June 2, 1931. A. NOVICK 1,807,863

ENVELOPE MACHINE

Original Filed Feb. 10, 1927 5 Sheets-Sheet 1

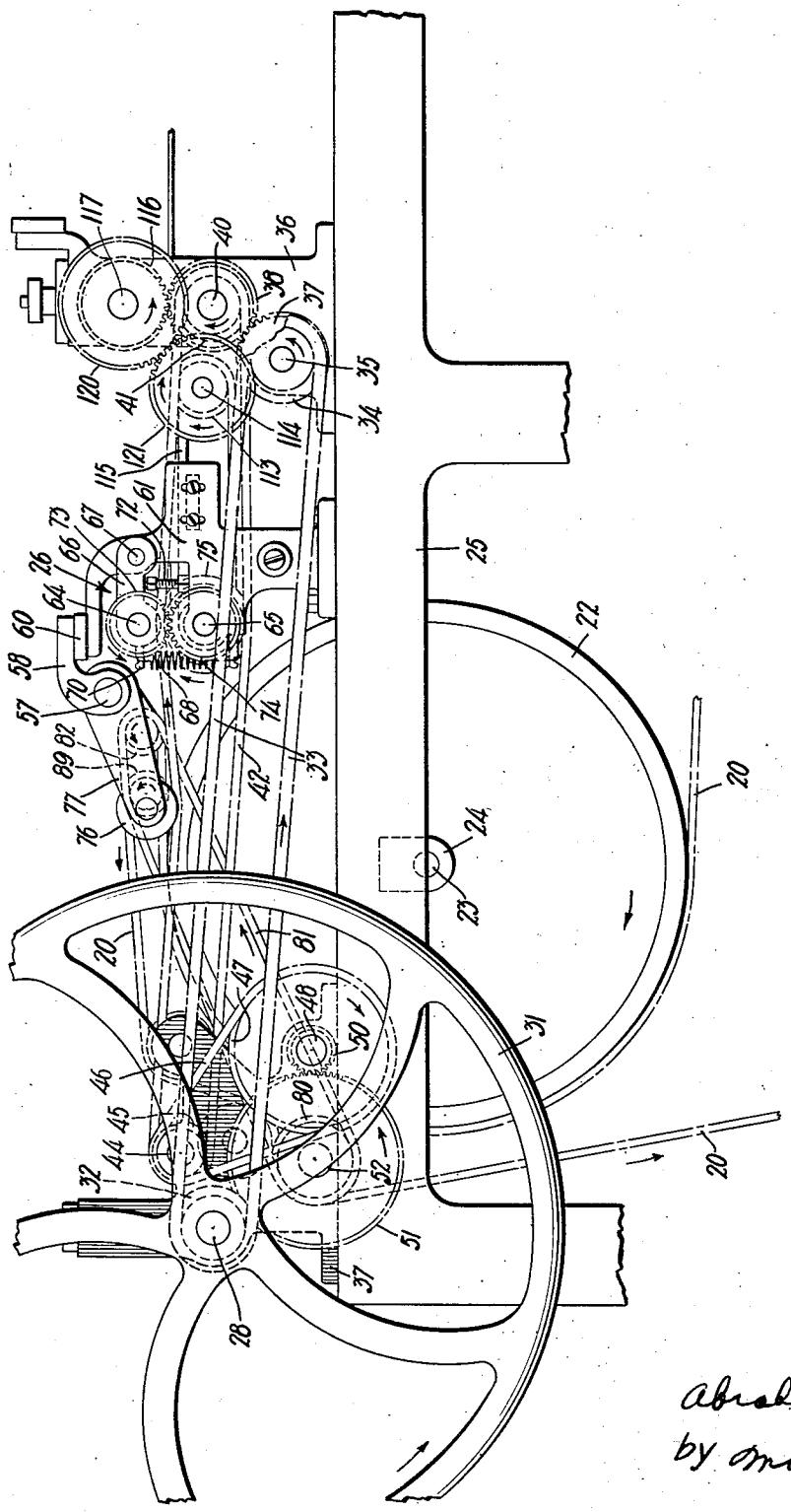


Fig. 1.

