Sept. 6, 1927. 1,641,406

W. H. ALDEN, JR

MAIL HANDLING MACHINE

Original Filed Oct. 10, 1921 4 Sheets-Sheet 1

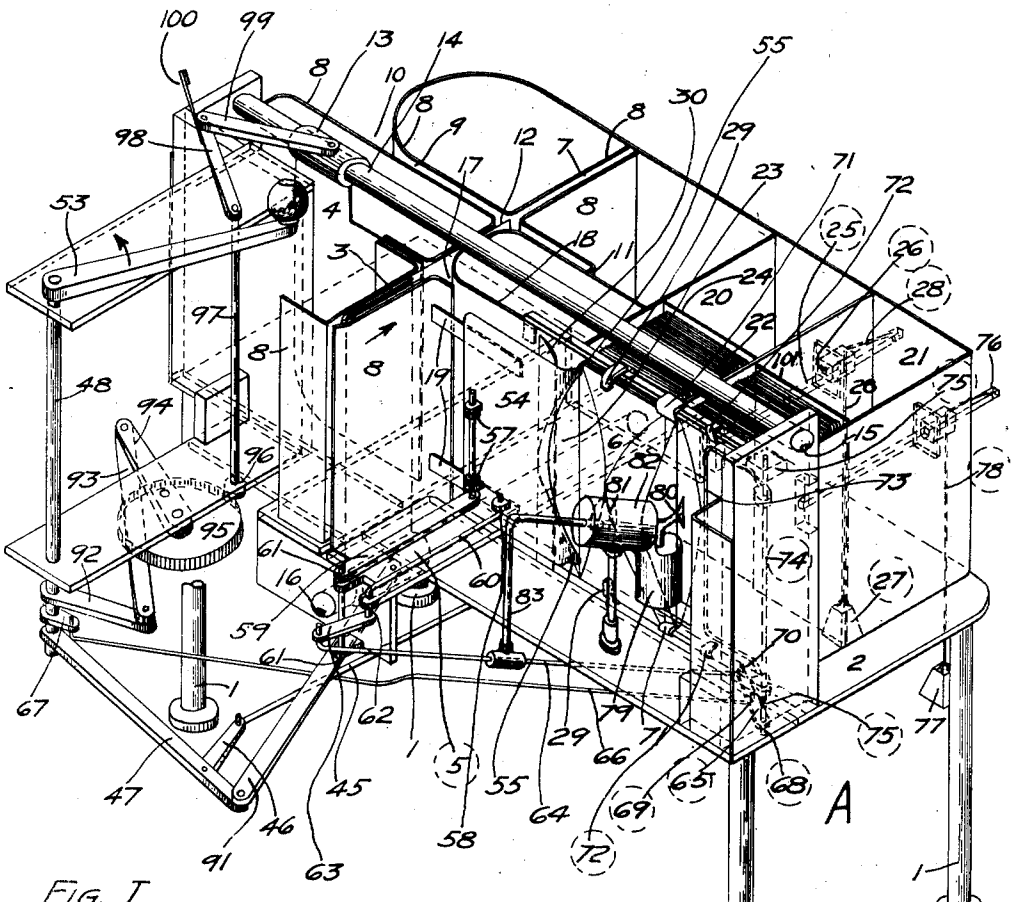


FIG. I

INVENTOR

by Symmestvedt & Lechner

ATTORNEYS

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Original Filed Oct. 10, 1921 4 Sheets-Sheet 2

