June 2, 1931. A. NOVICK 1,807,862

ENVELOPE MACHINE

Original Filed Dec. 21, 1926 7 Sheets-Sheet 1

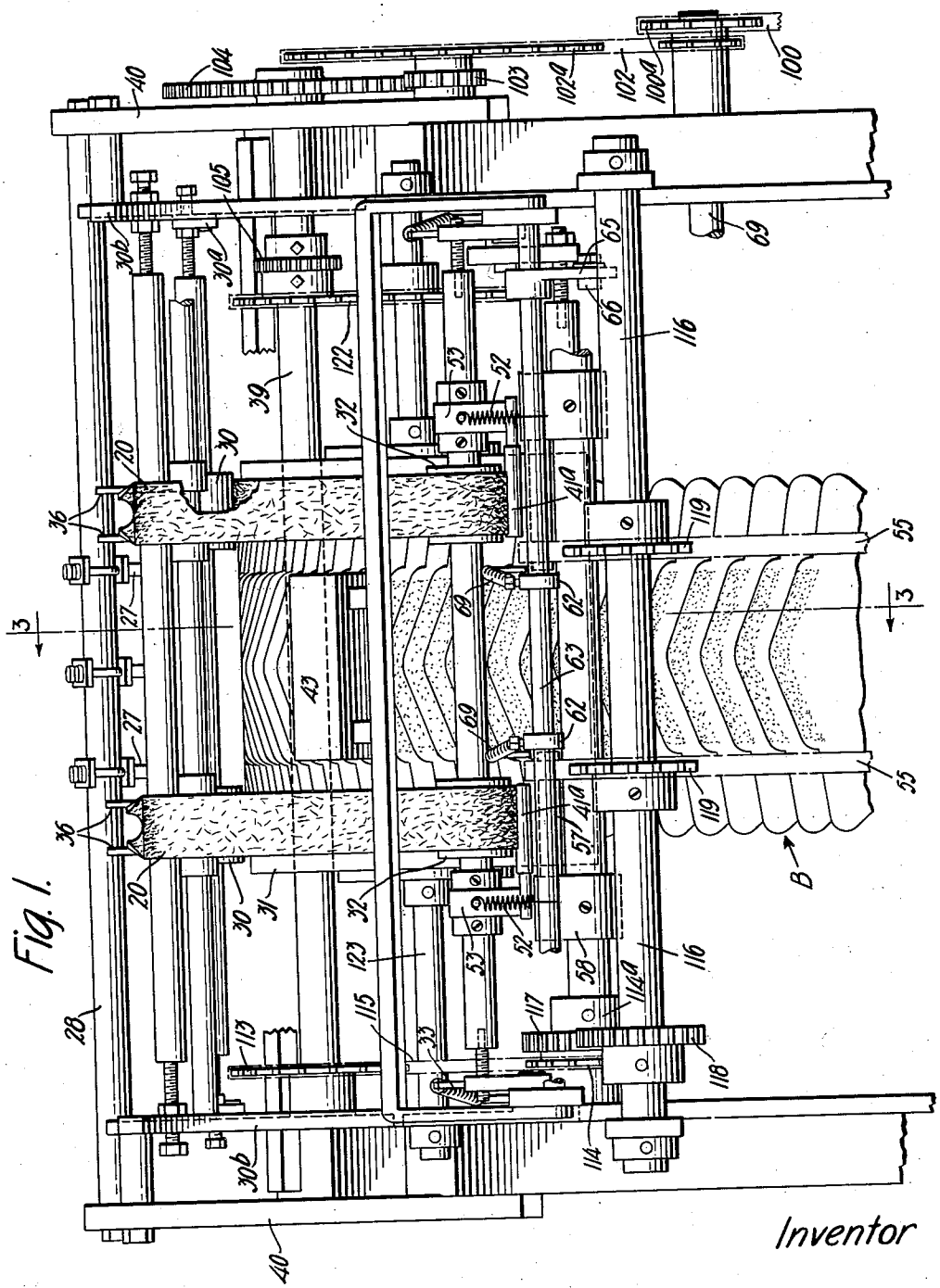


Fig. 1.

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Original Filed Dec. 21, 1926 7 Sheets-Sheet 2

