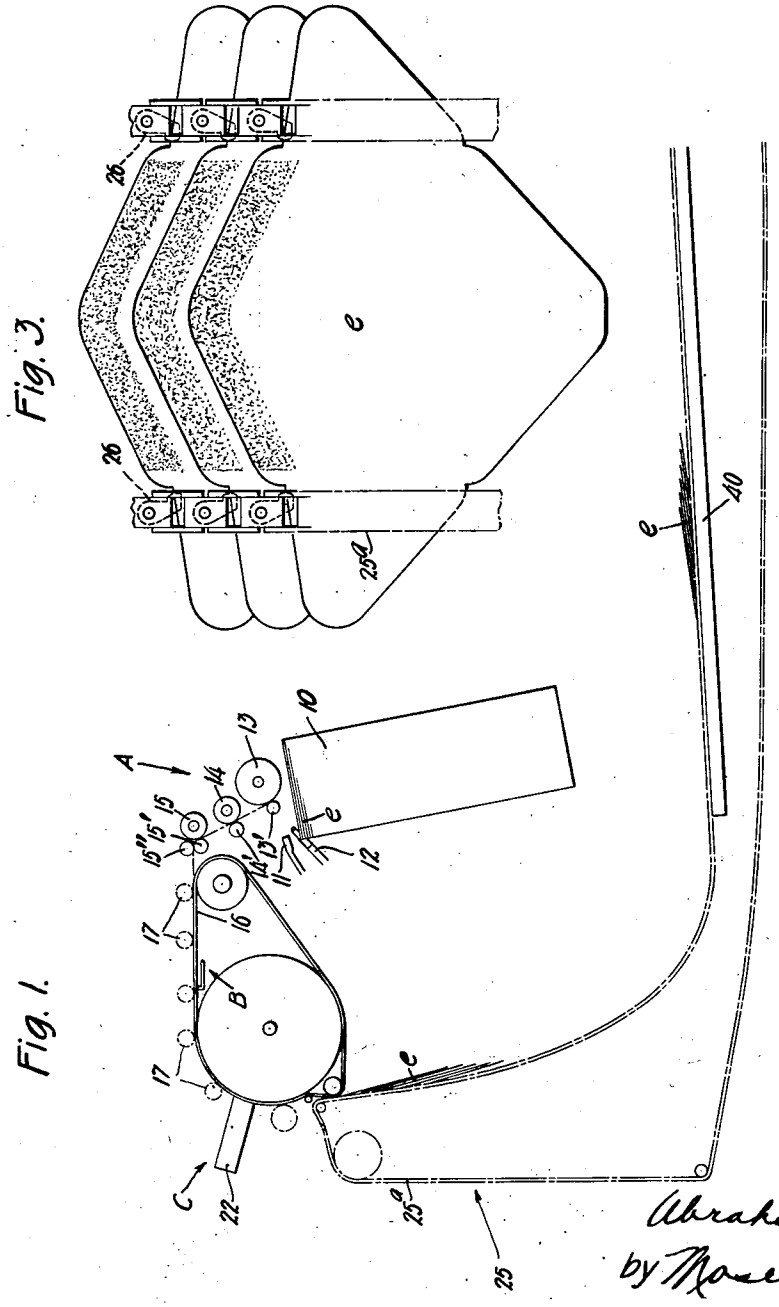
June 2, 1931. A. NOVICK 1,807,867

MACHINE FOR MAKING ENVELOPES

Original Filed June 12, 1928 4 Sheets-Sheet 1



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MACHINE FOR MAKING ENVELOPES

