps may be changed in form to vary the angularity of this seam as desired, so that, if desired, the seams may be so inclined as to practically meet at the tops of the backs of the envelopes. Thus envelopes may be produced having the highly desirable diagonal or oblique seams in the back thereof from a continuously advancing web and with great speed and economy.

Obviously, also, by a slight variation readily understood by those skilled in this art, the envelopes may be formed, as indicated in Fig. 5, with the end flaps 19 under the back flap 18, as shown.

In Figs. 6 and 7 I have illustrated another arrangement of cutting elements on the peripheries of the cutting rollers 11 and 12. Here the upper roller 11 is provided with a male die member 25 having cutting edges 25′ shaped exactly as are the cutting edges of the knife blades 13—17 previously described. The lower cutting roller 12 is likewise provided with a female die recess 26 having similarly shaped cutting edges 26′ cooperating with the cutting edges 25′ to effect a shear or scissor action as the two rollers revolve, thereby performing precisely the same cuts in the edges of the web 10. Obviously, these cutters will produce precisely the same envelopes as are produced by the cutters already described.

While I have illustrated and described the preferred mechanism and method for carrying my invention into effect, these are capable of variation and modification without departing from the spirit of the invention. I therefore do not wish to be confined to the precise details disclosed but desire to avail myself of such variations and modifications as fall within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, said cuts diverging rearwardly in said web; and subsequently transversely severing said web to form separate envelope blanks.

2. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, said cuts diverging rearwardly and being confined to the body of said web, thereby leaving a central portion and marginal edges thereof intact; and subsequently transversely severing said web to form separate envelope blanks.

3. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web; performing rearwardly diverging cuts in said web outlining the edges of portions of envelopes; and subsequently transversely severing said web to form separate envelope blanks.

4. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web; simultaneously performing rearwardly diverging symmetrical cuts in said web outlining the edges of portions of envelopes; and subsequently transversely severing said web to form separate envelope blanks.

5. The combination with means for supporting and maintaining a continuously advancing web of means for substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, said cuts diverging rearwardly in said web; and means for subsequently transversely severing said web to form separate envelope blanks.

6. The combination with means for supporting and maintaining a continuously advancing web of means for substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, said cuts diverging rearwardly and being confined to the body of said web until the outlining cuts have been completed; and means for subsequently transversely severing said web to form separate envelope blanks.

7. The combination with means for supporting and maintaining a continuously advancing web of rotary means for substan-

tially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, said cuts diverging rearwardly and being confined to the body of said web until the outlining cuts have been completed; and means for subsequently transversely severing said web to form separate envelope blanks.

8. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks therefrom; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web and extending thence obliquely to form two of said outer edges; and subsequently transversely severing said web to form separate envelope blanks.

9. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks therefrom; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web and extending thence obliquely to form two of said outer edges, and at the same time transversely stretching the web; and subsequently transversely severing said web to form separate envelope blanks.

10. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks therefrom; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web and extending thence obliquely to form two of said outer edges, said cuts diverging rearwardly in said web, thereby transversely stretching the web; and subsequently transversely severing said web to form separate envelope blanks.

11. In an envelope machine comprising means for mounting and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks; means for substantially simultaneously performing oblique cuts in said web defining the outer edges of both end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of the web and extending thence obliquely to form two of said outer edges; and means for transversely severing said web to form separate envelope blanks.

12. In an envelope machine comprising means for mounting and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks; means for substantially simultaneously performing oblique cuts in said web defining the outer edges of both end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of the web and extending thence obliquely to form two of said outer edges, and at the same time transversely stretching the web; and means for transversely severing said web to form separate envelope blanks.

13. In an envelope machine comprising means for mounting and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks; means for substantially simultaneously performing oblique cuts in said web defining the outer edges of both end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of the web and extending thence obliquely to form two of said outer edges, said cuts diverging rearwardly in said web thereby transversely stretching the web; and means for transversely severing said web to form separate envelope blanks.

14. The method of cutting envelopes which consists in providing and maintaining a continuously advancing web of paper of a width just sufficient to form single envelope blanks therefrom; substantially simultaneously performing oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web constituting the outer corners of the back flap of the envelope, and extending thence obliquely to form two of said outer edges, said cuts diverging rearwardly in said web to complete the outer edges of the back flap of the envelope, then diverging sharply to offset outwardly the next cut, then diverging in directions parallel to said first mentioned cuts to form the outer edges of the side flaps of the envelope, then converging sharply and shortly to the point of

beginning completing said side flaps and commencing slightly the front flap of the envelope, but leaving the major portion of said web intact, thereby transversely stretching the web; and subsequently transversely severing said web to complete the front flaps of the envelopes and to form separate envelope blanks.

15. In an envelope machine comprising means for mounting and maintaining a continuously advancing web of paper of a width sufficient to form single envelope blanks; a pair of co-operating rotary cutters equipped with cutting means arranged to perform substantially simultaneously oblique cuts in said web defining the outer edges of both the end and back flaps for a single envelope unit commencing at two points substantially symmetrically located on opposite sides of the central line of the utilized portion of said web, constituting the outer corners of the back flap of the envelope, and extending thence obliquely to form two of said outer edges, said cuts diverging rearwardly in said web to complete the outer edges of the back flap of the envelope, then diverging sharply to offset outwardly the next cuts, then diverging in directions parallel to said first mentioned cuts to form the outer edges of the side flaps of the envelope, then converging sharply and shortly to the point of beginning completing said side flaps and commencing slightly the front flap of the envelope, but leaving the major portion of said web intact, thereby transversely stretching the web; and a pair of co-operating cutters arranged at a distance from said first mentioned cutters and also arranged for transversely severing said web to complete the front flaps of the envelope blanks.

In witness that I claim the foregoing as my invention, I affix my signature this 20th day of April, 1929.

WILLIAM H. RIFE.