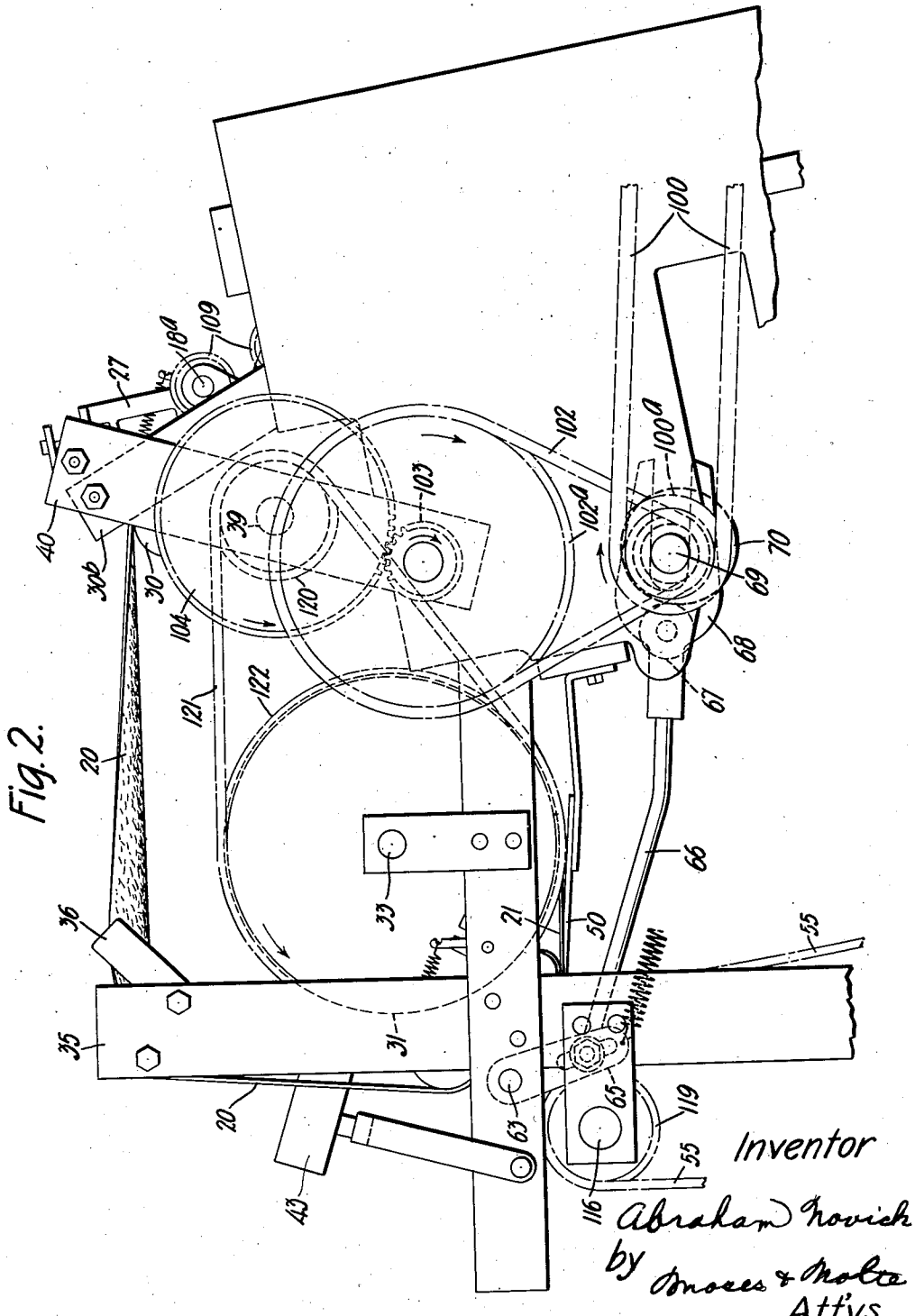


Fig. 2.

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ENVELOPE MACHINE

Original Filed Dec. 21, 1926 7 Sheets-Sheet 3

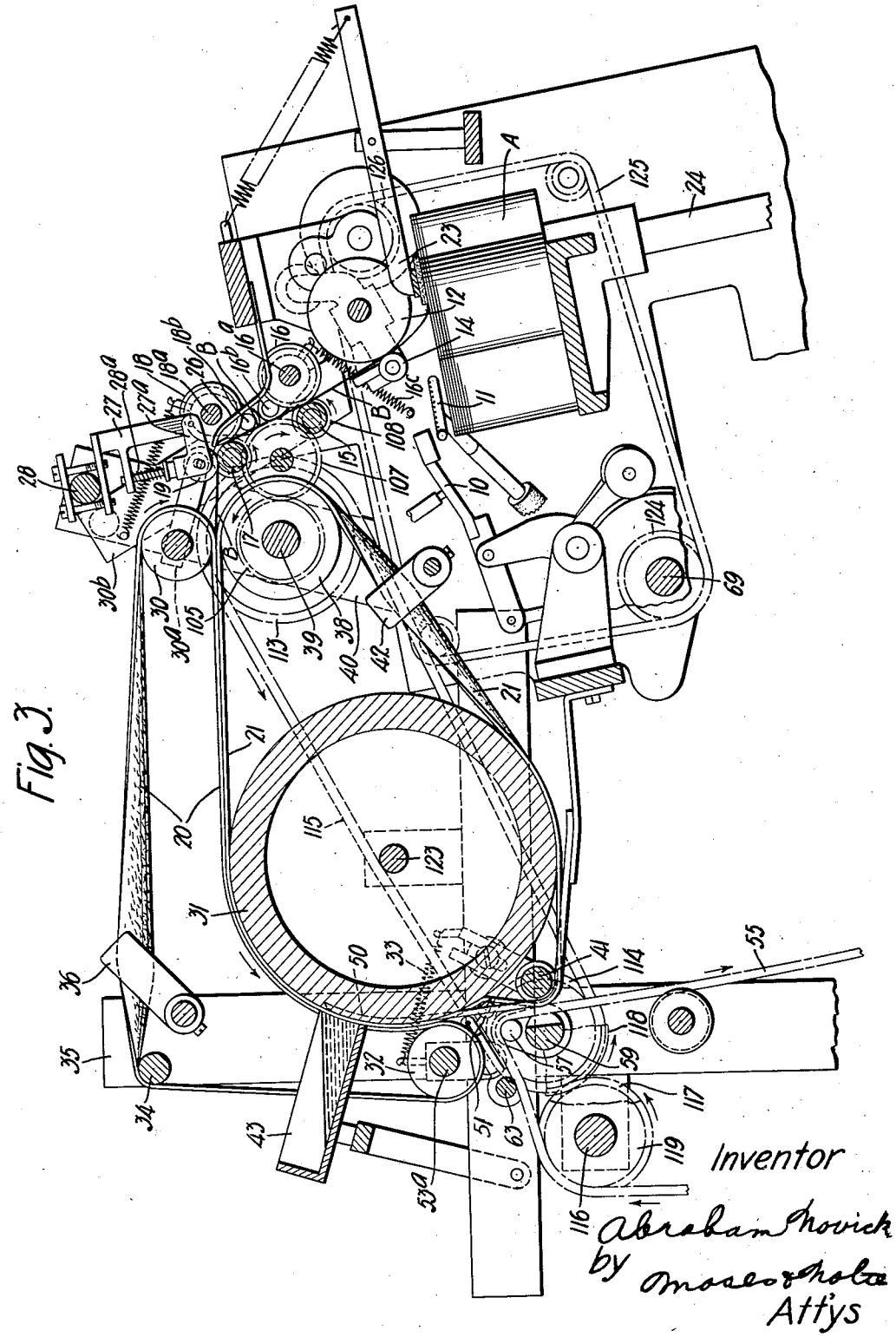


Fig. 3.

