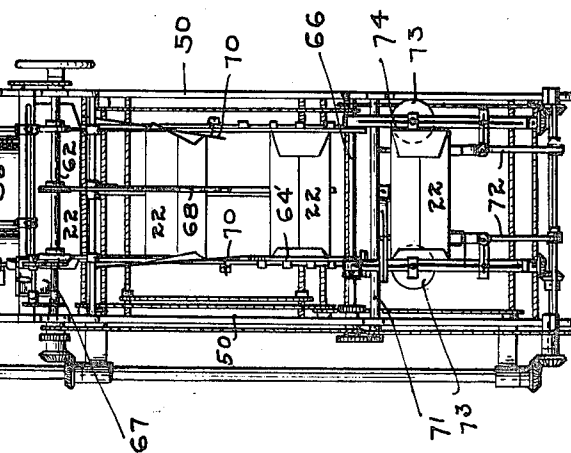
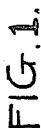
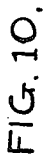


1,144,506.

5 SHEETS—SHEET 1.



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1,144,506.

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ENVELOP MAKING MACHINE.
APPLICATION FILED JULY 24, 1908.

Patented June 29, 1915.
5 SHEETS—SHEET 2.

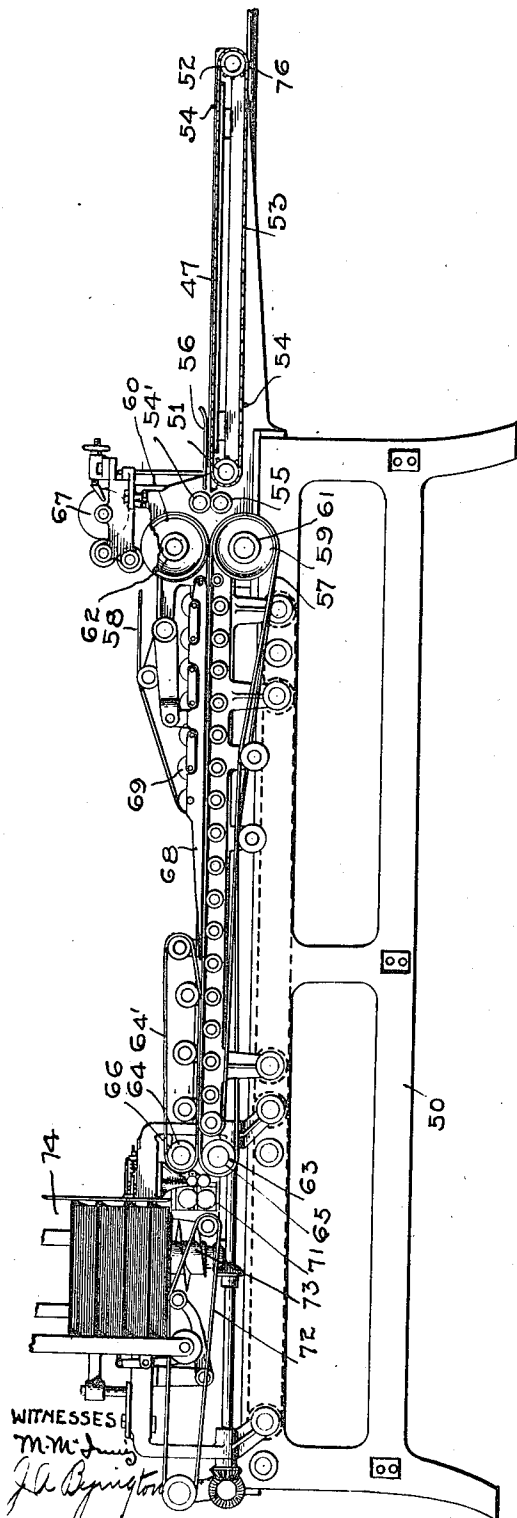


FIG. 3

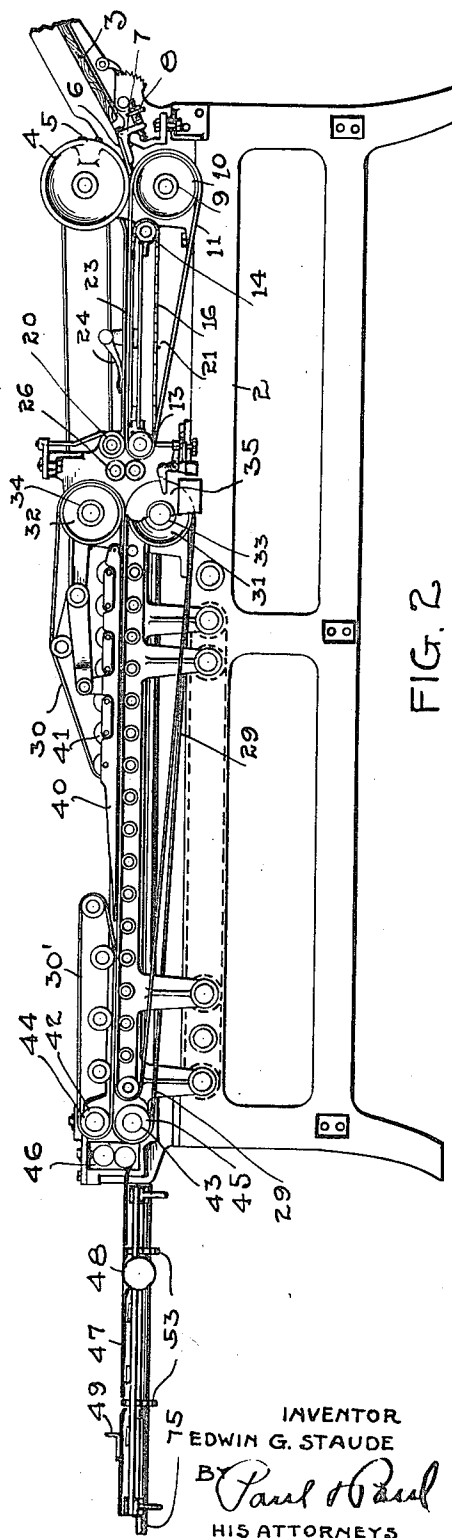


FIG. 2

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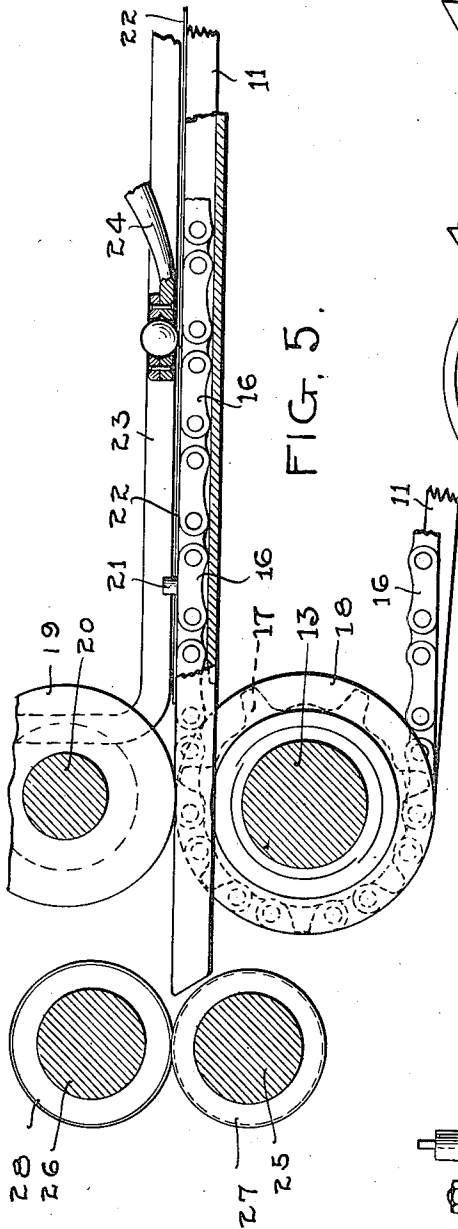


FIG. 5.