Original Filed June 12, 1928 4 Sheets-Sheet 2

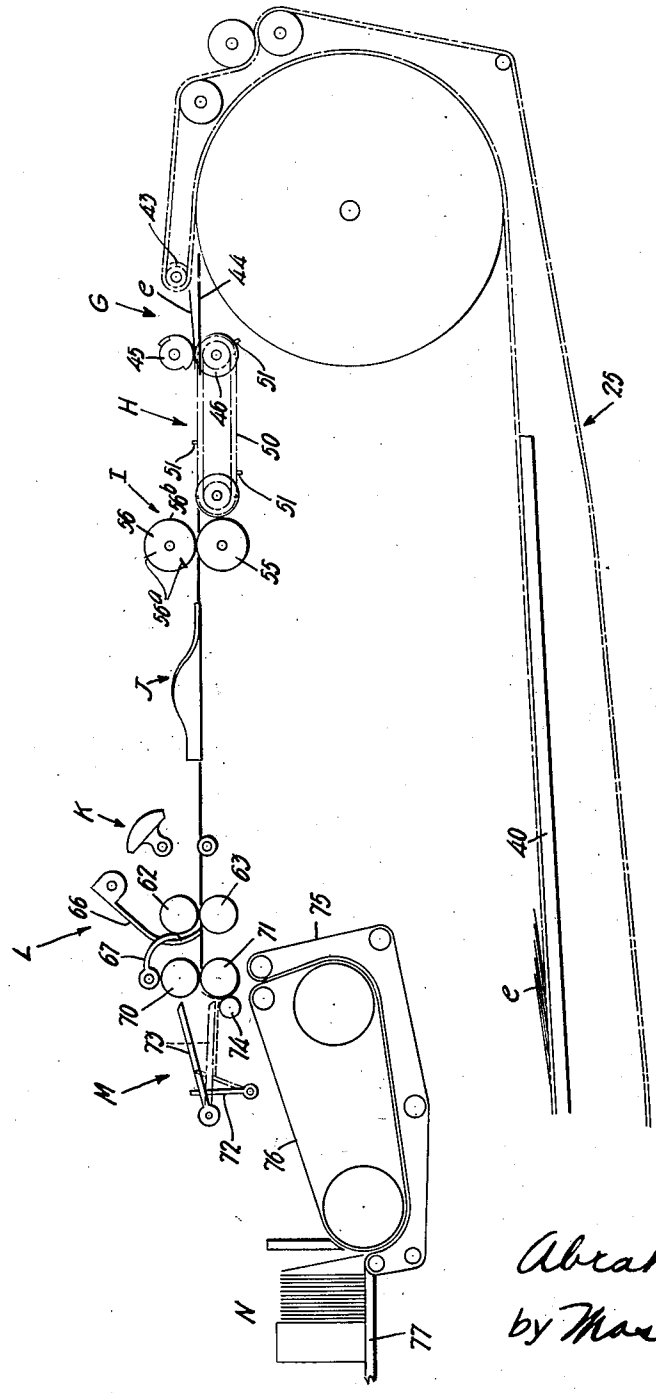


Fig. 2.

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Fig. 5.