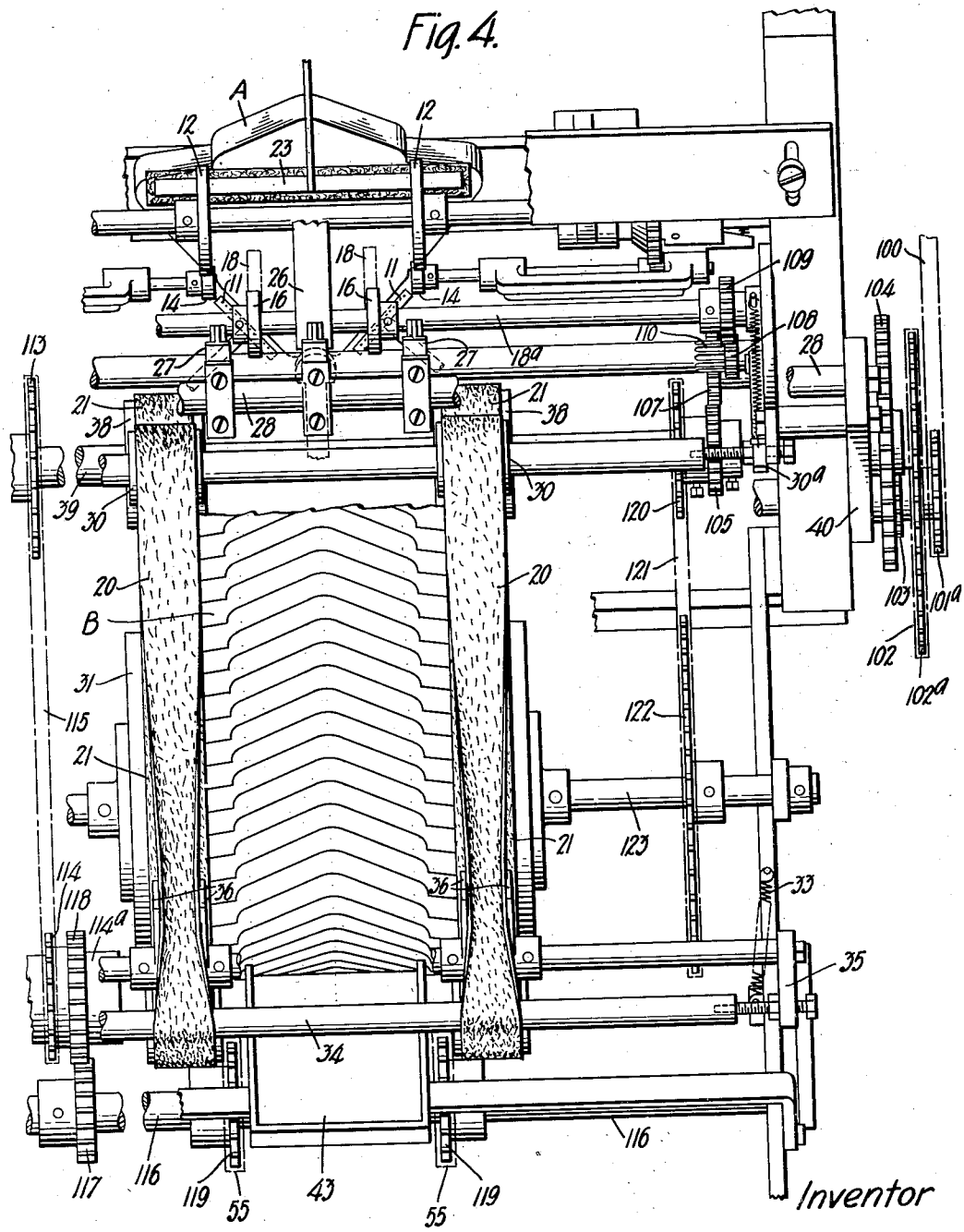
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Original Filed Dec. 21, 1926 7 Sheets-Sheet 4

Fig. 4.