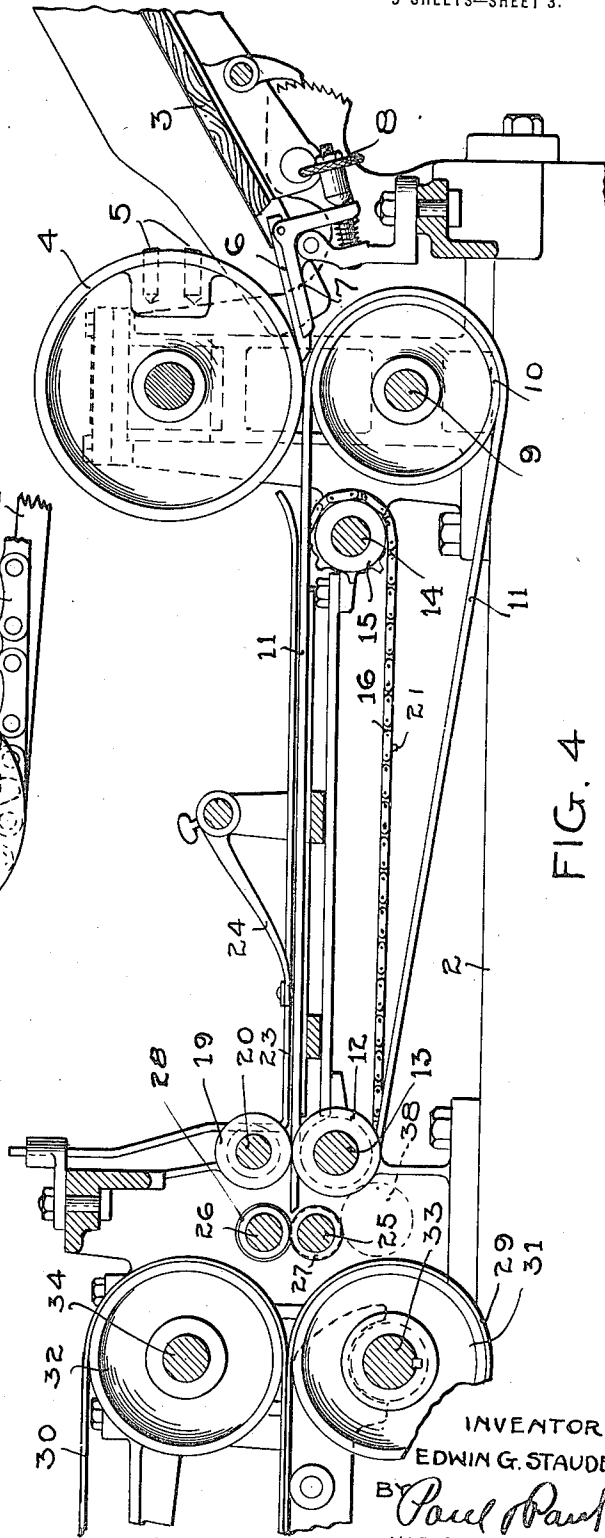


FIG. 4.

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Patented June 29, 1915.

5 SHEETS—SHEET 4.

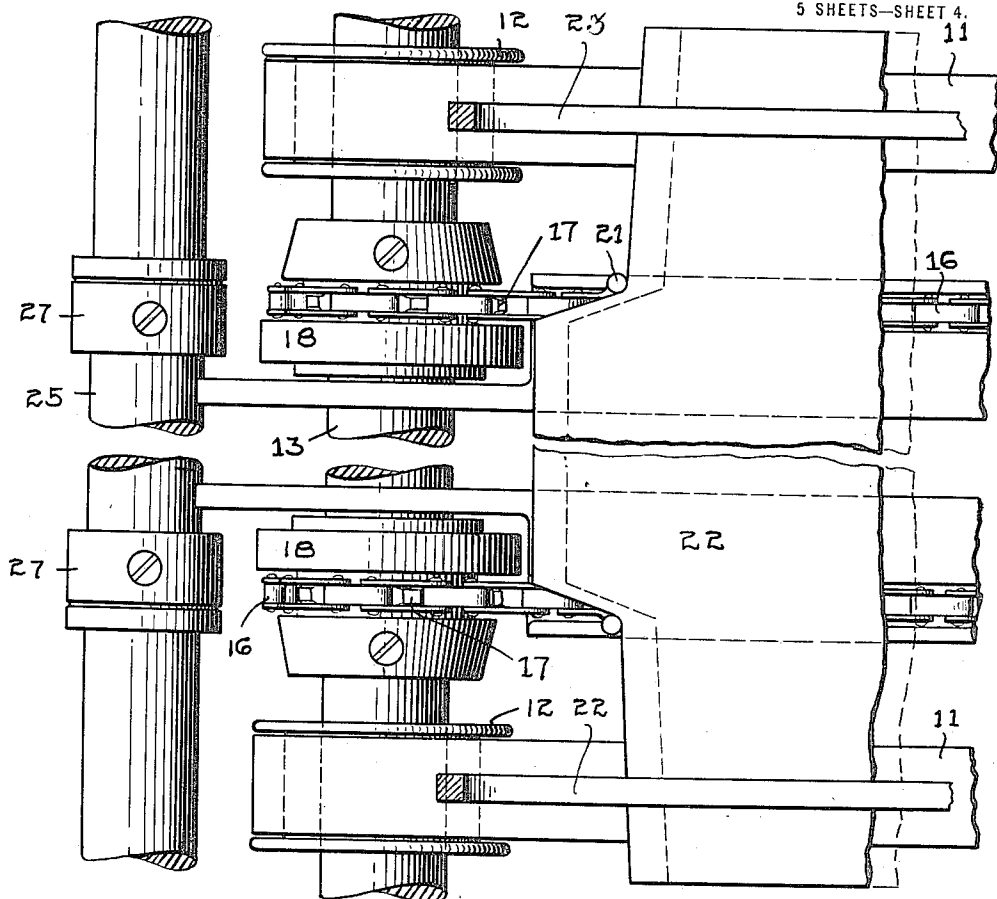


FIG. 6

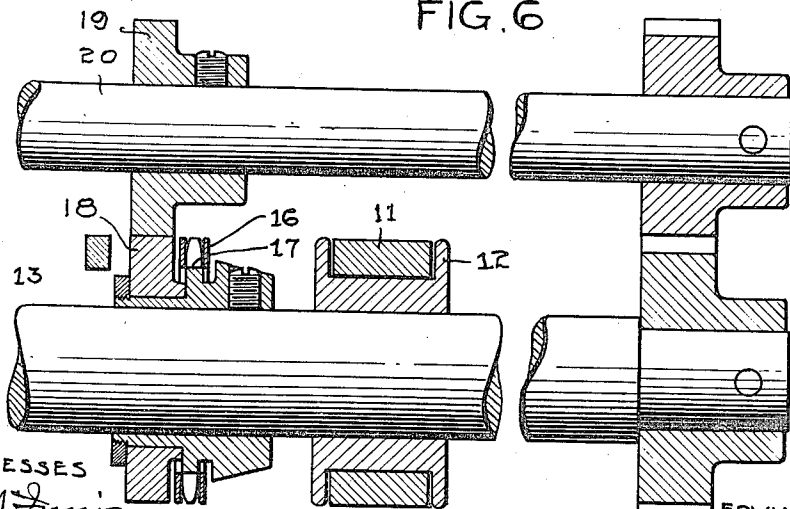


FIG. 7

WITNESSES

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 APPLICATION FILED JULY 24, 1908.