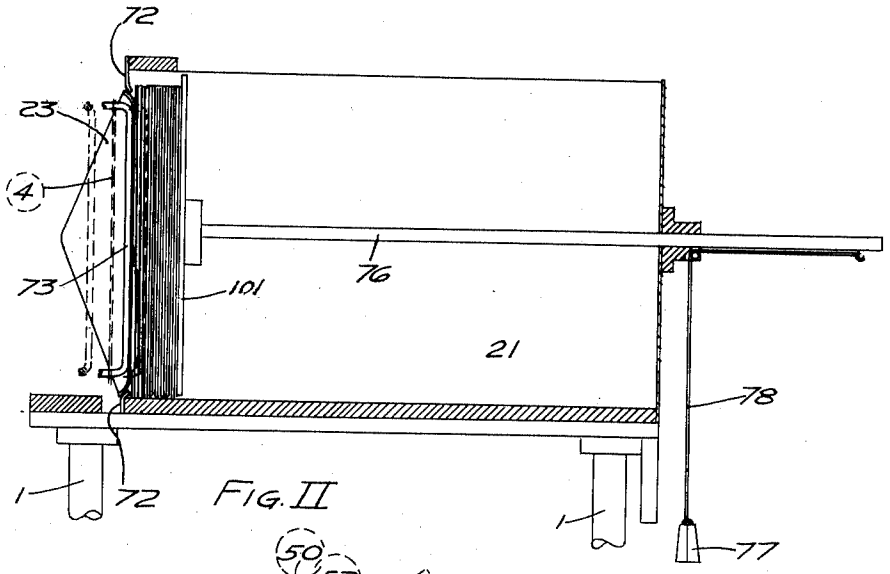


FIG. II

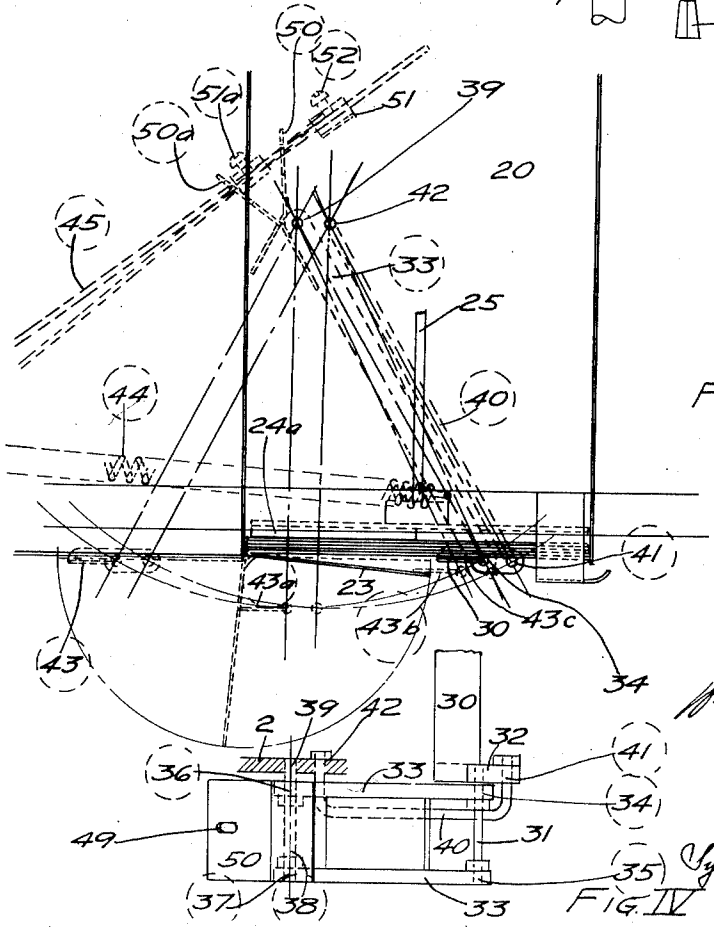


FIG. III

FIG. IV

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Sept. 6, 1927. 1,641,406

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MAIL HANDLING MACHINE

Original Filed Oct. 10, 1921 4 Sheets-Sheet 3

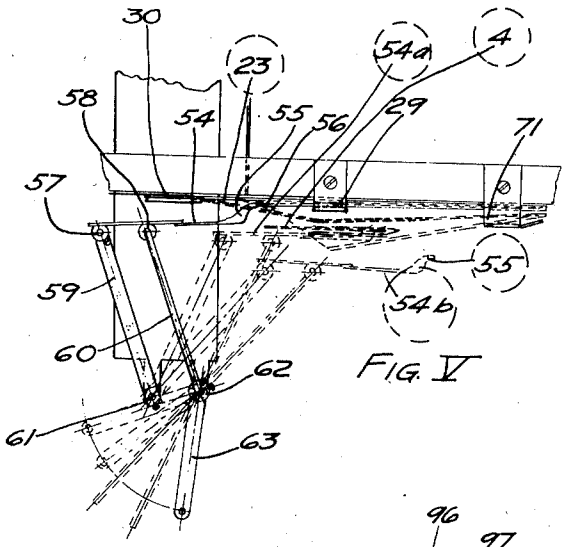


FIG. V

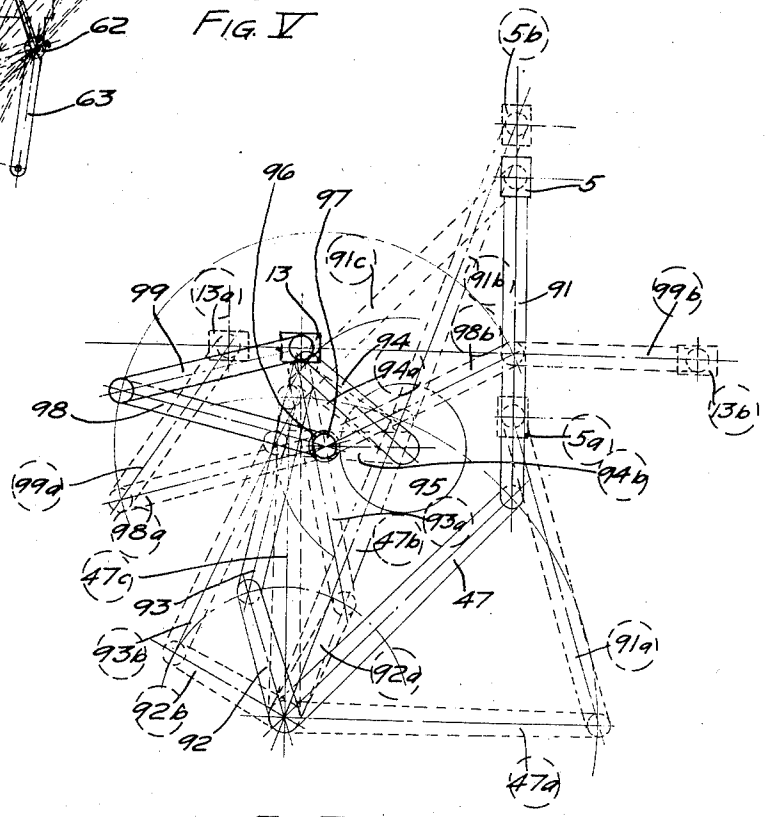


FIG. VI

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Sept. 6, 1927. 1,641,406

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MAIL HANDLING MACHINE

Original Filed Oct. 10, 1921 4 Sheets-Sheet 4

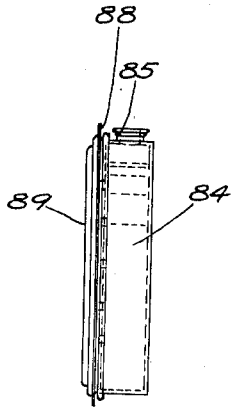


FIG. VII

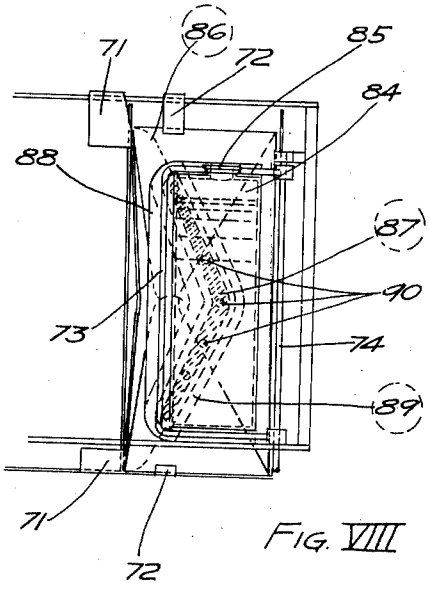


FIG. VIII



FIG. IX



FIG. X

INVENTOR

BY Symmestvedt & Lechner

ATTORNEYS

Patented Sept. 6, 1927. 1,641,406

UNITED STATES PATENT OFFICE.

WILLIAM H. ALDEN, JR., OF BRYN ATHYN, PENNSYLVANIA.

MAIL-HANDLING MACHINE.

Application filed October 10, 1921, Serial No. 506,800. Renewed February 7, 1927.

This invention relates to mail handling machines and particularly to a machine of this character which is capable of folding a letter or circular, inserting it into an envelope and in sealing the envelope so loaded.

The primary object of this invention is to so improve machines of this nature as to render them practically fool proof in operation through simplicity of construction, the machine of this invention, by comparison to other machines of a similar nature, being exceedingly simple both in its principles of operation and in the number of parts of which it is composed and in the character of their movements. This simplicity gives a maximum amount of positiveness and certainty in the performance of its functions.

Briefly described I provide a machine of the following general arrangement. Two envelope containing compartments having one end open are disposed in substantially parallel planes immediately adjacent to each other and each compartment is adapted to hold a stack of envelopes. One compartment feeds the envelopes forwardly toward the open end by means of a suitable pushing device and the other compartment receives the envelopes with the matter inserted therein through its open end and holds them in a stacked position by means of a similar pushing device which yields slightly as the envelopes accumulate in this compartment. The open ends of the two compartments are disposed in substantially the same transverse plane and in order to get an envelope from the feeding compartment to the receiving compartment it is only necessary to slide it from the open face of the one compartment to the open face of the other without its traversing any extended route from the one to the other. This is a feature which enables me to provide an unusually compact machine.