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ENVELOPE MACHINE

Original Filed Feb. 10, 1927 5 Sheets-Sheet 2

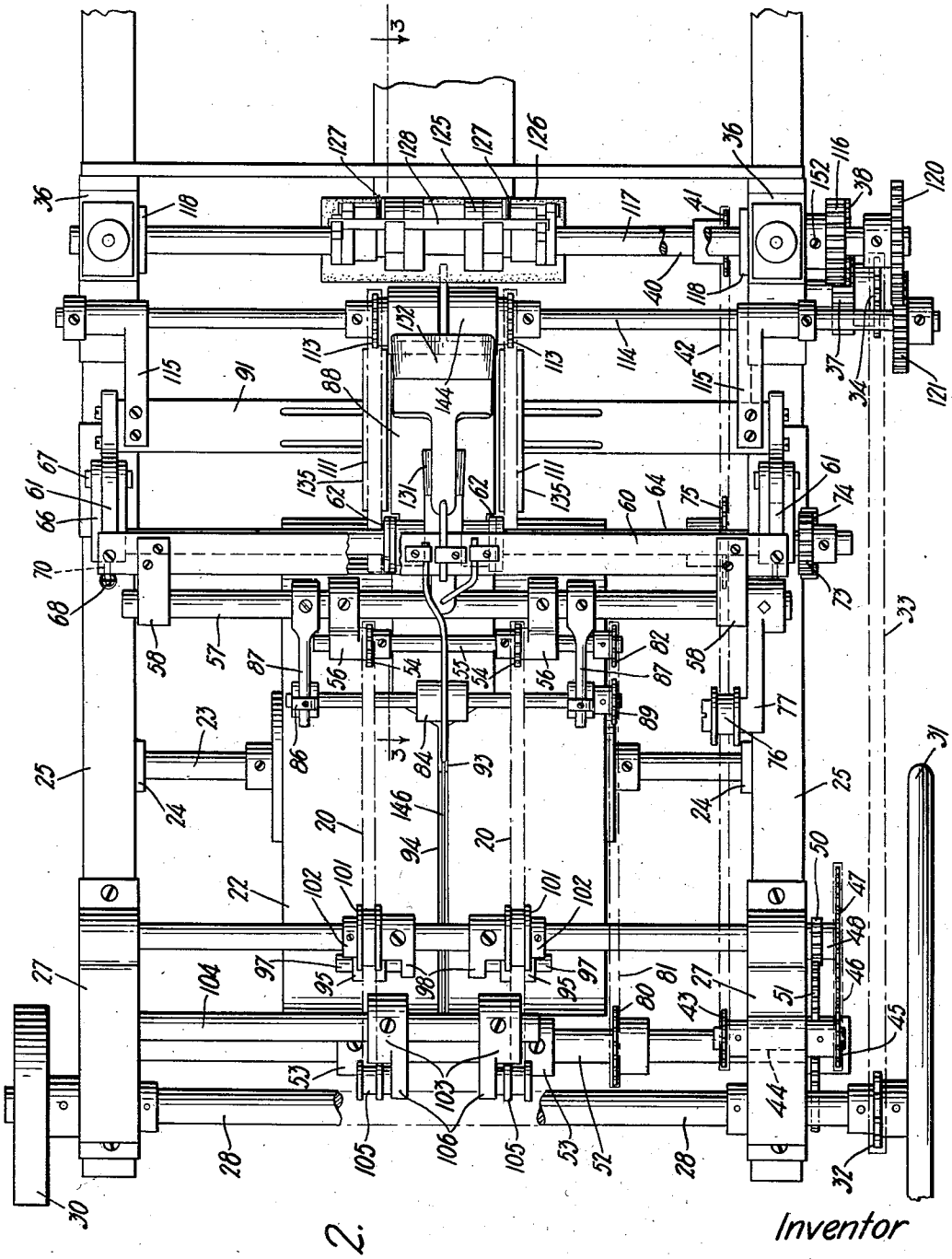


Fig. 2.