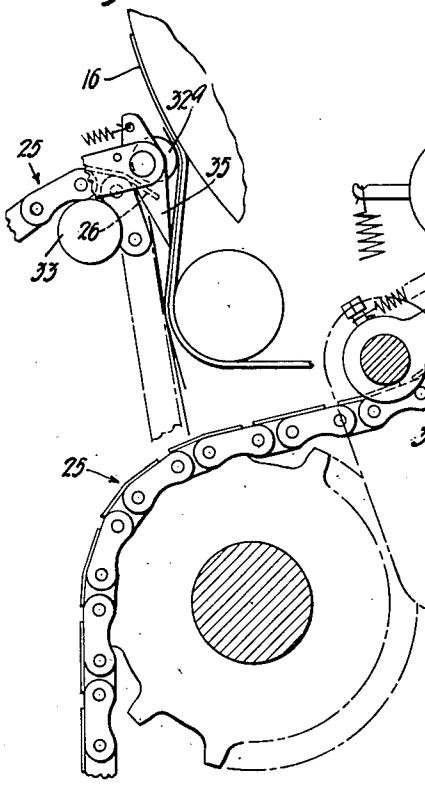


Fig. 4

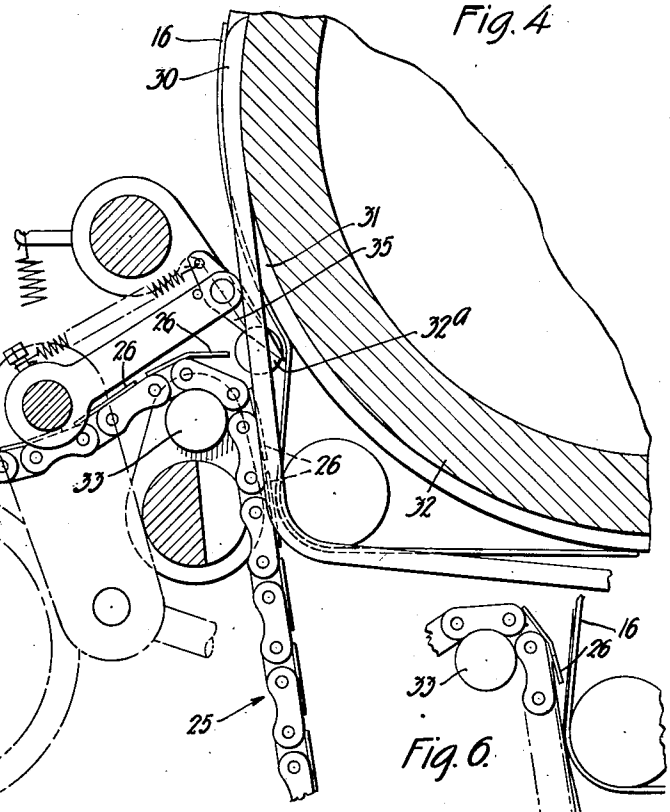
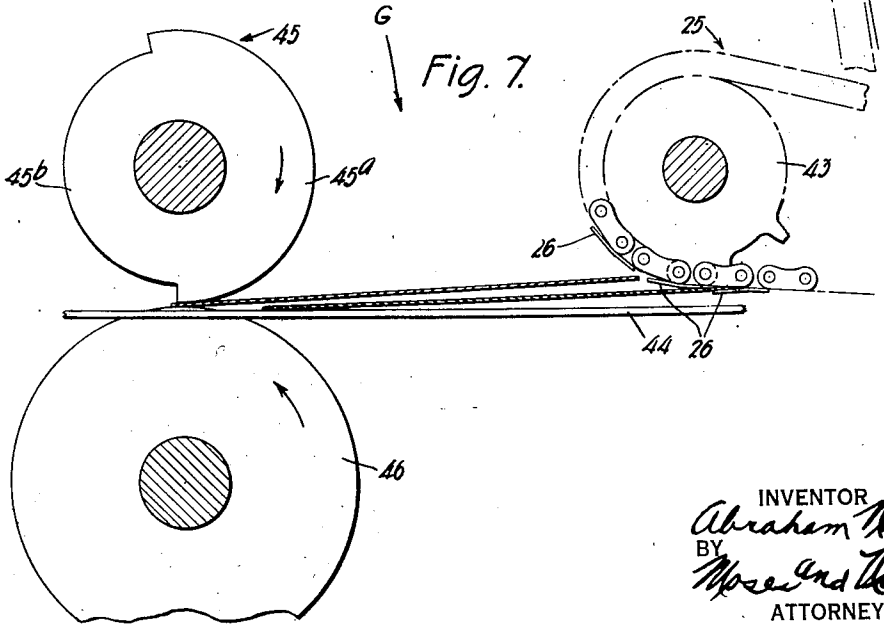


Fig. 6.

Fig. 7.



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Fig. 8.

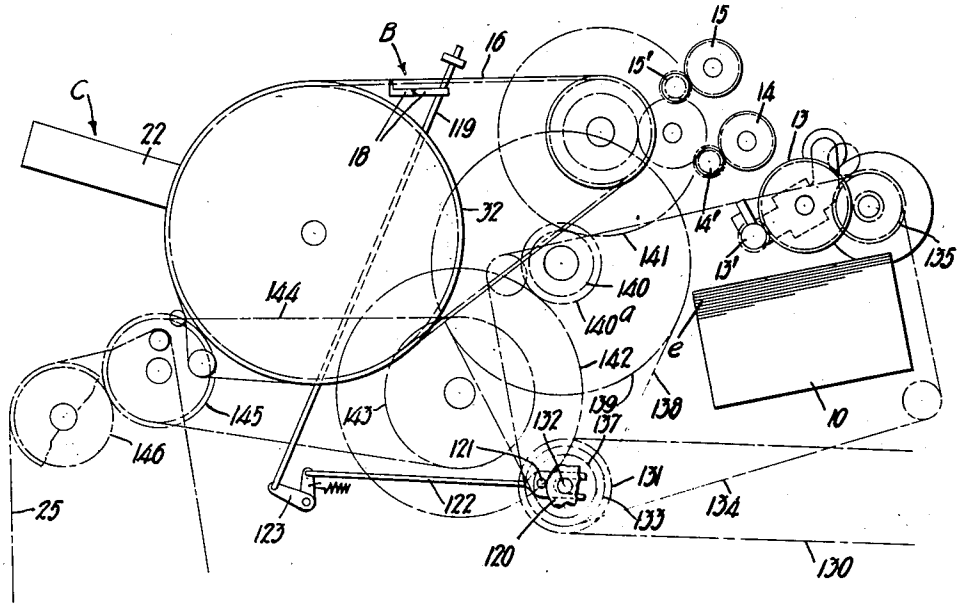
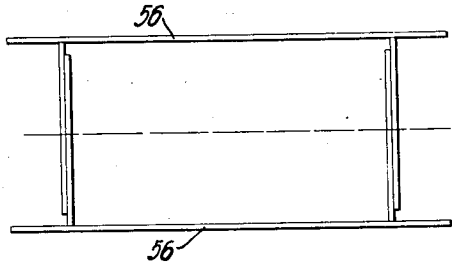


Fig. 9.