The letter or circular folding mechanism comprises one or more reciprocating blades operating in die-like slots in a manner to be hereinafter particularly described. The number of blades is dependent entirely upon the number and character of the folds it is desired to impart to the matter being handled. The blade which imparts the final fold is arranged in a plane which is substantially at right angles to the planes of the two compartments just mentioned but the envelopes in the compartments are disposed in planes which are parallel to the plane of this blade which imparts the final fold and the outermost envelope in each compartment is immediately adjacent the path of movement of such blade. The final folding blade after it has accomplished its folding function is arranged to move across the faces of the two envelope compartments, passing first the feeding compartment and then advancing toward the receiving compartment on its outward stroke as will appear more clearly hereinafter.

The envelopes are fed forward in the feeding compartment with their flaps closed and the first operation in connection with the envelopes is to open the flap of the outermost envelope in the feeding compartment. Suitable mechanism is provided for accomplishing this and after its accomplishment another element which I have termed a back opener comes in to play to open the back of the envelope and at the same time remove it from the feeding stack and hold it directly in the path of movement of the final folding blade. This blade, carrying the finally folded matter, then advances and enters the envelope so opened and held by the back opener and thereby inserts the folded matter therein. The blade then continues its motion toward the receiving stack carrying the loaded envelope from off the back opener and placing it in front of the envelope receiving compartment. Here the envelope and its contents are retained by suitable holding devices while the blade is withdrawn to its initial or folding position at the other end of its stroke. It should be borne in mind at this point that the envelope has been moved from one stack to the other with its flap in a straight out position parallel with the face of the envelope and as it stands in front of the receiving stack the flap still retains this position. A suitable pushing device now comes into operation which forces the loaded envelope out of the plane of the moving blade and into the receiving stack. As the envelope is forced past the edge of the open end of the compartment its flap is pushed backwardly away from the face of the envelope until it assumes a position at right angles to the face of the envelope.