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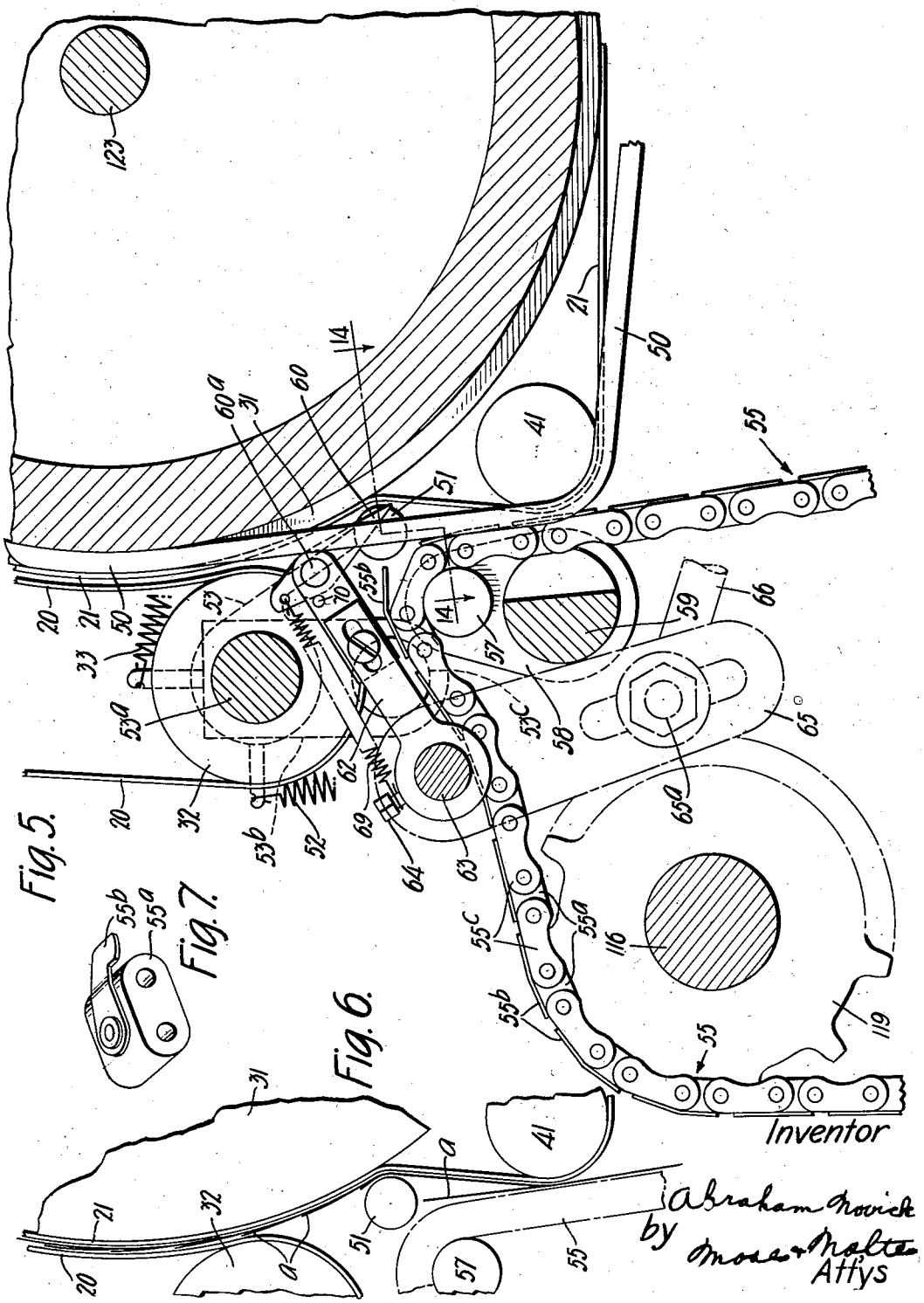


Fig. 5.

Fig. 7.

Fig. 6.

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Fig. 8.

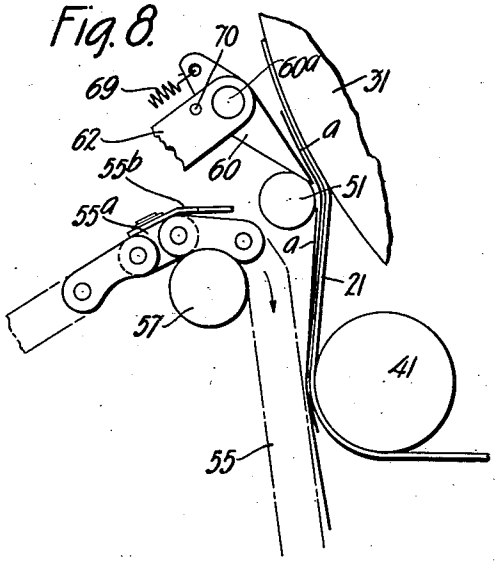


Fig. 9.

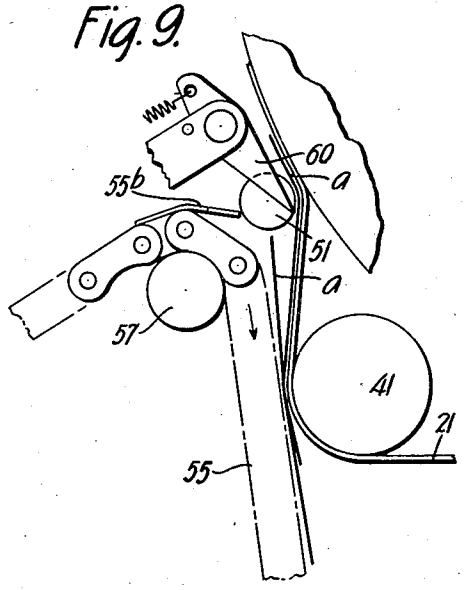


Fig. 10.

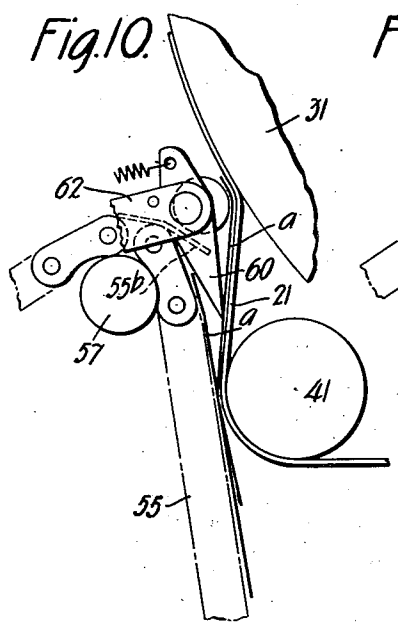


Fig. 11.