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ENVELOPE MACHINE

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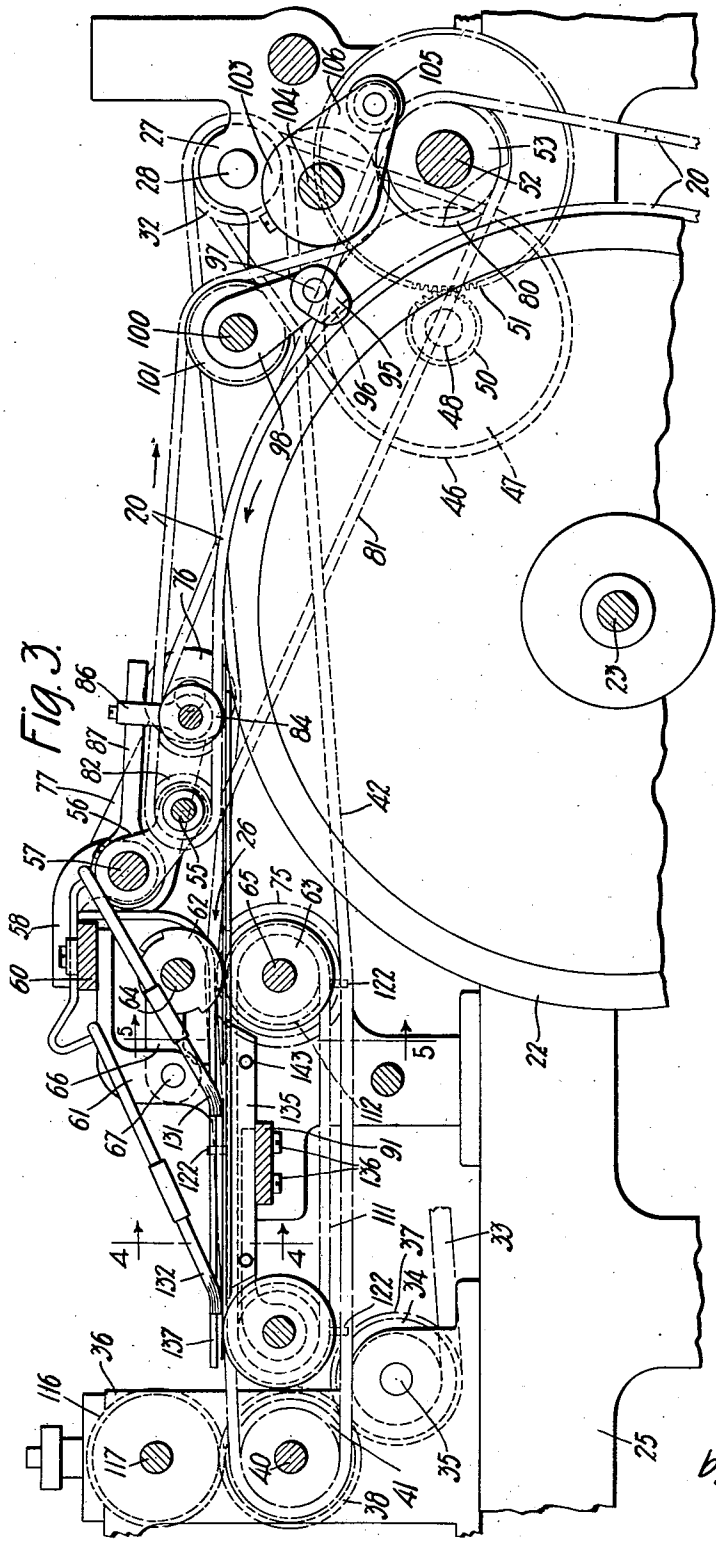


Fig. 3.

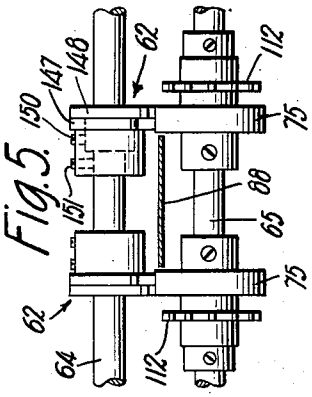


Fig. 5.

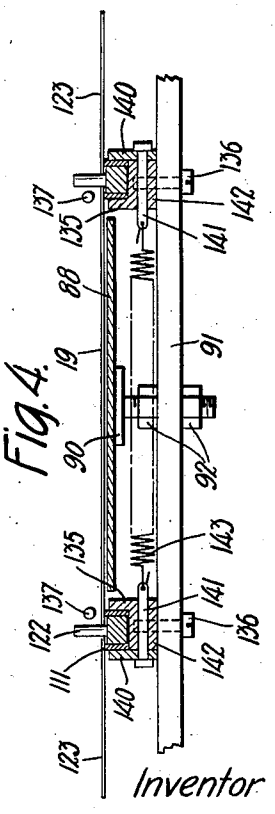


Fig. 4.

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June 2, 1931. A. NOVICK 1,807,863