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UNITED STATES PATENT OFFICE

ABRAHAM NOVICK, OF FLUSHING, NEW YORK, ASSIGNOR TO F. L. SMITHE MACHINE CO., INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

MACHINE FOR MAKING ENVELOPES

Application filed June 12, 1928, Serial No. 284,856. Renewed January 17, 1931.

The present invention relates to a machine for making envelopes. In the machines of the type heretofore used, the sealing flaps of the blanks are first gummed by being continuously fed out into a band in which the envelopes overlap, whereby to present a continuous surface formed of the sealing flaps upon which gum may be applied in a continuous band. When this has been done the blanks with their edges slightly separated are then dried and fed to an individualizing station whence they are fed singly into the folding apparatus.

It is my present purpose to improve the operation of such a machine in a number of respects, and particularly to maintain the blanks in timed relation substantially throughout the entire machine, whereby to prevent the blanks from getting out of step with reference to the operating cycle of the machine whereby such blanks will require a minimum of retiming or adjustment at any point in the machine.

My invention will be best understood by reference to the accompanying drawings showing an illustrative embodiment thereof. In these drawings:

Figure 1 is a diagrammatic showing of the head end of the machine, such view showing a pile of blanks and means for fanning them out and conveying them through a drying chamber.

Figure 2 is a view of the rest of the machine showing the individualizing, folding and stacking portion of the machine.

Figure 3 is a detail view showing the means for gripping the envelopes and conveying them in fanned-out relation.

Figure 4 is a detail view illustrating the means for introducing the blanks into the gripping means.

Figure 5 is another detail of the same operation.

Figure 6 is a detail view showing the means employed for releasing the blanks from the chain.

Figure 7 is a view partly in longitudinal section of means for releasing the blanks from the chain.

Figure 8 is a detail view showing the driving means for the blank feeding mechanism.

Figure 9 is a diagrammatic view of the scoring blades.

Referring to Fig. 1, 10 denotes a pile of blanks which are fed therefrom by means of mechanism denoted generally by A and comprising a sucker 11 and a member 12 serving to transfer the separated blank into the grip of conveying rolls 13, 13′, such operation being shown in greater detail in my copending application Serial No. 143,047, filed October 21, 1926. It is to be understood that the operation of the feeding device thus far described is to create a band of fanned-out envelopes similar to what is shown in Figure 3, except that in the embodiment shown the gum is not applied until after the fanning-out operation.

To this end, said mechanism A, also comprises a roll 13′ arranged to move back and forth a slight amount along the periphery of the larger roll 13, and to be held against this roll by spring pressure. In this manner rolls 13, 13′ constitute gripping means for blanks presented thereto by the transfer device which in the instant case consists of the nozzle 12. Following rolls 13, 13′, I provide rolls 14, 14′, 15, 15′, and 15″, which further convey the band of envelopes thus formed to between an endless conveyor belt 16 and preferably a plurality of rollers 17 including a guide 17*a* which latter convey the band past the gumming device to be described.

After the blanks are thus fanned-out, their alignment may be insured by mechanism denoted generally by B and comprising aligning fingers 18, Figures 1 and 8, which engage behind the side flaps of successive blanks and

which are more fully disclosed in my copending application Serial No. 256,915 filed February 25, 1928.

Fingers 18, Figure 8, are attached to the rod 119 which is rocked by means of a cam 120 operating against a follower 121 attached to a link 122, which in turn is attached to rod 119 through a bell crank 123.

The blanks now having been fanned out into a band with their sealing flaps exposed, gum is applied thereto by means of a gumming mechanism C comprising a gum box 22 which serves to apply the gum in a continuous band over the area of the sealing flaps presented.

After traversing the gum box, the envelope band is brought to a conveyor 25 which in the embodiment shown comprises a pair of chains 25*a*, 25*b*, each link of which is provided with a spring clip 26, all as described in detail in my copending application Serial No. 156,080 filed December 21, 1926.