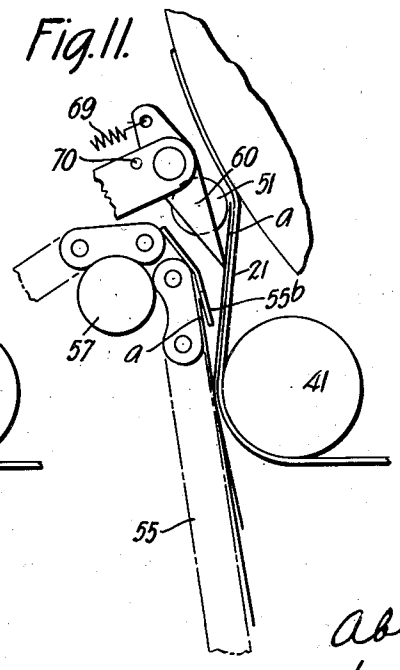
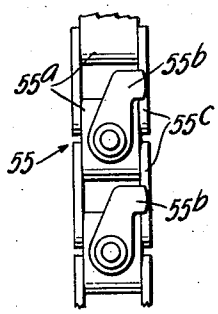


Fig. 12.



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Fig. 13.

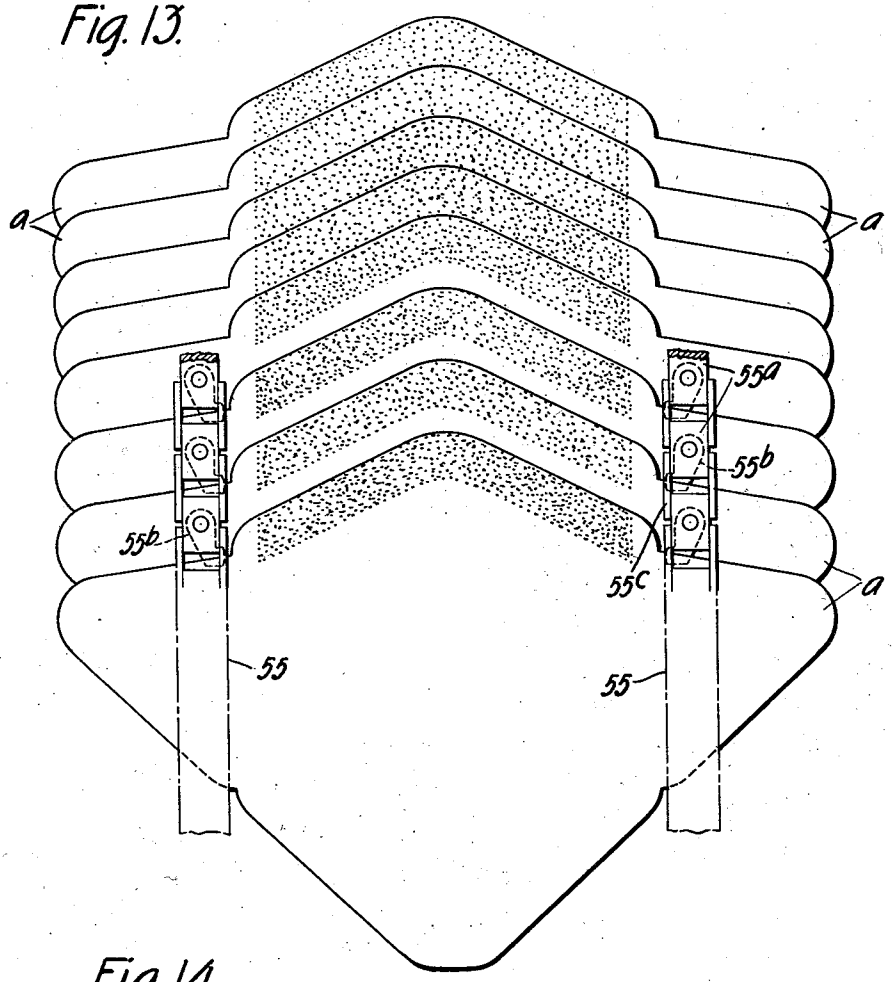
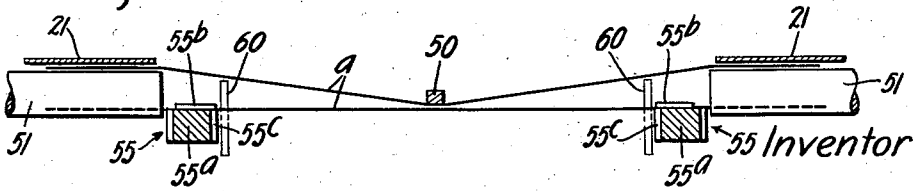


Fig. 14.



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Patented June 2, 1931

1,807,862

UNITED STATES PATENT OFFICE

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ENVELOPE MACHINE

Application filed December 21, 1926, Serial No. 156,080. Renewed August 1, 1930.

My present invention relates to machines for making envelopes. In an assembled machine in which my present invention would find application, 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. Fully separating the dried blanks and completing the operation by scoring, folding, gumming the side flaps, and forming the completed envelopes into bundles.

The present invention is particularly concerned with operation 3, and to a less extent with operations 1 and 2 listed above. Operations 1 and 2 have been described, and the novel features claimed, in my co-pending application filed October 21st, 1926, Serial No. 143,047, and accordingly the mechanism herein disclosed employs such mechanism shown in said co-pending application, with preferably slight changes as will be pointed out.