ENVELOPE MACHINE

Original Filed Feb. 10, 1927 5 Sheets-Sheet 4

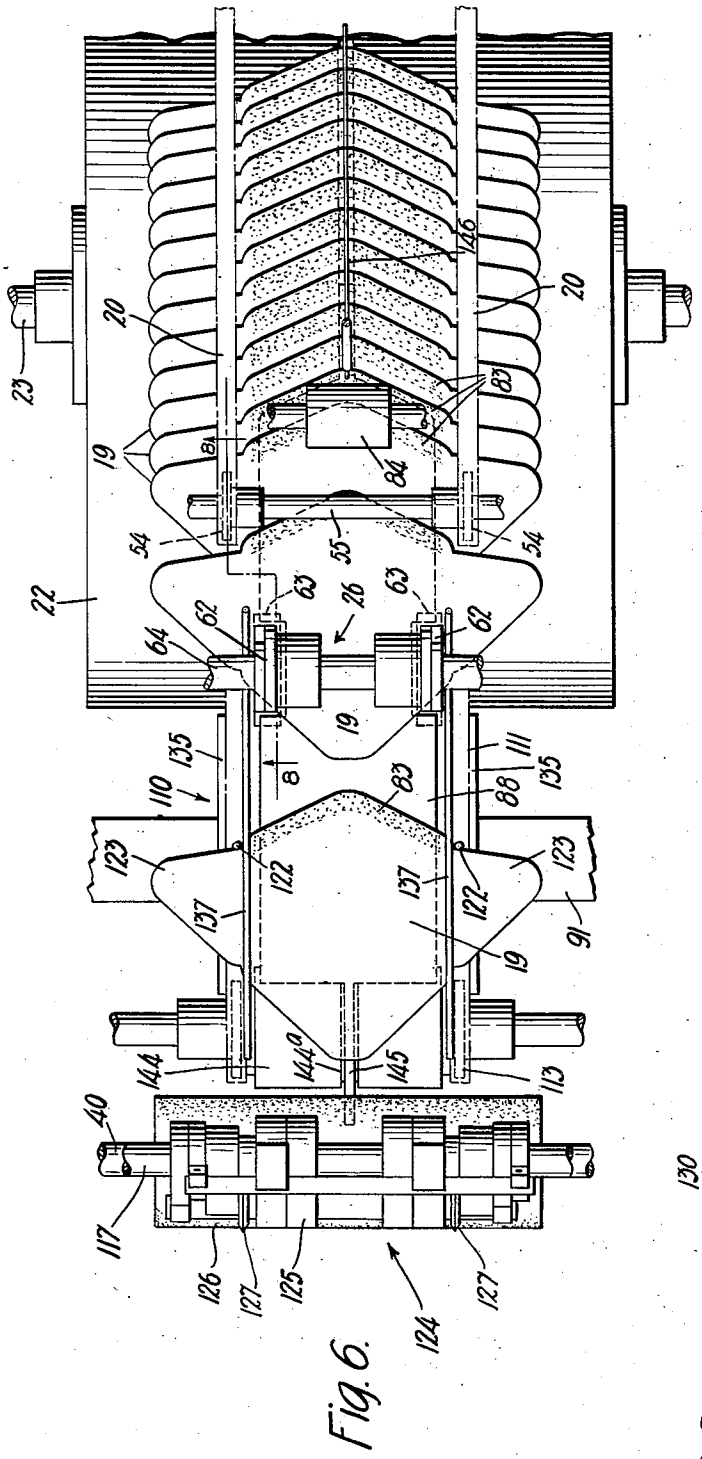


Fig. 6.

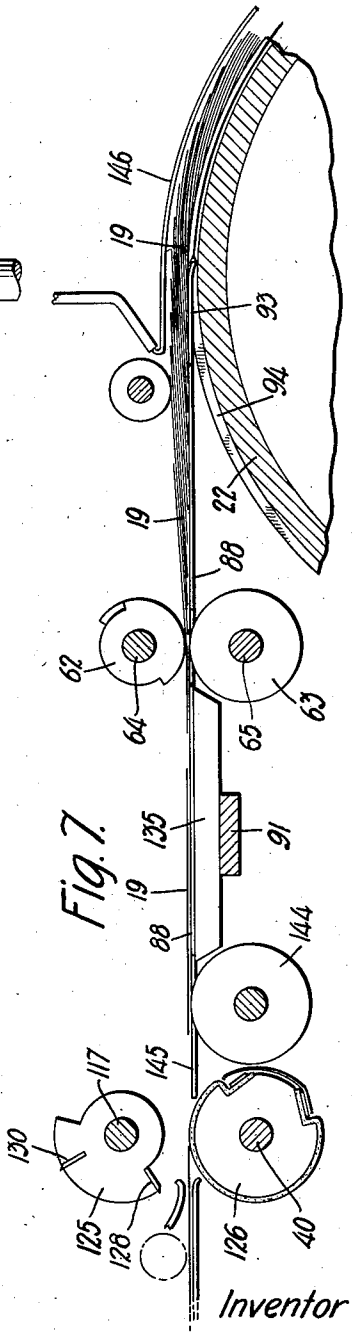


Fig. 7.

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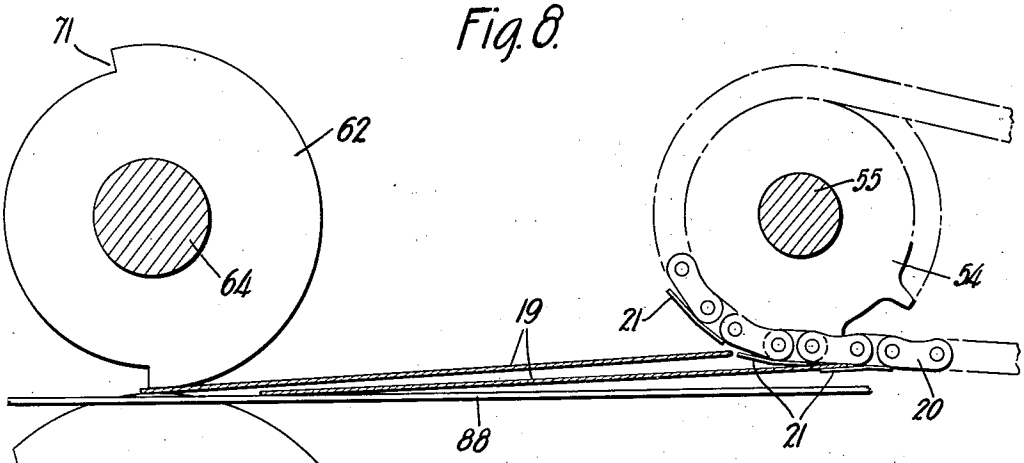
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June 2, 1931. A. NOVICK 1,807,863

ENVELOPE MACHINE

Original Filed Feb. 10, 1927 5 Sheets-Sheet 5

Fig. 8.