1,144,506.

Patented June 29, 1915.

5 SHEETS—SHEET 5.

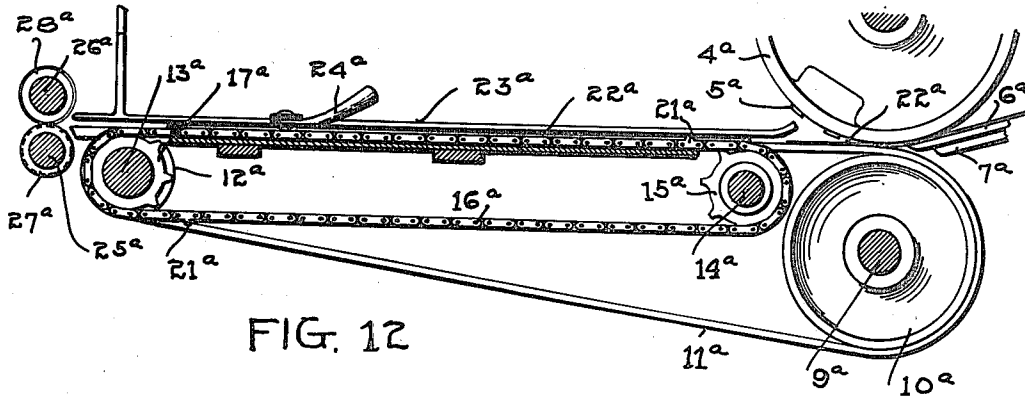


FIG. 12

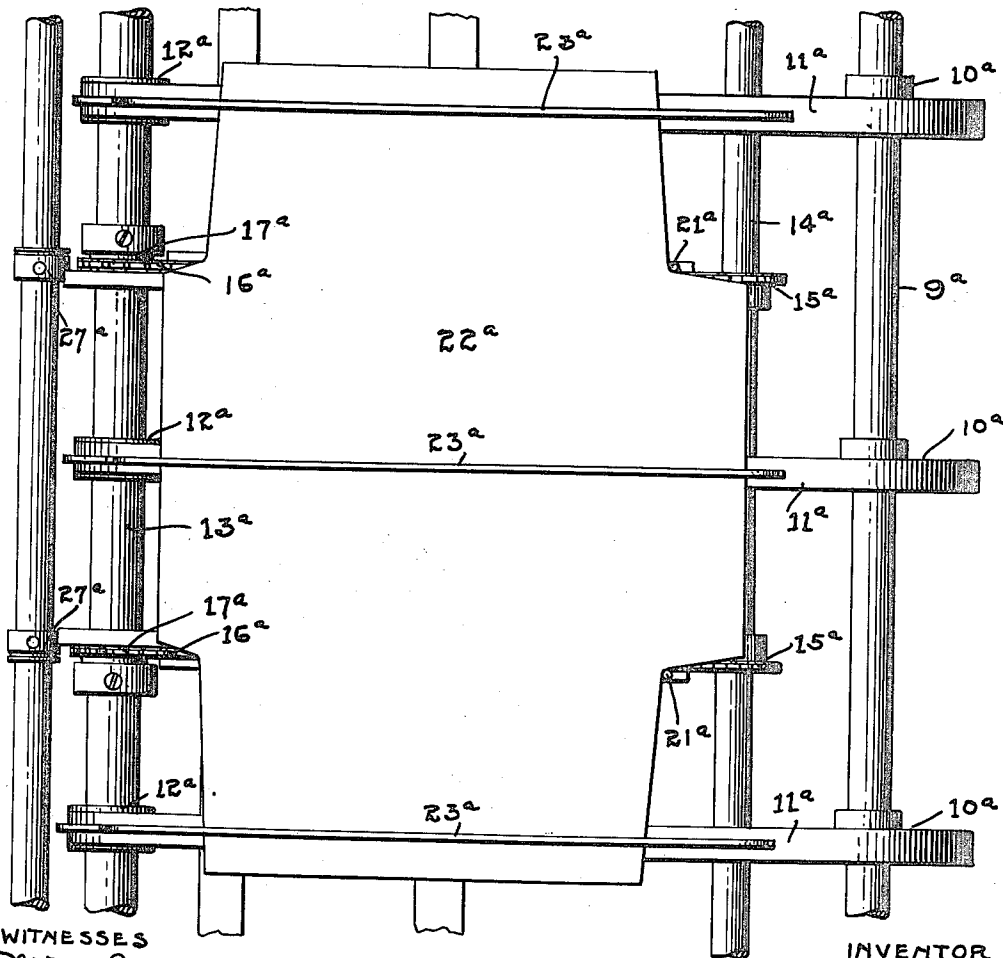


FIG. 11

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UNITED STATES PATENT OFFICE.

EDWIN G. STAUDE, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED STATES ENVELOPE COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION.

ENVELOP-MAKING MACHINE.

1,144,506.

Specification of Letters Patent.

Patented June 29, 1915.

Application filed July 24, 1908. Serial No. 445,166.

To all whom it may concern:

Be it known that I, EDWIN G. STAUDE, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Envelop-Making Machines, of which the following is a specification.