My invention is 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 an end elevational view of an illustrative embodiment and represents the machine as seen from the left of Figure 2;

Figure 2 is a side elevation of the machine, the parts being shown diagrammatically;

Figure 3 is a view corresponding to Figure 2 but taken on section 3—3 of Figure 1;

Figure 4 is a plan view of the machine;

Figure 5 is an enlarged view in elevation of a portion of the machine shown at the left of Figure 3;

Figure 6 is a diagram showing the releasing of the individual blanks, and the position assumed by them at the time they are secured to the conveyor;

Figure 7 shows a link in the conveyor chain;

Figures 8, 9, 10 and 11 are diagrammatic views showing the movement of the released blank and the gripping of same by appropriate means carried by the conveyor;

Figure 12 is an enlarged view of a portion of a conveyor chain;

Figure 13 shows a portion of the band of envelopes, the individual blanks of a portion of which have been secured to the conveyor; and

Figure 14 is a section taken on the line 14—14 of Figure 5.

Referring now to the drawings in detail, reference is had to Figure 3 wherein "A" denotes the stack of blanks which are to be fed into the machine by mechanism substantially similar to that described and claimed in my co-pending application above referred to, and which, therefore, may receive only brief description here.

Blank feeding mechanism

In brief, the topmost blank is gripped by a sucker 10, and is raised above a nozzle 11 which functions to blow the blank against a conveying roller 12. While in such position the blank is gripped against said roller by means of an auxiliary roller 14 having a planetary movement with respect to roller 12 and which immediately causes the blank to be fed upward and to the left as indicated in Figure 3. The operations mentioned are repeated and timed so that a continuous band of envelopes is formed which is fed between sets of rolls or rollers 15 and 16, 17 and 18, and 17 and 19, until the same is gripped between conveying bands 20 and 21. The band of envelopes thus formed is designated "B", the upper surface of which is seen in Figure 4. The blanks are separated by an amount allowing for the area to be gummed, as shown best in the upper half of Figure 13. A keeper 23 rests upon one end of the stack and maintains such end of the blanks in place, while the other (the bottom flap end) is elevated

by means of the sucker and air blast. The mechanism shown differs slightly from that disclosed in my co-pending application mentioned, in that the gumming is preferably performed at a subsequent point in the machine instead of by a gumming device located at the top of the stack "A" in the approximate position of the keeper 23. Otherwise the operation of this portion of the machine is substantially the same. The support 24 for the stack "A", as will be understood, is fed upwardly by automatic means by an amount required by the withdrawal of the blanks, so that the topmost blank is always at the same distance from the engaging members.

The requisite amount of pressure supplied by the rollers 16 and 18 against the envelope band is maintained due to the manner of mounting said rollers. As shown the shafts 16*a* and 18*a* bearing the respective rollers are contained in journals pivoted, respectively, at 16*b* and 18*b*. Springs 16*c* and 18*c* acting through said pivots hold their respective rolls with the required force against the envelope band in contact with rollers 15 and 17, respectively. A guide 26 constrains the band to pass beneath the guide rollers 19 and 17. Guide roller 19 is mounted in a frame 27 held in a crossbar 28, said frame 27 having a pivoted bell crank portion 27*a* in which said feed roll 19 is trunnioned and which is pressed down by means of spring 28. In this manner the roll 19 is resiliently held against the band of envelopes being conveyed.

The further transporting of the envelope band to the gumming and conveying means is accomplished in part by the endless bands 20 and 21 above mentioned. Band 20 passes around the roller 30 held in standard 30*b* by a pivoted arm 30*a* and thence in contact with the end portions or wings "*a*" composing the envelope band on band 21, around a main conveying drum 31 as far as roller or sheave 32 spring-pressed (spring 33, Figure 3) against drum 31, over roll 34, in a standard 35 and back to roll 30, guides 36, Figures 3 and 4, holding said band in place. Endless conveying band 21 is supported and driven as follows: supporting roll 38, on a shaft 39, in the standard 40, main drum 31, auxiliary guide rolls 41 and 51. Guides 42 hold the band 21 in place and correspond to guides 36 of band 20.

As the band of envelope blanks is thus conveyed by the bands 20 and 21 on either side, it passes in contact with the gum box 43 of conventional type by means of which a uniform band of gum is spread on the sealing flaps, as indicated best in Figures 1 and 13.

Mechanism for separating and securing individual blanks to the conveyor

In the embodiment shown, I accomplish these operations by first causing the blanks to pass over a stripping member disposed in the middle of the band and arranged so as to flex the middle of the band outwardly as is best shown in Figure 14, while holding the wings of the blanks against the bands 21 on the main drum. As the envelope band is fed further forward, the wings pass from under the roller which holds them against the drum, and are thereby released and spring outward to the plane of the middle portion and are thus separated from the wings of the unreleased blanks. This affords an opportunity for the wings to be brought into contact with the gripping fingers of the conveyor which takes them in separated relation through the drying chamber. The mechanism for accomplishing this will now be described.

Stripper member 50, as best shown in Figure 5, extends upwardly around the drum 31 in a groove 31*a* and being disposed in the middle of said drum causes the central portions of the envelopes to be flexed or to belly out. The wings of the envelopes constituting the sides of the band, however, are held against the drum by means of rollers 51 pressed thereagainst by means of spring 52 acting through the arm 53 in which each roller 51 is journaled. See Fig. 5. The arms 53 are loosely supported on a rod 53*a* which also carries the rollers 32. Said rod is carried by arms 53*b* which are pivoted on studs 53*c* and the springs 33 are connected to the arms 53*b* to press the rollers 32 against the drum 31. As the wings of the blank pass beneath the rollers 51, they spring away from the wings of the preceding blank now held by the same rollers, as best shown in Figure 6. While in such position the wings are gripped by means of the gripping members of the conveying chains 55, the construction of which is as follows:

Chain 55 conveniently is of the bicycle type, but has preferably its interior links 55*a* (see Figures 7 and 12) fitted with a spring clip 55*b*, the end of which extends both longitudinally and laterally so as to contact with an adjacent side member of the link 55*c*. Clip 55*b* is bent so as normally to maintain a pressure upon the link 55*c*. At the moment when the spring clip 55*b* is to grip the wing of the envelope blank, the chain is arranged so as to make a sharp bend over a guide shaft 57 held in a bracket 58, fixed in stationary shaft 59. This shaft is shown with a portion cut away in several of the figures in order to make room for the chains 55.