Suitable means is provided for applying moisture and when the next envelope is transferred from the feeding stack to the receiving stack it catches the flap of the preceding envelope and folds it down against the back of said preceding envelope. The cycle of operations is thus completed and the details of the various mechanisms mentioned will be considered below.

An additional object of prime importance contemplated by my invention is the provision of a single oscillating operating shaft for imparting the necessary motions to all of the devices above mentioned. There are no complicated gear or roll relations, all of the motions being of a simple oscillating or swinging type.

Additional objects and advantages will appear in connection with the following description relating to the accompanying drawings which illustrate my invention in preferred form.

Figure 1 is an isometric view of the complete machine; Figure 2 is a sectional view of that portion of the machine which is designed to receive, seal and stack the loaded envelopes; Figure 3 is a detailed view of the flap opening mechanism; Figure 4 is a partial side view of the mechanism of Figure 3 showing the construction in greater detail Figure 5 is a detailed view of the mechanism for opening the backs of the envelopes and pulling them away from the delivery or feeding stack: Figure 6 is a diagrammatic plan view of the levers and connecting links which operate the two principal motions; Figure 7 is a side view of an alternate envelope moistening device; Figure 8 is a face view of the device of Figure 7; Figure 9 illustrates what is meant by a Z fold and Figure 10 what is meant by an over and over fold.

Referring to the drawings and particularly to Figure 1 the machine, indicated as a whole by the reference character A, comprises the legs 1 and the table 2. In the machine illustrated the folding of the paper is accomplished by means of two blades 3 and 4 mounted for reciprocation in planes which cross each other substantially at right angles. The blade 3 is rigidly secured to a sliding member 5 mounted to reciprocate upon the guide rod 6 and arranged so that in its reciprocation it moves backward and forward in a slot 7 formed between suitably arranged pieces of sheet metal 8. The initial position of the blade 3 is at the back of the slot 7 and the sheet of paper to be folded is first placed in the slot 9 also formed by pieces of sheet metal 8 but arranged in a plane which is substantially at right angles to that of the slot 7. The outer or entrance end of the slot 9 is bell-mouthed as indicated at 10 in order to facilitate the entrance of the paper and the inner end of the slot 9 is closed by means of a suitably formed abutment or stop 11 which can take the form of a bend in one of the sheet metal pieces 8 or of an independent adjustable member capable of movement toward or away from the line of intersection between the slots 7 and 9 for the purpose of varying the initial fold to suit individual requirements or conditions. The blade 3 is shown in its forward position with a sheet of paper 12, either a letter or a circular, bent around it. This paper was first placed in the slot 9 transversely of the slot 7, but as the blade 3 moves forwardly it drags the paper with it into the position illustrated in Fig. 1 thereby giving the paper its initial fold and the crease in this instance being approximately one third of the distance from an end of the sheet. The mechanism for imparting the necessary reciprocating motion to the blade 3 will be described in detail hereinafter.

The sheet of paper is now ready to be acted upon by the second folding blade 4 for the purpose of imparting the second and in this case final fold. The blade 4 is mounted upon the sliding member 13 which travels back and forth along the guide rod 14. It should be noted that this sliding member as well as the sliding member 5 previously mentioned are prevented from turning on their respective guide rods by means of suitable keys running in the key ways 15 and 16. The blade 4 is illustrated in Figure 1 in its initial or retracted position at the left of the machine. As it slides forwardly along the guide rod 14 the sheet 12 is forced through the folding slot 17 and the final fold imparted. In the arrangement of slots illustrated the sheet of paper has then been given what I term a Z fold as illustrated in Figure 9. By moving the abutment 11 sufficiently far away from the intersection of the slots 7 and 9 it is possible to make the initial fold one third of the distance down the sheet from the other end than that which is illustrated and in such case the second fold would give what is termed an over and over fold as illustrated in Figure 10. The Z fold is commonly used where it is desired to have the address show through an envelope with a transparent front but otherwise the most common fold is the over and over fold.

It is desired to call attention to the fact that the blade 4 has a very long stroke upon the guide rod 14 much longer in fact than is necessary merely to impart the last fold. The reason for this is that the second or final folding blade is designed to perform other functions which it will be noted are accomplished by a single stroke and in the shortest possible operating space. After being forced through the slot 17 the sheet of paper is carried along the face of the

partition 18 between it and the guides 19 to a position in front of the envelope feeding compartment 20 at which point it is entered into an envelope opened and held in proper position by means of mechanism to be described later. From this point onward as the movement of the blade 4 continues the loaded envelope is carried from its position in front of the feeding compartment 20 to a position in front of the receiving compartment 21. When this is accomplished the blade is withdrawn and the moistening and sealing operations take place as will also appear hereinafter.

The stack of envelopes 22 is placed in the feeding compartment with the flaps 23 closed or in other words in the normal position in which envelopes are prepared by the manufacturer. The tops of the envelopes are toward the approaching blade 4 so that the flap opening is away from said blade. A follower plate 24, acted upon by means of the rod 25 arranged to slide in an opening 26 in the back of the compartment and the weight 27 which acts to push the rod forwardly through the medium of the cord 28 serves to advance the envelopes in the compartment as the outermost one is loaded and removed. Retaining shoulders 29 serve to prevent the envelopes from being pushed out into the path of the blade 4 except as they are needed and removed by the proper mechanism.