The object of this invention is to provide a machine wherein envelops or other blanks can be rapidly and accurately creased, pasted and folded, preferably by a single and continuous operation.

A further object of the invention is to provide a machine having large capacity and one that is economical in operation and maintenance.

The invention consists generally in means for centering or squaring the blanks as they approach the creasing devices, so that the creasing or scoring may be evenly and accurately performed.

The invention consists further in means for centering the blanks after the side flaps have been folded and pasted preparatory to creasing and folding the end flaps.

The invention consists further in various constructions and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a plan view of an envelop folding machine embodying my invention, Fig. 2 is a longitudinal section through the feed mechanism and the portion of the machine wherein the side flaps are creased, pasted and folded. Fig. 3 is a similar view of the delivery portion of the machine wherein the end flaps are creased and folded and one of said flaps is preferably pasted. Fig. 4 is a sectional detail view of the receiving portion of the machine illustrating the feeding device and means for centering or squaring the blanks and delivering them to the creasing rolls. Fig. 5 is a sectional detail view illustrating the means for centering or squaring the blanks before they pass between the creasing rolls. Fig. 6 is a top view illustrating the position assumed by the blanks during the centering or squaring operation. Fig. 7 is a sectional detail view illustrating the means for driving the belts. Fig. 8 is a detail view illustrating the operation of the creasing rolls at

the receiving end of the machine. Fig. 9 is a similar view illustrating the operation of a similar pair of rolls that crease the end flaps in the other portion of the machine. Fig. 10 is a detail view illustrating the mechanism for moving the blank laterally toward the creasing and folding devices for the end flaps. Fig. 11 is a plan view illustrating a modified arrangement of the blank centering means. Fig. 12 is a sectional view of the structure shown in Fig. 11.

In the drawings, 2 represents the frame of the machine whereon the operating mechanism is mounted. This frame may be of any preferred construction. At the receiving end of the frame 2 blank feeding means are provided, preferably having an inclined feed plate 3 upon which the blanks to be creased, pasted and folded, are arranged. The device that I have illustrated in the drawings and which I prefer to use in this machine for taking the blanks successively from the pile on the feed plate and delivering them one at a time to the belts by which they are fed or carried to the creasing rolls, is shown and described in Letters Patent of the United States, No. 1,033,040, issued to me July 16, 1912. I make no claim to the construction of this device herein and a detailed description of it is, therefore, unnecessary in this specification, nor do I limit myself to the use of this or any particular blank feeding device.

The roll or wheel 4 by which the blanks are delivered one at a time to the feed belts, is preferably provided with plugs 5 of rubber or other yielding material arranged in sockets in its periphery. This feed roll or wheel 4 engages the top blank of a series resting upon a block 6, preferably of rubber or other yielding material, mounted on a plate 7 that is preferably pivoted to the machine frame and capable of adjustment by means of a screw 8, whereby the proper angle is obtained to insure the uniform feeding of the blanks. A shaft 9 is arranged below the roll or wheel 4, and this shaft preferably carries a series of pulleys 10 upon which are arranged the feed belts 11, also preferably extending over pulleys 12 on a shaft 13.

I provide means whereby as each blank is

moved forward by the belts 11, it is engaged
 by a centering device traveling at a differ-
 ent rate of speed than said belts and is center-
 5 ed or squared up so as to pass in proper
 alinement to the succeeding rolls. As here
 shown this centering device is constructed as
 follows: A shaft 14 is preferably arranged
 in front of the shaft 9 and this shaft is pro-
 10 vided with sprockets 15 which are connected
 by suitable sprocket chains or chain belts 16
 with sprockets 17 secured on the shaft 13.
 Narrow faced rolls 18 are preferably loosely
 15 mounted on the collars of the sprockets 17
 and said rolls contact with similar rolls 19
 preferably secured on a shaft 20 arranged
 above the shaft 13. The chain belts 16 are
 preferably two in number and they are each
 20 preferably provided with projecting pins 21
 correspondingly arranged on the chains and
 extending into the path of an envelop blank
 carried by the belts 11. The pulleys 12 are
 preferably loose on the shaft 13 and the belts
 25 11, of which there are usually three, operate
 at a greater speed than the chain belts 16,
 and, consequently, as a blank is fed forward
 by the belts 11 it will, the movement of the
 chain belts being properly timed, engage the
 30 pins 21 and be held in contact therewith un-
 til the forward portion of the blank is in
 position to be engaged by the narrow faced
 rolls 18 and 19, which feed the blank be-
 35 tween the creasing rolls. The feed rolls 18
 and 19 preferably catch the blank before the
 pins 21 relieve it and these rolls bring the
 blank to the creasing rolls without losing
 register, or without its position being dis-
 40 turbed.

The engagement of the pins 21 with the
 forward portion of the blank, as described,
 45 will insure the centering or squaring of the
 blanks during the feeding operation and will
 prevent any possibility of their passing to
 the creasing rolls unevenly, which, if it did
 occur, would result in an irregular creasing
 50 of the blank and a mis-shaped envelop when
 the blank was folded. A guard 23 is prefer-
 ably arranged above the blank on belts 11
 and an arm 24, preferably carrying a ball, is
 arranged to bear on the blank and hold it
 55 down upon the belts.