Reference to the diagrammatic showings of Figures 8 to 11 will indicate that the guide shaft 57 is disposed so that the clip 55*b* will be caused to engage the released wing "*a*" of the blank. Continued movement of the chain now brings the link 55*a* over the guide shaft 57, thus straightening it out and causing the clip to press the wing "*a*" with full force against the preceding link in the chain.

The envelope blanks thus secured to the chain are transported into the drying chamber, not shown.

In order to insure that the wings "*a*" shall be brought to such a position as will enable the clips 55*b* to grip them, the following mechanism is provided: Referring to Figs. 8 to 11 and also to Fig. 5, I have provided a pair of separating members or fingers 60, each of which is caused to engage the under surface of each wing "*a*" of a blank as soon as such wings are released by the spring pressed roller 51. Continued movement of a finger 55 causes the corresponding wing to be pressed into close proximity to the link 55 then in position to receive it. Slight forward movement of the chain then causes the clip 55*b* firmly to engage the wing whereupon finger 60 is retracted to its initial position. The mechanism for accomplishing this consists of an arm 62 for each finger, which arm, as shown in Figure 5, is adjustable in length, and to which the finger 60 is pivoted at 60*a*. Arm 62 is fastened to rotate with the shaft 63, being secured thereto by a set screw 64. Shaft 63 is rocked by means of a crank 65 adjustably secured to a link 66 by means of a bolt and slot arrangement by means of which the throw of link 65 may be varied. The latter receives its to and fro motion by means of a cam follower 67 attached to a fork 68 which latter engages a shaft 69 bearing cam 70 engaging follower 67. In order to permit the tip of the finger 60 to move into the space between the chain 55 and that portion of the conveying band 21 beneath the roller 51, its rotational movement about its pivot 60*a* is controlled by means of a spring 69 conveniently attached at its remote end to set screw 64 and by a pin 70 in arm 62 which acts as a stop to limit counterclockwise rotation of finger 60. Thus by the mechanism described each finger 60 is constrained to move downwardly and to scrape against the band 21 and hence strip from same the wings *a* (should such action be necessary) and force them against the receiving link of chain 55. Preferably the links of the chains 55 are slightly longer than the original spacing between the envelope blanks and the speed of the chain is slightly greater than that of the blanks so that upon the securement of the wings *a* of the blanks by means of the clips 55*b* such blanks will be slightly speeded up and be spaced slightly farther apart than the amount of the gummed area on the sealing flap as clearly shown in Figure 13. It will be evident that by being so spaced the danger of the blanks sticking to one another due to the gummed flaps is obviated.

Having described the construction and operation of the machine which thus accomplishes the steps of feeding the blanks from the stack, gumming the sealing flaps and securing the gummed blanks in spaced relation upon the conveyor, the manner of driving the various parts of the machine may now be dealt with.

Referring to Figs. 1 and 2, the machine receives power by means of a chain 100 driving sprocket 100*a* on shaft 69. From shaft 69 power is then transmitted to shaft 39 (running transversely of the machine) through chain 102 and sprocket 102*a* and gear train composed of gears 103, 104, the latter being attached to shaft 39. The various sprockets and gears mentioned serve to accomplish a speed reduction as will be evident from inspection if Fig. 2. A gear 105 on shaft 39—see Figs. 1 and 4—drives shaft 15 through gear 107 on an intermediate shaft and gear 110 on shaft 15. Shaft 16 is then driven from shaft 15 by gears 108 and 109, Figs. 4 and 3. Thus far the application of power has been traced to the feed rolls 15 and 16. Roller 17 is also driven by intermediate gear 107 which in turn drives shaft 18*a* by means of a gear on said shaft meshing with gear 110 cut in roller 17. The said shaft 39 also drives the chain 55 as follows: Attached to said shaft is a large sprocket 113 which, by means of chain 115, drives a sprocket 114 which rotates freely on shaft 59—see Figs. 4 and 3—and is held in place by a collar 114*a*. Sprocket 114 in turn transmits power to shaft 116 through intermeshing gears 117 and 118, Fig. 4. Mounted on shaft 116 are sprockets 119, 119, over each of which passes a chain 55. Drum 31 is driven from shaft 39 by means of sprocket 120 fixed thereon, chain 121 and sprocket 122 on shaft 123 bearing said drum—see Figs. 2 and 4.

Referring to Fig. 3 the power for driving the mechanism for feeding the sheets from the stack is obtained from gear 124 on shaft 69 by means of chain 125 which meshes with a gear 126 in the manner which has already been described in my copending application referred to.

The nozzle 11 (Figures 3 and 4) extends along the edge of the blanks and is provided with a row of perforations so that the blast of air issuing from the nozzle acts on a large part of the blank to effectively raise the blank to the feed rolls 12 and 14.

To accommodate envelope blanks of various widths the chains 55 and associated parts are adjustable towards and away from each other. Accordingly the feed bands 20 and 21 are also adjustable transversely of the drum or cylinder 31.