Before the outermost envelope is removed from the stack in the feeding compartment its flap 23 is opened by the flap opening blade 30 the details of the operation of which will now be described particular reference being had to Figures 3 and 4. This mechanism is on the underside of the table 2 the blade 30 projecting upwardly therefrom. A shaft 31 is rigidly secured to the base 32 of the blade 30. A link 33 embraces the shaft 31 at two points having bearings 34 and 35. The other end of this link is pivoted at 36 and 37 to the shaft 38 which is rigidly secured to the frame or table 2 at the point marked 39. A tie rod 40 of the same length as the link 33 is pivoted to the base 32 of the blade 30 at the point 41 and to the table 2 at the point marked 42. The distance between the pivot points 34 and 41 at the base of the blade is equal to the distance between the pivot points 39 and 42 and a line drawn through the centers of the pivots 39 and 42 would be substantially parallel to the face of the envelope to be opened and since the blade is also disposed in a plane which is substantially parallel to the face of the envelope it will be seen that throughout its entire range of movement the flap opening blade will be at all times parallel to the face of the envelope or substantially so. The normal position of the flap opening blade is indicated at 43 in which position it is held by means of a spring 44 one end of which is attached to the link 33 and the other end to some point on the frame or table of the machine.

The drive rod 45 for the operation of this mechanism is pivotally connected to an extension 46 of the crank 47 and the crank 47 is rigidly secured to the main driving shaft 48. Oscillation of the shaft 48 therefore imparts a reciprocatory motion to the rod 45 which slides through a slotted opening 49 in an extension member 50 rigidly secured to the link 33. The slot 49 permits free sliding movement of the rod regardless of the varying angularity between it and the extension member. A stop 51 is adjustably secured by means of the set screw 52 to the rod 45 at a point on the outside of the extension member 50 or on the side away from the operating shaft 48.

The shaft 48 is provided with a main operating crank 53 the movement of which is of an oscillatory character and the extent of which is approximately a quarter of a revolution in each direction. As the main crank is moved in the direction of the arrow in Figure 1, the rod 45 is first pushed through the opening 49 in a direction away from the shaft 48 and then afterward as the motion of the crank 53 is continued and toward the end of its stroke the rod 45 is pulled a considerably greater distance toward the main shaft 48 and as this movement takes place the adjustable stop 51 comes into contact with the extension member 50 thereby swinging the link 33 around the pivot 39 until the flap opening blade assumes in turn the positions indicated at 43^a, 43^b, and 43^c. The position 43^c is reached when the crank 53 has swung to its extreme limit of travel on the backward stroke indicated by the arrow in Figure 1. During the return stroke of the crank 53 and particularly during the initial portion of the return stroke the rod 45 moves the stop 51 away from the extension member 50 and thereby permits the spring 44 to return the flap opening blade 30 and its associated parts to their normal positions in which position they remain for the greater part of the cycle of operations. When the flap opening blade is in the position indicated at 43^c the adjustable stop 51 is in the position indicated at 51^a and the extension member 50 at the position indicated by the reference character 50^a.

In its movement from the position at 43 to the position at 43^c, the flap opening blade first passes over the outside of the flap pressing it against the back of the envelope and afterwards moving slightly beyond the tip of the flap as clearly indicated in Figure 3. The flap is then free to project forwardly slightly from the back of the envelope as also clearly indicated in this figure this action being brought about by the natural

tendency of the flap to spring away from the envelope and also somewhat by the projection 24ª on the follower plate 24. It will be noticed that the extension 24ª is on the front part of the follower plate 24 or on that part which comes opposite the flap of the envelope and it acts against the pressure of the flap opening blade at the lower portion of the envelope. By means of this arrangement the flap opening blade on its return stroke under the influence of the spring 44 catches under the bottom of the flap as indicated by the position 43ᵇ and as its motion continues it swings the flap into an open position and holds it in a straight out position against the partition 18 in a plane which is substantially parallel to the face of the envelope. In this position the blade 30 and the flap are to the inside of the path of movement of the blade 4 so that the blade 4 will not be interfered with in its motion across the compartments 20 and 21.

The next step in the process of loading an envelope is that which I have termed the back opening step. In other words it is not sufficient to merely open the flap of an envelope but the back also must be spread open slightly so that the blade 4 carrying the folded sheet 12 can readily enter therein. The mechanism by which this is accomplished is illustrated in detail in Figure 5 to which reference should be made as well as to Figure 1.

The back opener comprises a main or body portion of a blade-like character 54 provided at its opposite corners on one side with flexible tips 55. The flexible tips are preferably made of a metal having a slight spring. After the flap has been opened these strips are made to enter the back of the envelope as indicated at 56 in Figure 5. The back opener is pivotally mounted at 57 and 58 upon a pair of parallel links 59 and 60, the outer ends of which are pivoted respectively at 61 and 62, the distance between pivot 57 and pivot 61 being equal to the distance between pivot 58 and pivot 62. Pivots 61 and 62 are fixed pivots on the frame of the machine. This manner of mounting the back opener is practically identical with that in which the flap opening blade was mounted and it will be seen that the back opener remains at all times substantially parallel to the face of the envelope. Crank 63 is fixedly secured to the link 60 and swinging motion is imparted to the back opener through the medium of this crank, the rod 64, the crank 65, the rod 66 and the crank 67 which latter is adjustably secured to the main operating shaft 48. Parts 64 to 67 inclusive are clearly shown on Figure 1, the crank 65 being pivoted to the frame at the point marked 68 and the rod 66 being pivoted to the crank 65 at the point marked 69 located between pivot 68 and pivot 70, the latter being for the rod 64.