In front of the shafts 13 and 20 I prefer-
 ably provide shafts 25 and 26 on which
 creasing rolls 27 and 28 are mounted. These
 rolls are adapted to crease or score the blank
 60 preparatory to its side flaps being folded.
 The creasing rolls as well as the pulleys and
 sprocket wheels for the feed belts and chains
 are laterally adjustable on their shafts to
 adapt the machine for blanks of different
 65 widths. After leaving the creasing rolls the
 blanks pass to belts 29 and 30 preferably
 carried by pulleys 31 and 32 on the shafts
 33 and 34. The belt 30 runs upon a suitably
 journaled pulley 32'. Near the pulley 31

and mounted on the shaft 33 I preferably 65
 provide a pasting device 35 arranged to ap-
 ply paste to the edges of the flaps of the
 passing blanks. The shaft 33 preferably ex-
 tends beyond the machine on one side and
 has a driving pulley 36 that also has a driv- 70
 ing connection with the shaft 34. The shafts
 13 and 25 are driven by means of a belt 37
 and the gear 38. Stationary folders 39 are
 preferably provided to engage the edges of
 the blanks and fold them over upon the mid- 75
 dle portion, the folding operation being
 completed by means of frames 40 supported
 above the feed belts and carrying anti-fric-
 tion rolls 41. Shafts 42 and 43 are prefer- 80
 ably mounted one over the other at the de-
 livery end of the first frame, and on these
 shafts are pulleys 44 and 45 around which
 belts 29 and 30' pass. These belts, with the
 folding mechanism, are adjustable laterally
 on their supports to adapt the machine for 85
 folding blanks of different widths. Near
 the shafts 42 and 43 I prefer to arrange rolls
 46 through which the blanks are delivered
 on to a table 47. This table has preferably
 a roll 48 mounted in suitable bearings with 90
 the top of the roll about on a level with the
 top of the table. The table is also provided
 at one side with an adjustable stop 49 which
 engages the blank and arrests further move- 95
 ment thereof. The roll 48 is arranged to
 engage the envelop, as indicated in Fig. 1,
 and move it into contact with the stop 49.
 If the envelop rebounds upon striking this
 stop the roll 48 immediately returns it to its
 100 proper position so that when the feed belts
 53 deliver the envelop to the mechanism car-
 ried by the frame 50 it will be in proper
 alinement for a continuance of the folding
 and pasting operation.

The frame 50 preferably forms a horizon- 105
 tal continuation of the table 47. It prefer-
 ably extends in a direction at right angles
 substantially to the frame 2 of that part of
 the machine in which the initial folding op-
 eration is performed. When the blanks are 110
 delivered to this table, the side flaps are
 creased and folded, and their gummed sur-
 faces squeezed together and to that extent
 the envelop or other article is completed.
 The final step in this operation is the creas- 115
 ing and folding of the end flaps of the blank
 and this is accomplished in this machine by
 the following means: The shafts 51 and 52
 are mounted on said table 47 and are con-
 120 nected by belts 53 having pins 54 which are
 adapted to engage the edges of the partially
 formed envelops deposited upon the table
 and move them laterally thereon toward the
 creasing rolls 54' and 55, a suitable guide 56
 being provided in advance of said rolls. 125
 Feed belts 57 and 58 are provided for pul-
 leys 59 and 60 mounted on shafts 61 and 62.
 The belt 57 passes around a pulley 63 on a

shaft 65 and a shorter belt 64' passes around a pulley 64 on a shaft 66. A paste device 67 is arranged above the feed belts and is adapted to apply paste to the end flaps. If preferred only one of said paste devices may be used. A frame 68 having anti-friction wheels 69 is provided to hold the blanks in place during this feeding and folding operation. Stationary folders 70 are arranged to turn the ends of the flaps inwardly and complete the folding operation. These devices are preferably adjustable laterally with respect to the other portions of the machine to adapt them for blanks of different lengths. After leaving the feed belts the blanks preferably pass to rolls 71, and from these to a stacker belt 72 which operates in connection with vertical spirals 73 for the purpose of lifting the blanks and stacking them in a hopper 74. The stacker device that I prefer to use is shown and described in the patent issued to me February 20, 1912, No. 1,018,187.

The mechanism of the secondary portion of the machine is driven through shafts 75 and 76 geared to each other and to the driving shaft.

In Figs. 11 and 12 I have shown a modification of the centering mechanism which consists in pins arranged on the centering belts to engage the rear edges of the blanks instead of contacting with the forward edge of said blanks. The feed belts 11 in this case operate at a slower speed than the belts carrying the pins. The mechanism is substantially the same as that shown in Fig. 4 of the drawings, except that its mode of operation is reversed. I, therefore, use the same reference numerals in referring to the different parts of the modified structure with the addition of the exponent "a".