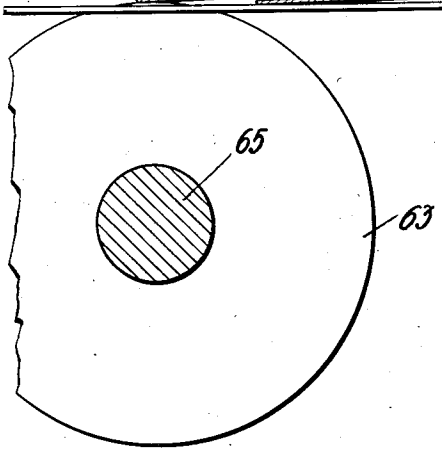
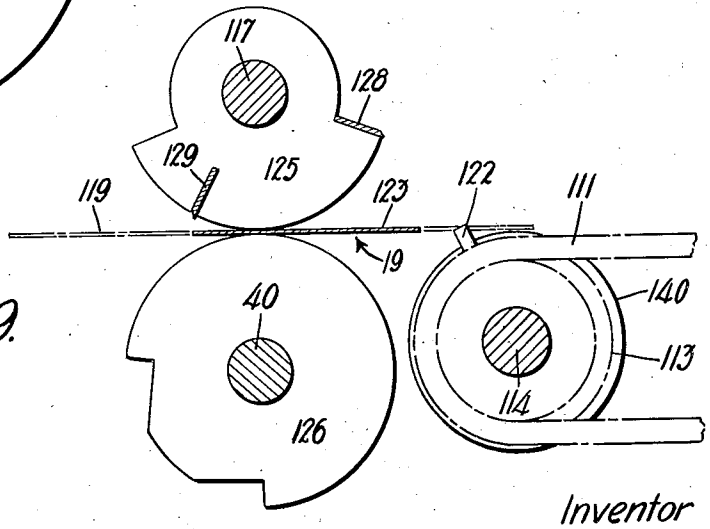


Fig. 9.



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UNITED STATES PATENT OFFICE

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ENVELOPE MACHINE

Application filed February 10, 1927, Serial No. 167,077. Renewed November 8, 1930.

My present invention relates to machines for making envelopes. My invention finds particular application in an assembled machine in which the following typical operations are carried out:

1. Feeding individual blanks into the machine from a stack so as to form a band with that area of the sealing flaps exposed which is destined to receive the gum. 2. Gumming said band so that the sealing flaps of the individual blanks are gummed. 3. Separating the individual blanks by a slight amount so as to prevent sticking together of the blanks in the drying operation and at the same time gripping the individual blanks whereby they may be conveyed. 4. Drying the blanks thus gripped, the gripping mechanism constituting part of the mechanism conveying the blanks through the dryer. 5. Individually releasing the blanks from the gripping mechanism and fully separating them, aligning the blanks so separated and feeding them to the mechanism which is to initiate the folding and gumming operation. 6. Completing the folding operation and forming the completed envelopes into bundles.

The present invention is particularly concerned with operation 5 above listed. Operations 1 and 2 have been described and claimed in my co-pending application filed October 21, 1926, Serial No. 143,047, operation 3 in my co-pending application filed December 21, 1926, Serial No. 156,080.

My invention will be best understood by reference to the following detailed description taken with the annexed drawings forming a part of this specification, and in which:

Figure 1 is a side elevation of a portion of the machine.

Figure 2 is a top plan view of that portion of the machine illustrated in Figure 1.

Figure 3 is a sectional side view taken on the line 3—3 of Figure 2 and looking in the direction of the arrows at said line.

Figure 4 is a detail sectional view taken on the line 4—4 of Figure 3, showing the guide ways for the paper feeding and aligning chains.

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 3 and shows the feed rolls which remove the envelope blanks from the conveyor.

Figure 6 is a top plan view of some of the parts illustrated in Figure 3.

Figure 7 is a side view of the portion of the machine shown in Figure 6.

Figure 8 is a view illustrating the release of the envelope blanks from the conveyor.

Figure 9 is a diagrammatic side view illustrating the speeding up of the envelope blank to feed it clear of the aligning pins of the feed chains.

While my invention has other applications, it is particularly designed to form a part of an assembled machine of the type above mentioned. Accordingly, it will be understood that preparatory to being operated upon by the present mechanisms, the blanks will ordinarily have been fed from a stack into a band, the sealing flaps gummed, the blanks gripped in a conveying means to be shown and described herein and dried. The envelope blanks 19 are fed from the drying chamber by means of a conveyor including two chains 20 to which they are secured by means of spring clips or fingers 21 (Figure 8) as illustrated in my co-pending case Serial No. 156,080 above mentioned. The conveyor chains are driven by means illustrated in said co-pending application and they extend to a large cylinder 22 (Figures 1 and 2) rotatably supported by a shaft 23 in bearings 24 secured to side plates 25 of the machine frame; said side plates being secured to a bed plate (not shown). The chains are conducted to the top of said cylinder, by suitable means hereinafter described, where the blanks are automatically detached from the chains and advanced at an increased rate of speed by suitable feeding means 26.