What I claim is:

1. In an envelope making machine, means for removing blanks from a stack and forming them into a band so as to expose the area of a sealing flap to be gummed, means for gumming the said flaps and means for individually conveying the blanks of said band

comprising positive means for holding said blanks in spaced relation.

2. In an envelope making machine, means for removing blanks from a stack and forming them into a band so as to expose the area of a sealing flap to be gummed, means for gumming that portion of the band constituted by the said flaps, means for separating the gummed blanks so as to prevent sticking including means for individually conveying said blanks, said means last mentioned comprising positive means for holding said blanks in spaced relation.

3. In an envelope making machine, means for removing blanks from a stack and forming them into a band, means for gumming a portion of said band, means for individually conveying the blanks of said band comprising means for flexing the band along an axis parallel to its path of movement, means for releasing a side portion of an individual blank while its fellows behind it are held, whereby said side portion is caused to spring toward the plane of said axis of flexing and means for gripping the exposed side portion.

4. In an envelope making machine, means for removing blanks from a stack and forming them into a band, means for gumming a portion of said band, means for individually conveying the blanks of said band comprising means for releasing an exposed side portion of the blank while said blank is otherwise held and means for gripping said exposed portion.

5. In an envelope making machine, means for removing blanks from a stack and forming them into a band, means for conveying said band, means for gumming a portion of said band, means for individually conveying the blanks of said band comprising a conveyor proper, means for releasing an exposed side portion of the blank while same is otherwise held including a separator member and means for inserting same beneath said portion and moving it into reach of gripping means attached to said conveyor proper.

6. In an envelope making machine, means for removing blanks from a stack and forming them into a band, means for conveying said band, means for gumming a portion of said band, means for individually conveying the blanks of said band comprising means for releasing an exposed side portion of the blank while same is otherwise held and means for gripping said exposed portion, said last named means comprising a conveyor chain, clips carried by said chain and openable by flexing of said chain and means for creating a flexing of said chain at the moment of gripping said blanks.

7. In an envelope making machine, means for moving a band of envelope blanks placed with a flap foremost comprising a conveying belt and a drum over which said belt passes, and mechanism for transferring said blanks in said band to a conveying means, said mechanism comprising means for releasing a side flap of an individual blank while same is otherwise held, a separator member insertable between said released flap and said belt, and a movable arm to which said member is pivoted, means for moving said arm to move said member against said belt and spring means attached to said member and constraining it to follow said belt.

8. In an envelope making machine, means for moving a band of envelope blanks placed with a flap foremost comprising a conveying belt and a drum over which said belt passes, means for releasing a side flap of an individual blank, comprising a stripper member adjacent said drum causing an intermediate portion of said band to flex outwardly and longitudinally, means for releasing an end portion of an individual blank while flexed and while otherwise held and while its fellows are constrained and means for gripping the released end portion and conveying it from the recited mechanism.

9. A conveyor comprising a chain, clips carried by said chain, each of said clips being secured to one link and bearing on a succeeding link, and means for releasing the bearing portions of said clips.

10. A conveyor comprising a chain, clips carried by said chain, each of said clips being secured to one link and bearing on a succeeding link such that flexing of said chain in the proper direction will release the bearing portion of the clip at such point of flexure.

11. A conveyor comprising a chain of the bicycle type, clips carried by the flat or solid links of the chain and bearing upon the succeeding links such that flexing of said chain in the proper direction will release the bearing portion of the clip at such point of flexure.

12. In an envelope making machine, means for removing blanks from a stack and forming them into a band so as to expose the area of the sealing flaps to be gummed, means for gumming said flaps and means for conveying the blanks of said band comprising positive means for holding said blanks in spaced relation.

13. In an envelope making machine, means for removing blanks from a stack and forming them into a band so as to expose the area of the sealing flaps to be gummed, means for gumming said flaps and means for conveying the blanks of said band comprising gripping means for positively holding said blanks in spaced relation, the arrangement of the parts being such that said gripping means engage the blanks from behind, whereby the blanks so gripped are in effect pushed by the gripping means and when a receiving station is reached, the blanks may be released from the gripping means by imparting to the blanks an accelerated movement in their direction of travel.

14. In an envelope making machine, means for removing the blanks from the stack and forming them into a band so as to expose the area of the sealing flaps to be gummed, means for gumming said flaps and means for conveying the blanks of said band comprising spring clips which present their open ends to the blanks about to be gripped.

15. In an envelope making machine, means for removing blanks from a stack and forming them into a band, means for gumming the sealing flaps of said envelopes, means for conveying the gummed blanks of the band and holding same in spaced relation comprising positive means engaging the side flaps of the blanks.

16. In the manufacture of envelopes from envelope blanks, the steps which consist in feeding said blanks from a stack into an overlapping band, applying gum to the blanks in said band, then gripping said blanks by steps which include flexing said band whereby such flexed portions tend to return to their unflexed condition, and then releasing a portion of each individual blank while constraining in such flexed position the blank next thereto and introducing a separating member into the space between the so released blank and blank which has as yet not been released.

17. In the manufacture of envelopes from envelope blanks, the steps which consist in feeding said blanks from a stack into an overlapping band, then gripping said blanks by steps which include flexing said band whereby such flexed portions tend to return to their unflexed condition, and then releasing a portion of each individual blank while constraining in such flexed position the blank next thereto and introducing a separating member into the space between the so released blank and blank which has as yet not been released, and gripping the thus separated blank and conveying it away.

18. The method according to claims 16 and 17, in which the released portions are the side flaps of the blanks.

19. The method of separating blanks which partially overlap to form a band, which consists in flexing along an axis longitudinal of said band such overlapping blanks, constraining one portion of the blanks so as to prevent said portion from moving into the flexed position and releasing the blanks successively from said constraining action.

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

ABRAHAM NOVICK.