Operation: The blanks to be folded are preferably placed upon the feed board 3 in the manner described in my said Letters Patent No. 1,033,040, and are fed one at a time from the top of the pile on to the feed and carrier belts 11. As they are being carried forward by these belts the forward edge of each blank is brought into contact with the pins 21 upon the slower moving chain belt 16, as illustrated clearly in Fig. 6 of the drawings. By this means the blanks are centered or squared up, and are properly and evenly presented to the feed rolls 18 and 19, which deliver the blanks to the creasing rolls 27 and 28. They are moved forward by the creasing rolls and are engaged and carried along by the belts 29 and 30. While being carried by these belts paste is applied to the edge of one flap of each blank and the flaps are then folded and passed between the rolls 46 by which the flaps are pressed together, and the blanks thus creased, pasted and folded are delivered by

the rolls 46 to the table 47. The roll 48 engages the under side of each partially folded blank as it reaches this table and moves its forward end against the stop 49. The roll 48 tends to hold the partially folded blank with its forward end against said stop. This action centers the blank for the other set of creasing rolls. While the end of the blank is thus held against the stop 49 it will be noted that it is not prevented from being moved freely laterally into engagement with the second set of creasing, pasting and folding devices, and, in fact, while the roll 48 is in engagement with the blank and is holding its end against the stop 49, said blank will be moved laterally by the chain belts 53 having lugs 54, to the second creasing mechanism by which the end flaps are creased, after which at least one of said flaps will be folded and pasted. The result of this second centering or squaring up of the partly folded article, after it leaves the mechanism by which its side flaps are creased, pasted and folded, is to present this partly folded article to the mechanism by which the end flaps are creased, in proper position and alinement for such creasing.

The operation is substantially the same when the chain belts are caused to move faster than the other belts and the pins engage the rear of the blank as illustrated in the modified form of the invention. In each instance each individual blank is centered or squared up while it is traveling and before it is engaged by the creasing means, and thereby the creases or scores are properly positioned on the blanks and irregular creasing or mis-shaping of the envelopes or other articles, is avoided.

While I have shown and described a mechanism adapted particularly for making envelopes I do not confine myself to such use of the machine, as the apparatus may be employed for handling other blanks which are to be creased and folded to form side and end flaps.

I claim as my invention:

1. In a machine of the class described, means for forwarding a blank and for squaring it during its forward movement, comprising the following instrumentalities:—a frictionally engaging forwarding means for said blank, positively engaging means, to which the blank is delivered by said frictionally engaging means, for continuing the forward movement of said blank in the plane of its flat or extended position, means for engaging an edge of said blank during its movement by said frictionally engaging means, to square the same, and means for moving said engaging means out of the path of the blank as the same is delivered to said positively engaging forwarding means.

2. In a machine of the class described, a

blank forwarding means comprising a movable member frictionally engaging the blank, and a positively engaging feeding means to which the blank is delivered by said frictionally engaging member, means for engaging an edge of said blank during its movement by said frictionally engaging member, and means for moving said engaging means at a speed different from the speed of said frictionally engaging member, said engaging means being movable out of engagement with said edge of the blank before said blank is seized by said positively engaging forwarding means.

3. In a machine of the class described, a series of moving tapes for forwarding a blank in the plane of its flat or extended position, a pair of feed rolls in advance of said tapes, into the bight of which the blank is delivered by said tapes, said rolls adapted to continue the forward movement of the blank, and a plurality of members moving in the same direction as said tapes but at a different rate of speed for engaging an edge of the blank during the period of its forward movement upon said tapes, whereby the blank is squared previous to its passage into the bight of said rolls.

4. In a machine of the class described, the combination, with feed rolls and belts adapted to feed blanks to said rolls, some of said belts operating at a higher speed than the other belts, means mounted on the slower moving belts and against which the blanks are held by the faster moving belts, means for creasing, pasting and folding the side flaps of a blank, and means for moving the blank in a direction at right angles substantially to its initial movement to crease, paste and fold the end flaps.

5. In a machine of the class described, the combination, with feed rolls, of belts adapted to feed blanks to said rolls, some of said belts operating at a higher speed than the other belts, lugs carried by the slower moving belts against which lugs the blanks are held by the faster moving belts, means for folding the side flaps of the blank, a stop provided in the path of said blank, means for moving the blank laterally with respect to its initial movement, means for holding the blank against said stop during a portion of such lateral movement, and means for creasing, pasting and folding the end flaps.

6. In a machine of the class described, the combination, with means for feeding the blank and means for creasing, pasting and folding the side flaps thereof, of a table whereon the partially folded blanks are delivered, a roller mounted in said table, feed belts operating in a direction at right angles substantially to the direction of movement of said roller and said feeding means,

and creasing, pasting and folding means for the end flaps of said blank, substantially as described.

7. In a machine of the class described, the combination, with the initial feeding means and means for creasing, pasting and folding the side flaps of an envelop blank, of a secondary feeding means operating at right angles substantially to said initial feeding means, a stop provided in the path of the blank fed by said initial feeding means, means for holding the blank in contact with said stop, and creasing, pasting and folding means for the end flaps of said blank, arranged to receive it from said secondary feeding means.

8. The combination, with an initial blank feeding means, of a secondary feeding means operating in a horizontal plane at an angle to said initial feeding means and arranged to receive the blanks therefrom, a stop provided in the path of the blank carried by said initial feeding means, means for holding the blank in contact with said stop after the blank has been released by said initial feeding means, and folding means arranged to receive the blank from said secondary means.