Brackets 27 (Figures 1 and 2) are secured to the side plates 25 to carry a shaft 28 having a pulley 30 secured thereto, which is driven by a belt (not shown). The shaft 28 is provided with a fly wheel 31 and a sprocket 32 around which runs a chain 33; said chain driving a sprocket 34 to rotate a shaft 35 supported in one of two bearing brackets 36 secured to the end plates 25. A gear 37, secured to the shaft 35, meshes with

a gear 38 to drive a shaft 40 having secured thereon a sprocket 41. The sprocket 41 drives a chain 42 to drive a sprocket 43 to rotate a shaft 44 supported in one of the brackets 27. The shaft 44 is provided with another sprocket 45 to drive a chain 46 cooperating with a larger sprocket 47 to rotate a shaft 48 also supported in the bracket 27. The shaft 48 has secured thereto a pinion 50 meshing with a gear 51 secured to a shaft 52 to rotate the latter. On the shaft 52 are secured two sprockets 53 (Figures 2 and 3) to assist in feeding the conveyor chains 20.

The conveyor chains 20 pass around sprockets 54 on a shaft 55 located above the cylinder 22; said shaft being supported in adjustable brackets 56 secured to a rod 57. The rod 57 is held by brackets 58 secured to a bar 60 fastened to brackets 61 on the side plates 25.

The sprockets 54 are of comparatively small diameter (Figures 3 and 8) so that as the chains 20 pass around them the free end of the spring clips 21 move away slightly from the chain. However, at a point slightly in advance of the position at which the spring clips are thus opened, the blanks 19 are jerked from the chain by the feeding means 26, the spring clips in the preferable form of embodiment of the invention being arranged to have but a light hold on the blanks, this hold being sufficient because the blanks are pushed, not pulled, by the chains. The feeding means 26 comprises feed rollers 62 and 63 supported on shafts 64 and 65 respectively; the surface speed of said feed rolls being greater than that of the chains to effect the jerking of the blank away from the chains 20.

The shaft 65 which supports the feed rollers 63 is supported in the brackets 61 (Figures 1 and 3). The shaft 64, however, has secured thereto, at its ends, arms 66 by which it is pivotally supported on pins 67 in the brackets 61 so that the rolls 62 may be resiliently held against the rolls 63 by springs 68 connected to pins 70 of the arms 64. It will be noticed that the rolls 62 are cut away to provide a non-feeding portion (Figure 8). Accordingly the downward movement of the roller, when the cut away portion 71 is reached, is limited by set screws 72 (Figure 1) adjustable in the brackets 61 and engaging the arms 60.

To drive the shafts 64 and 65 they are connected by gears 73 and 74 secured respectively to said shafts, and the shaft 65 has fixed thereon a sprocket 75 (Figures 1 and 3) which is driven by the chain 42; the chain engaging the sprocket at upper end and at its lower end. A roller 76 on an arm 77 adjustably mounted on the rod 57 is provided to take up the slack in the chain 42 and to hold the chain in engagement with the sprocket 75.

To preserve the proper time relation between the conveyor chains and the feed rolls and to prevent these from becoming disturbed or out of phase, the shaft 55 is connected to be driven with the shaft 52, the shaft 52 being provided with a sprocket 80 (Figures 1, 2 and 3) which drives a chain 81 connected with the shaft 55 through a sprocket 82.

The blanks 19 are fed by the conveyor chain 20 in overlapping relation as illustrated in Figures 6 and 7. Due to fact that the seal flaps 83 of the blanks have been gummed and dried while in transit before they reach the top of the cylinder 22 there is at times a tendency for a blank to be removed to stick to a succeeding one due to the gum having run over the edge of the one blank on to the other.

To facilitate separation of the blanks when they stick together there is provided a roller 84 which may be of rubber, said roller bearing on the end of the seal flap 83 of one blank to hold it while the preceding one is being pulled from the conveyor by the feed rolls 62 and 63. The roller 84 is supported on a shaft 85 rotatable in blocks 86 adjustably supported on arms 87 to locate the roller 84 in the proper position. The arms 87 are adjustably suported on the rod 57 so that the roller 84 may be adjusted to bear against a table 88 over which the blanks are fed. The roller shaft 85 has a sprocket 89 secured thereto which engage the chain 81 to drive the roller 84; the surface speed of said roller corresponding with the speed of the conveyor chains 20.

The table 88 may be secured to a support 90 (Figure 4) adjustably mounted on cross bar 91 by nuts 92; the cross bar being supported on the brackets 61 (Figure 2). Said table is provided with a finger 93 (Figures 6 and 7) extending into a groove 94 in the cylinder 22 to facilitate the passage of said blanks from said cylinder to said table without interference by said table.