The back opener is in the position indicated in full lines in Figure 5 when the main operating crank 53 is in the position indicated in Figure 1. As the crank 53 is moved backward in the direction of the arrow it will be seen that the back opener will move toward the envelope and at the same time will swing slightly inward thereby insuring that the flexible tips 55 come in contact with the inside of the envelope and then slip under the back. As the motion progresses the back opener is swung away from the stack of envelopes and the tips pull outwardly thus opening the envelope and pulling it from the stack out from beneath the retaining shoulders 29, the flap being still held out of the way by the flap opening blade. This position is indicated in dotted lines in Figure 5 at the point marked 54ª. The envelope is now ready to receive the folded sheet which is at this time inserted by the blade 4, the envelope having been pulled from the stack and held in the path of such blade 4. As the blade 4 continues in its travel toward the receiving stack it carries with it the envelope and its contents, the flap being drawn out from under the flap opening blade and the envelope being slid off of the back opener so that the back opener is free to swing to its extreme position indicated at 54ᵇ in Figure 5. In this position the back opener is out of the way of the flap opening blade which at this time in the manner previously described moves forwardly and then backwardly to open the flap of the next succeeding envelope.

The blade carries the envelope and its contents as before stated to a position in front of the receiving compartment and the blade is then withdrawn, the envelope and its contents being held in this extreme position by means of the stops 71 which are bent backwardly at the tips to engage the opening in the back of the envelope and thereby restrain the envelope or its contents from any tendency to follow the folding and inserting blade 4 on its return motion.

After the flap opener has operated and the inserting blade has returned to its initial position at the far end of the machine the back opener swings into position ready to operate on the next envelope and at the same time that this is taking place a pressing operation is being accomplished at the receiving stack whereby the envelope placed in position in front of said stack or compartment is forced under the retaining clips 72.

The pushing device consists of a swinging frame 73 pivoted upon the rod 74 so as to swing inwardly and outwardly much after the manner of a door. The rod is trunnioned above and below in bearings 75 and

the frame is rigidly secured to the rod. The rod 74 passes down through the pivot point 68 and is rigidly secured to the crank 65 so that motion of said crank moves the frame 73.

As the envelope is forced into the receiving compartment the flap, which it will be remembered is in a straight out position parallel with the face of the envelope, is caught by the edge of the compartment and moved or swung around until it assumes a position substantially at right angles to the face of the envelope as clearly shown in Figure 2. In this position it remains while the moisture is applied in a manner to be described below and when the blade 4 next advances carrying the next envelope and its contents this flap is caught by the succeeding envelope and forced back down against the back of the envelope.

The receiving compartment is provided with a follower plate 101, a pushing rod 76 and a weight 77 operating through the cord 78 of practically identical character with the corresponding parts in the feeding compartment. The envelopes in the receiving compartment are therefore always held under tension which aids in causing the flap to become securely stuck as each envelope is pushed into position.

I have illustrated two forms of moistening apparatus. In the showing of Figure 1 there is a small supply receptacle 79 for the water which is provided with a spraying nozzle 80 directed to spray moisture on the back of the envelope over substantially the area which is to be covered by the gummed portion of the flap. The spray is created on the principle of the atomizer and the air pressure for which is obtained by reciprocation of the piston 81 in the cylinder 82, the piston being mounted upon a rod 83 bent so as to be secured upon the rod 64; all as clearly shown in Figure 1. It will be seen that the spraying takes place while an envelope is being forced under the clips 72.

The other form of moistening device is illustrated in Figures 7 and 8. Secured to the frame 73 is a suitable receptacle or tank 84 provided with a filler opening 85. In Figure 8 the flap of the envelope is indicated by the dotted line 86 and the gummed area by the shaded area 87. A piece of felt 89 is clamped between a plate 88 and the back of the receptacle 84. The plate 88 is provided with an opening corresponding in shape to the opening in the tank and the plate is very firmly pressed against the tank so that the felt 89 protrudes toward the envelope through the opening in the manner indicated in Figure 7. The felt opposite the opening in the plate 88 is moistened by a series of small holes in the side of the compartment 84 indicated by the reference character 90. The moistening of the felt is confined to the portion opposite the opening in the plate by virtue of the pressure exerted by the plate on the remaining portion of the felt and it will, therefore, be seen that when the pusher operates to push the envelope into the receiving compartment the moistened portion of the felt corresponding to the gummed area on the flap will come in contact with the back of the envelope and properly moisten it to receive the gummed portion of the flap as it is turned down by the next forward stroke of the inserting blade 4, as already described.