9. In a machine of the class described, the combination with an initial blank feeding means, and means for creasing, pasting and folding the side flaps thereof, of a secondary feeding means operating at an angle to said initial feeding means, an adjustable stop provided in the path of the blank delivered by said initial feeding means, means for holding the blank in contact with said stop, and creasing, pasting and folding means whereto the blank is delivered by said secondary feeding means.

10. In a machine of the class described, the combination, with an initial blank feeding means, of a secondary feeding means operating at an angle to said first named means, a stop provided in the path of the blank fed by said initial feeding means, and a driven roller contacting with the blank to hold it against said stop during the first part of its movement on said secondary feeding means.

11. The combination, with an initial blank feeding means, of a secondary feeding means operating at an angle to said initial feeding means and arranged to receive blanks therefrom, a stop provided in the path of the blank carried by said initial feeding means, means holding said blank against said stop while permitting it to be moved at an angle to its original line of travel by said secondary feeding means, and folding means arranged to receive the blanks from said secondary means.

12. In an envelop machine, the combination, with an initial blank feeding means,

and means for creasing, pasting and folding the side flaps thereof, of a secondary feeding means operating at an angle to said initial feeding means, a stop provided in the path of the blank delivered by said initial feeding means, means for holding said blank against said stop while permitting it to be moved at an angle to its original line of travel by said secondary feeding means, and creasing, pasting and folding devices whereto the blank is delivered by said secondary feeding means.

13. The combination, with an initial blank feeding means, of a secondary blank feeding means operating at an angle to said initial feeding means, said secondary blank feeding means including belts having means for engaging a blank and moving it sidewise, means for centering the blank in respect to said secondary feeding means, and folding means arranged to receive the blank from said secondary means.

14. In an envelop machine, an initial blank feeding means and means for folding the side flaps of an envelop blank, of a secondary feeding means operating at an angle to said initial feeding means and including feed belts having means to engage an envelop blank delivered thereon by said initial feeding means, means for centering the blank on said belts, and pasting and folding means for the end flaps of the blank arranged to receive it from said secondary feeding means.

15. The combination, with an initial blank feeding means, of a secondary feeding means operating at an angle to said initial feeding means, and arranged to receive blanks therefrom, a stop provided in the path of the blank carried by said initial feeding means, means for holding said blank against said stop while permitting it to be moved sidewise by said secondary feeding means, and folding means arranged to receive the blank from said secondary means.

16. The combination, with an initial blank feeding means, of a secondary feeding means operating at an angle to said initial feeding means and arranged to receive the blanks therefrom, a stop provided in the path of the blank carried by said initial feeding means, means for engaging the blank to hold it in contact with said stop, and folding means arranged to receive the blank from said secondary means.

17. The combination, with an initial blank feeding means, and means for folding the side flaps of the blank, of a secondary feeding means operating transversely with respect to said initial feeding means and having means to engage the blank to move it sidewise, a stop in the path of the blank, and means contacting with the blank and

holding it against said stop during a portion of such sidewise movement.

18. The combination, with an initial blank feeding means and means for folding the side flaps of the blank, of a secondary feeding means operating transversely with respect to said initial feeding means, said secondary feeding means including belts and means thereon adapted to engage the blank and move it sidewise, and means for centering the blank in respect to said secondary feeding means.

19. The combination, with an initial blank feeding means and means for folding the side flaps of the blank, of a secondary feeding means operating transversely with respect to said initial feeding means and including belts having means adapted to engage the edge of the blank and move it sidewise, a stop to arrest lengthwise movement of the blank, and means for holding the blank in engagement with said stop while the blank is being moved sidewise.

20. The combination, with an initial blank feeding means and means for folding the side flaps of the blank, of a secondary feeding means operating transversely with respect to said initial feeding means and including belts and lugs thereon adapted to engage the blank and move it sidewise, a stop in the path of the blank, a friction roller arranged to hold the blank in engagement with said stop while it is moved sidewise by said belts and lugs, and folding means for the end flaps to which the blank is delivered by said secondary feeding means.

21. The combination, with an initial blank feeding means, of a secondary feeding means operating at an angle to said initial feeding means and comprising an endless carrier arranged to receive the blank from said initial feeding means, means for projecting the blank over and upon said carrier, a stop for limiting the movement of the blank transversely of said carrier, means for holding the blank against said stop while it is being moved sidewise by said carrier, and folding means arranged to receive the blank from said carrier.

22. The combination, with an initial blank feeding means, of a table, feed belts operating on said table transversely with respect to said feeding means, means for centering the blank on said belts, and a folding means arranged to receive blanks from said belts.

23. In a machine of the class described, means for forwarding a blank in the plane of its flat or extended position, independent forwarding means to which the blank is delivered by said first mentioned forwarding means for continuing the forward movement of the blank, and a plurality of members moving in the same direction as said first

mentioned forwarding means, but at a different rate of speed, for engaging an edge of the blank during its forward movement by said first mentioned forwarding means,
5 whereby the blank is squared previous to its delivery to said second mentioned forwarding means.

In witness whereof, I have hereunto set my hand this 17th day of July 1908.

EDWIN G. STAUDE.

Witnesses:

RICHARD PAUL,
J. A. BYINGTON.