To guide the conveyor chains 20 there is provided for each chain a guide block 95 (Figures 2 and 3) having a groove 96 so as to straddle the chain 20 as in Figure 3. Each guide block 95 is adjustably secured to a stub shaft 97 projecting laterally from an arm 98 secured to a rod 100 fixedly supported in the brackets 27. On its return movement each conveyor chain 20 passes over grooved guide rollers 101 which rotate freely on the rod 98 and are held between the arms 97 and collars 102. From the guide roller 101 each chain passes downwardly and under a hub 103 secured to a rod 104 supported in one of the brackets 27. The chain then extends around the sprockets 53. Grooved guide rollers 105 are provided to keep the conveyor chains 20 in contact with the sprockets 53; said guide rollers being rotatably supported on arms 106 extending from the hubs 103.

As each blank 19 is advanced over the table

88 by the feed rolls 62 and 63, it is brought into cooperative relation with combined aligning and feeding means 110 by which it is fed after the feed rolls have functioned. Said means includes continuous bands or feed chains 111 conducted around sprockets 112 which rotate freely on the shaft 65. The chains are conducted over similar sprockets 113 (see Figure 2 also) on a shaft 114 supported in brackets 115 secured to the cross bar 92 the shaft 114 being driven by means including a gear 116 on a shaft 117 said gear meshing with the gear 38. The shaft 117 is supported in bearing blocks 118 in the brackets 36 and is provided with a gear 120 which meshes with a gear 121 secured to the shaft 114 to drive the latter upon which the sprockets 113 are mounted. The feed chains 111 are provided with feed pins 122 which after advancing around the sprockets 111 engage behind the end flaps 123 of the blanks 19 to advance the blanks over the table 88 to suitable scoring means 124 which may be like that disclosed in another one of my co-pending applications Serial No. 163,612, filed January 26, 1927 and which includes a male cylinder 125 on the shaft 117 and a female cylinder 126 on the shaft 40; the male cylinder including side scorer blades 127 and top and bottom scorer blades 128 and 130 respectively. Friction devices or brushes 131 and 132 bear on each envelope blank 19 as it is being advanced over the table so as to cause the pins 122 to find the corners formed by the seal flap 83 and the side flaps 123 to thus not only square the blank with reference to the scoring means 124, but to also accurately locate the blanks laterally with reference to the side scorer blades 127. The surface speed of the feed chains 111 is greater than that of the feed rolls 62 and 63 so as to carry the blank quickly away from said feed rolls to separate it completely from the next blank to be fed by the feed rolls 62 and 63.

To insure accuracy of operation the feed chains 112 are conducted through guides which may be in the form of channel bars 135 (Figures 2, 3 and 4) secured to the cross bar 92 by screws 136. Guide wires 137 are provided to keep the blank 19 in the path of the pins 122; said guide wires being attached to the cross bar 60 in any suitable manner. There is just enough mechanical clearance in the channel bars to permit the chains to move through freely. Occasionally it happens that a blank gets caught on the links of said chain which may result in drawing the blank into the channel. This would ordinarily cause a binding of the chain in said channels and thus produce slipping of the feed chain sprockets on their respective shafts thus disturbing the operation of the feeder chains 112 by throwing them out of time relation with respect to the feed rolls 62 and 63. To prevent any such occurrence one wall 140 (Figure 4) of each channel bar 135 is resiliently connected thereto so that said wall may yield slightly to permit a blank, caught as above described, to move freely through the guide channel without injuring the machine. The walls 140 may be supported on headed pins 141 loosely supported in the body portions 142 of the channel bars 135. Coiled springs 143 are connected to the inner ends of the pins 141 to hold the walls 140 against the body parts 142.

The cylinders 125 and 126 of the scoring means are geared up to run at a surface speed greater than that of the feed chains 111 to insure freeing the end flaps 123 of the chain pins 122 (Figure 9) before the pins start around the sprockets 113 thus preventing damaging of the side flaps by the pins 122.

To assist in the passage of the blanks 19 to the scoring means there may be provided a supporting cylinder 144 (Figures 2 and 6) located between the sprockets 113 and supported by the shaft 114. The cylinder is provided with a groove 144*a* through which extends a finger 145 which forms a continuation of the table 88 to guide the leading edge of the blanks between the cylinders of the scoring means 124.

A guard wire 146 (Figures 2, 6 and 7) partly surrounds the cylinder 22 to hold the seal flaps 83 down as the blanks pass around said cylinder.

The feeding surface of the feed rolls 62 may be increased or decreased as desired by constructing each feed roll 62 of two sections 147 and 148 (Figure 5) adjustable relatively to each other such adjustment being facilitated by a set screw 150. Rolls 60 are also adjustable circumferentially on a shaft 64, and longitudinally thereof for various sizes of envelope blanks; the feed rolls 62 are secured to the shaft 64 by set screws 151.