An analysis of the motions incident to the operation of the machine will now be undertaken reference being had particularly to Figure 6 and also of course to Figure 1. In my machine it should be noted at this point, each of the motions going to make up the complete cycle of operations is a reciprocating motion and the method of imparting this type of motion has been greatly simplified by my invention and this through the adoption of an oscillating main driving shaft 48. This drive shaft has a rotary motion of approximately a quarter of a turn first in one direction and then in the other and the motion is imparted by the crank 53 as has been previously pointed out. In my construction therefore cams, intermittent gears, etc., usually found in machines of this character are eliminated all of which enables me to provide an exceedingly compact and efficient machine.

The sliding member 5 carrying the first folding blade 3 receives its motion through crank 47 and link 91. The knife 3 is shown in its extreme forward position in Figure 1 and this position is the position indicated in dotted lines in Figure 6 at 47^a, 91^a and 5^a. As the main crank 53 is moved in the direction of the arrow in Figure 1 the blade 3 will move to the far side of the slot 7 until it clears the edge of the slot 9 and this position is indicated in full lines in Figure 6 at 47, 91 and 5. Further movement of the main crank 53 in the direction of the arrow will bring these parts to the position indicated in Figure 6 at 47^b, 91^b and 5^b and when the crank 53 has reached its extreme rearward position these same parts will assume the location indicated in Figure 6 at 47^c and 91^c, the sliding member 5 in this instance assuming the same position as it would have with the parts as indicated in full lines. It will, therefore, be noted that throughout the last half of the stroke of the main crank 53 in the direction indicated by the arrow in Figure 1 and throughout the first half of the return stroke, the sliding member 5 and consequently the blade 3 which it carries will remain to all practical purposes substantially stationary there being simply a slight retrograde movement to the position 5^b and then back again to the position 5. During the final half of the return stroke of the

crank 53 the blade will be advanced to the dotted line position at 5^a and the sheet of paper which had previously been placed in the slot 9 will have received its initial fold and the machine will be in the condition illustrated in Figure 1.

The second folding blade 4 mounted upon the sliding member 13 receives its motion from the same main shaft 48 and crank 53 through the medium of the crank 92 fixed to the shaft 48, the link 93, crank 94, gear 95, pinion 96, shaft 97, crank 98 and link 99. With the machine in the condition shown in Figure 1 the parts just mentioned are in the positions indicated in Figure 6 by the reference characters 92^a, 93^a and 94^a with the crank 98 and the link 99 in substantially the positions shown in full lines in this figure. (The dotted line position of the crank 98 and of the link 99 which corresponds exactly to the position 92^a of the crank 92 are not shown in order not to complicate the drawing too greatly.) During the first half of the stroke of the crank 53 in the direction of the arrow in Figure 1 these parts are brought to the positions indicated in full lines in Figure 6, the sliding member 13 having been brought slightly backward to the position indicated at 13^a by means of the crank 98 and the link 99. The two latter members are then in the position indicated at 98^a and 99^a. It will therefore be seen that during the first half of the stroke of the crank 53 the sliding member 13 and the blade 4 which it carries have remained practically stationary except for the slight movement to the rear and then forwardly again just mentioned. It is during this portion of the stroke that the sliding member 5 and the blade 3 are performing their functions. It will be seen that during approximately the first quarter of the stroke of the crank 53 the gear 95 is rotated clockwise and the pinion 96 counterclockwise but during the last three quarters of the stroke the gear 95 is rotated counterclockwise and the pinion clockwise. From the position indicated in full lines in Figure 6 the parts under consideration move to the positions indicated in dotted lines at 92^b, 93^b, 94^b, 98^b, 99^b and 13^b. At this time the folding blade 4 has been advanced to its extreme forward position after having imparted the second fold to the paper at the slot 17, inserting the letter into the envelope in front of the feeding compartment 20 and depositing the envelope with its contents in front of the receiving compartment 21.

There is a four to one ratio between the gear 95 and the pinion 96 but by virtue of the relation between cranks 92 and 94 and link 93 a quarter revolution of the crank 53 will produce only approximately an eighth of a revolution in the gear 95 and approximately a half revolution in the pinion 96 as well as in the shaft 97 the latter imparting its motion to the crank 98 and the link 99. In this way I am able to provide for the long stroke necessary for the blade 4 to accomplish its various functions. The crank 98 is provided with a stop 100 so that when the blade 4 is in its extreme forward position there is no danger of the crank 98 and the link 99 going past the center of the straight out position to the other side. The return of the blade 4 to the position indicated in Figure 1 is, of course, accomplished upon the reverse stroke of the crank 53.