Means are provided for varying the spacing of the blanks in the band, and hence the width of gum applied to the sealing flaps of the individual blanks, preferably by varying the speed of the conveyor mechanism comprising rolls 14, 14′ and those following, keeping the speed of operation of the sucker mechanism and that of the chain conveyor 25 constant. Thus a high speed of the intermediate conveying mechanism produces a wide spacing and vice versa. Preferably the distance apart of the spring clips 26 is slightly greater than the maximum spacing of the blanks whereby when the blanks are gripped by the clips, a still further spacing of the blanks results, such action thus preventing the blanks from sticking to one another during the drying operation. In other words the chain conveyor 25 runs at a uniform speed and carries all blanks with the same separation, irrespective of the width of gum employed.

The mechanism for driving the feeding and conveying means may now be referred to in detail: Power from a source not shown is received by means of a chain 130 engaging sprocket 131 on a stud shaft 132. Also mounted on said shaft is a sprocket 133 which is engaged by a chain 134 which through a sprocket 135 drives gripping rolls 13, 13′ as well as the sucker mechanism. Driving of the conveyor band 16 is accomplished by means of a sprocket 137, chain 138, and gears 139, 140, 141, the latter being attached to the pulley 20*a*. Gear 141 also drives feed rolls 14, 14′, and 15, 15′ thru gear 141*a* which meshes with unit gears on rolls 14′ and 15. Gears 140 and 141 are interchangeable with gears of different relative numbers of teeth whereby the speed of said conveyors 19 and 20 and that of feeding rolls 14, 14′ and 15, 15′ may be suitably varied. Gear 140 also drives the conveyor chain 25 through gears 140*a*, 142, 143, chain 144 and intermeshing gears 145, 146. From the foregoing it will be evident that the speed of the sheet separating mechanism bears a definite relation with reference to the drive for conveyor chain 25 (such that the same number of sheets per minute are operated upon), whereas the speed of belt 16 and that of feed rolls preceding said belt may be varied for different separations of the sheets fed.

The specific mechanism for presenting the blanks to the spring clips may now be described.

Referring to Fig. 4, the band of envelopes before leaving contact with the conveyor 16, is engaged by a stripper member 30 which is partly disposed in a groove 31 in the conveyor roller 32, stripper 30 serving to cause the central portions of the blanks to be flexed, whereby when the side flaps of the envelopes are released by rollers 32*a* contacting therewith, such flaps spring away from those of the preceding blank which is held. While in this position, the flaps are engaged by the spring clips 26, which due to the sharp bend in chain 25 occasioned by the latter passing over the shaft 33, have their ends standing away from the links of chain 25, and are thus in position to engage the envelopes against the links when the chains have passed the shaft 33 as shown in Fig. 6. In order to insure that the flaps will be in position to be engaged by the clips 26, a pair of fingers 35 is provided which are caused to engage beneath the under surface of each flap as soon as the latter is released by the roller 32, continued movement of such fingers causing the flaps to be pressed into close proximity to the pair of clips 26 then in position to receive them. When this has occurred, the fingers 35 are retracted to their initial position. By means of the mechanism shown, each finger 35 is constrained to move downwardly and scrape against the band of envelopes and strip the flaps released by the roll 32 (if such action be necessary), and force them against the receiving links of chain 25. The speed of the chain conveyor 25 is slightly greater than that of the previous blank conveying means and due to this, a slightly increased spacing of the gummed sealing flaps results whereby the danger of the blanks sticking during the drying operation is obviated. The blanks now being held in chain 25, the latter is passed above a dryer 40, Figs. 1 and 2, so that when the blanks have passed over said dryer, they are fully dried. The blanks having been dried and maintained in timed relation to the operating cycle of the machine, are now brought to the individualizing station G, where their travel is to be speeded up, whereby they may be fed individually to the scoring and folding mechanism. The means for releasing the blanks from the chain conveyor is set forth in my copending application, filed Febru-

ary 10, 1927, Serial No. 167,077. Referring to Fig. 7, herein it will be noted that the terminal sprockets 43 of chain 25 are disposed somewhat above the table 44 and that the position of the clips 26 is such that the conveyed blanks may be released therefrom simply by pulling the blanks forward in their direction of travel. In order to impart to the blanks this accelerated forward movement, a pair of rolls 45, 46 is provided, lower roll 46 projecting through the table 44 as shown and upper roll 45 having a portion of its periphery cut away forming an operative portion 45*a* and an inoperative portion 45*b*.