Provision is made to facilitate adjustment of the conveyor chains 20 to vary the space between them to accommodate envelope blanks of various sizes. To this end the sprockets 53, arms 106 which carry the guide rollers 105, guide blocks 95, rollers 101, and sprockets 54 are adjustable laterally.

The feed chain guides 135 and the sprockets 112 and 113 are also adjustable laterally according to the size of envelope blank to be fed thereby.

The scoring blades 127, 128 and 129 are adjustable as described on one of the above mentioned applications to accommodate various sizes of envelope blanks. After the blades 128 and 129 have been adjusted relatively to each other they may be adjusted as a unit to act on the blank at the proper time by adjusting the shaft circumferentially with respect to its driving gear 116. To facilitate this adjustment the gear 116 is secured to said shaft by means of a set screw 152 (Figure 2).

What I claim is:

1. In an envelope making machine having means for conveying a band of envelope blanks including positive means for holding the individual blanks in spaced overlapping relation, during which an operation is performed upon them, and means for engaging each blank, releasing it from said holding means and individually conveying it for further operations thereon.

2. In an envelope making machine the combination of conveying means including two sprocket chains, devices on said chains to grip envelope blanks in overlapping relation, feeding means to draw the blanks from the chains, driving means to feed said chains, and to operate said feeding means, and means connecting the sprockets of said chains with the driving means to keep the release of the envelope blanks in phase with the feeding means.

3. In an envelope making machine, aligning means including a pair of chains, means to drive said chains, pins on said chains to engage in the corners formed by the side flaps and one of the end flaps of an envelope blank, guides for said chains and means for resiliently mounting said guides whereby to prevent undue binding of said chains by a blank caught between a chain and guide.

4. In an envelope making machine, aligning means including a pair of chains, means to drive said chains, pins on said chains to engage in the corners formed by the side flaps and one of the end flaps of an envelope blank, and channel bars to guide said chains, one wall of each channel bar being resiliently supported.

5. In an envelope making machine, the combination of means to convey envelope blanks, means to drive said conveying means means to remove said blanks from said conveying means, means to drive said feeding means at a surface speed greater than that of the conveyor means, aligning means to which the blanks are fed by said feeding means, means to drive said aligning means at a surface speed greater than that of said feeding means, scoring means to receive the blank from said aligning means, and means to drive the scoring means at a surface speed greater than that of the aligning means.

6. In an envelope making machine, means for feeding a band formed of overlapping blanks, means for individualizing the blanks of said band including a drum over which said blanks are fed, a table receiving the blanks from said drum, a groove in said drum and a stripper member constituting an extension of said table and extending within said groove.

7. In an envelope making machine, means for feeding a band formed of overlapping blanks, means for individualizing the blanks of said band comprising a pair of rollers engaging opposite sides of the blank and adapted to speed the advance of the blank engaged by them, one of said rollers having a segmental bearing surface and being resiliently held against the other roller.

8. In an envelope making machine, means for conveying a band of overlapping envelope blanks, said means comprising a conveyor having thereon means for positively holding said blanks in spaced overlapping relation, and means operating in timed relation to said conveyor means for removing said blanks from the positive holding means of said conveyor and advancing them in fully spaced relation to one another.

9. In an envelope making machine, means for conveying a band of overlapping envelope blanks, said means comprising a conveyor having thereon means for positively holding said blanks in spaced overlapping relation, and means comprising a pull out roller operating in timed relation to said conveyor means for removing said blanks from the positive holding means of said conveyor and advancing them in fully spaced relation to one another.

10. In an envelope making machine, means for conveying a band of overlapping envelope blanks, said means comprising a conveyor having thereon means for positively holding said blanks in spaced overlapping relation, said means last mentioned being arranged so that the blanks are releasable by accelerating movement in the direction of travel thereof, and means for releasing said blanks by producing upon them such accelerated movement.

11. In an envelope making machine, means for conveying a band of overlapping envelope blanks, said means comprising a conveyor having thereon means for positively holding said blanks in spaced overlapping relation, said means last mentioned being arranged so that the blanks are releasable by an accelerating movement in the direction of travel thereof, and means for releasing said blanks by producing upon them such accelerated movement, said means producing said accelerated movement operating in timed relation to said conveyor means.

12. An envelope making machine as set forth in claim 10 in which the means for producing accelerated movement of the blanks comprises a roller having a segmental bearing surface.

13. In combination, means to individualize blanks, which are in overlapping relation and means for delivering such overlapping blanks to said individualizing means, said delivering means having thereon means for positively holding said blanks in spaced overlapping relation and being arranged to deliver each blank in positively timed relation to the operating cycle of said individualizing means.

14. In an envelope making machine, means for feeding a band formed of overlapping blanks, means for individualizing the blanks of said band comprising a pair of rollers engaging opposite sides of the blank and adapted to speed the advance of the blank engaged by them, one of said rollers having a segmental bearing surface, and comprising a pair of sections in the plane of said roller adjustably secured to one another whereby the segmental bearing surface of said roller is adjustable.

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

ABRAHAM NOVICK.