It will be noted that the segmented roll 45, seizes the blank not at the forward edge, but just behind it, so that the start of the feed by said roll does not depend upon the exact position of the edge of the sheet nor upon the condition of that edge whereby a positive feed of the blanks in timed relation is insured. The same effect would theoretically be obtained by having rolls neither of which were segmented and which were dropped upon the blanks at the proper time.

The effect of rolls 45, 46 is to separate the blanks by at least an amount such that the trailing edge of the side flaps is no longer overlapped. In this condition the separated blanks may now all be engaged by conveyor H, having pins 51, Fig. 2, which push preferably the side flaps of the blanks from behind and operate to square the blanks and also to further increase the separation thereof until each blank is free of the one behind it. It will be noted that while the propulsion of the blank is momentarily interrupted when the rolls 45, 46 cease to operate and the pins 51 have not yet taken hold, this interruption is momentary, and that the tendency of the blank will be to keep moving by its inertia. The result is that there is a gradual transition from one speed to the next and at no point is there any interruption or stopping of the blanks.

The receiving end I of the folding mechanism consists of a pair of scoring rolls 55, 56 which are described in detail in my copending application, Serial No. 163,613, filed January 26, 1927, upper scoring rolls 56 containing transverse scoring blades 56*a* and circumferential scoring blades 56*b*. Figure 9 shows a developed view of such blades.

Blanks which have been fed to the scoring rolls, 55, 56 in timed relation, are fed therefrom through side flap folders J, which consist of a pair of members resembling plough shears, and thence to gumming apparatus K for applying gum to the blanks, whereby the bottom flap will be gummed to the side flaps. From the gumming mechanism K, the blanks are passed to the bottom flap folding mechanism L, consisting of a pair of rolls 62, 63 running in contact, and a pair of cooperating folding blades 66, 67. From the bottom flap folding device L, the blanks are passed to means M for folding the top flaps, and delivering the blanks from the folding mechanism consisting of a pair of feed rolls 70 and 71, and cooperating folding members 72, 73, for reversing the travel of the envelope and introducing the sealing flap into the bite of feeding rolls 74, 71.

The last-named rolls feed the blank between a pair of conveying belts 75, 76, whence they are delivered to a receiving section N, where the blanks are stacked and counted.

Mechanism for accomplishing the bottom flap folding is shown in greater detail in my co-pending application, Serial No. 235,526, filed November 25, 1927, and mechanism for accomplishing the top flap folding is shown in detail in my co-pending application, Serial No. 232,272, filed November 10, 1927.

It will be seen from the foregoing description of a complete machine for folding envelopes from envelope blanks, that the latter are fed through the machine substantially continuously, each maintained in timed relation to the operating cycle of the machine for each operation performed upon them, whereby the machine may be operated with a minimum of supervision and a minimum of stoppages due to blanks getting out of timing.

I claim:

1. In an envelope machine, in combination, means for holding a stack of blanks, means for fanning out said blanks in timed relation to the operating cycle, means for conveying the blanks so fanned out in positively timed relation to the operating cycle, and means timed to operate on each blank at the discharge end of the conveying means to individualize it.

2. In an envelope machine, in combination, means for holding a stack of blanks, means for fanning out said blanks, means for conveying the blanks so fanned out in positively timed relation to the operating cycle, and means timed to operate on each blank at the discharge end of the conveyor to individualize it, said means last mentioned being also timed with respect to the operating cycle of the machine.

3. In an envelope machine, in combination, means for holding a stack of blanks, means for fanning out said blanks, means for gumming said blanks, a drier, means for conveying said gummed blanks through said drier in positively timed relation to the operating cycle, and means timed to operate on each blank at the discharge end of the conveyor to individualize it.

4. In an envelope machine, in combination, means for holding a stack of blanks, means for fanning out said blanks, means for applying gum in a band to the area of the sealing flaps exposed, means for conveying the blanks so fanned out to said gumming means, means for drying the gummed blanks,

means for seizing the gummed blanks and conveying them through said drying means in positively timed relation to the operating cycle, and means for adjusting said machine for different widths of gum applied to the sealing flaps comprising means for varying the speed of said conveying means first mentioned, whereby the speed of said second conveying means measured in the number of blanks operated on per minute may remain equal to that of the fanning out means.

In testimony whereof I have affixed my signature to this specification.

ABRAHAM NOVICK.