Briefly summarizing the sequence of operations is as follows. The sheet to be folded is of course placed in the slot 9 and when this is done the blade 3 is at the far side of the slot 7 opposite to the position indicated in Figure 1; the blade 4 is at its extreme forward position in front of the receiving compartment also opposite to the position indicated in Figure 1; the back opener is in the position indicated at 54^b in Figure 5; and the flap opener is at the position indicated at 43^c just about ready to be pulled back by the spring 44 to its position at 43. The crank 53 under these circumstances is, of course, at its backward extreme of travel opposite to the position indicated in Figure 1 and after the sheet has been inserted in the slot 9 it is brought forward in a clockwise direction. During the first part of its forward stroke the blade 3 remains substantially stationary in the slot 7 while the blade 4 is brought all the way back to the position indicated in Figure 1 and during the last portion of the forward stroke the blade 3 moves across the slot 9 to impart the initial fold while the blade 4 remains substantially stationary. In the meantime the flap opener has as stated, assumed the position at 43 in Figure 3 and the back opener is about to begin its forward motion from the position indicated in full lines in Figure 5 to that indicated in dotted lines at 54^a. (It should be here stated that after the blade 4 was retracted the back opener was caused to assume the position indicated in full lines in Figure 5.) During the initial movement of the stroke of the crank 53 in the direction of the arrow of Figure 1 the blade 3 is retracted to its position at the far side of the slot 7 while the blade 4 remains substantially stationary and during the last portion of the stroke of the crank 53 in the direction of the arrow in Figure 1, the blade 4 advances, folds the paper at the slot 17 and then passes on to insert it in the envelope now being held out and open by the back opener and then transfers the loaded envelope to a position in front of the receiving stack 21 all as previously stated and described. The pushing device of course is caused to operate just after the blade 4 is retracted and it is moved

to a position out of the way of the blade 4 just prior to the time that the blade 4 is advanced.

I claim:

1. In a mail handling machine, the combination of an envelope feeding stack, an envelope receiving stack, means for inserting a letter into an empty envelope and carrying the loaded envelope to the receiving stack, and means for sealing the envelope while in the receiving stack.

2. In a mail handling machine, the combination of an envelope feeding stack, an envelope receiving stack, means for opening the flap of an envelope while in the feeding stack, means for inserting a letter into the envelope so opened and carrying the loaded envelope to the receiving stack with the flap open, means for causing the flap to assume a position substantially at right angles to the face of the envelope and projecting outwardly from the receiving stack, and means for causing the succeeding envelope to close said flap as it is carried to the receiving stack.

3. In a mail handling machine, the combination of an envelope feeding stack, an envelope receiving stack, a letter folding blade having a reciprocatory motion across the faces of said stacks which is adapted to insert a letter into an envelope and carry the loaded envelope to the receiving stack.

4. In a mail handling machine, the combination of an envelope feeding stack, an envelope receiving stack, means for opening the flap of an envelope while in the feeding stack, means for opening the back of the envelope, means for inserting a letter into the envelope so opened and carrying the loaded envelope to the receiving stack with the flap open, means for causing the flap to assume a position substantially at right angles to the face of the envelope and projecting outwardly from the receiving stack, and means for causing the succeeding envelope to close said flap as it is carried to the receiving stack.

5. In a mail handling machine, the combination of an envelope receiving stack to receive the loaded but unsealed envelopes with the flap projecting outwardly substantially at right angles from the back, means for moistening substantially that portion of the envelope which comes under the gummed area of the flap, and means for closing the flap against said moistened area to seal the envelope.

6. In a mail handling machine, the combination of an envelope receiving stack to receive the loaded but unsealed envelopes with the flap projecting outwardly substantially at right angles from the back, means for carrying a loaded envelope across the face of said stack, and means for moistening substantially that portion of the envelope which comes under the gummed area of the flap, the flap of an envelope so moistened being closed by the next envelope to be moved across the face of the receiving stack.

7. In a mail handling machine, the combination of an envelope feeding stack, and an envelope receiving stack, a reciprocating letter folding blade operating across the faces of said stacks, means for retaining the envelopes in said stacks out of the path of movement of said blade, means for pulling the outside envelope from off the feeding stack and holding it in the path of movement of said blade, said blade being adapted to insert a letter into said envelope and carry the loaded envelope to the receiving stack, and means for pushing the loaded envelope into the receiving stack until it is engaged by the envelope retaining means.

8. In a mail handling machine the combination of an envelope feeding stack, a letter folding blade adapted to reciprocate across the face of the said feeding stack, and a member for removing the outermost envelope from the stack and holding it in the path of movement of the blade, said blade being adapted to insert the letter into the envelope.

9. In a mail handling machine, the combination of a reciprocating letter folding blade, an envelope feeding stack out of the path of movement of said blade, the blade, however, being arranged to move across the face of the stack, an envelope flap opening blade adapted to open the flap of an envelope by transverse motion across the back thereof and to hold the flap in a straight out position parallel with the body of the envelope and out of the path of movement of the blade, and an envelope back opening device adapted to move the body of the envelope from the feeding stack into the path of movement of the blade, said blade being adapted to insert the folded letter into the envelope so held.

10. In a mail handling machine, the combination of envelope feeding mechanism, envelope receiving mechanism, and a reciprocating blade adapted to fold a letter, insert it into an envelope and transfer the loaded envelope from the feeding mechanism to the receiving mechanism.

11. In a mail handling machine, the combination of an envelope feeding stack, a reciprocating letter folding blade, means for opening the envelope flap, and a member entering the back of the envelope to open the same, pull it from off the stack and hold it in the path of movement of the blade, said blade being adapted to insert a letter into said envelope while so held and to carry the loaded envelope from off the back opening member.

12. In a mail handling machine, the combination of oscillating letter folding blades,

an oscillating envelope flap opening member, an oscillating envelope back opening member, an oscillating moistening device, a sealing device, and an oscillating operating shaft from which each of said members or devices receives its motion.

13. In a mail handling machine, the combination of letter folding mechanism, envelope flap opening mechanism, envelope back opening mechanism, and letter inserting mechanism, each of said mechanisms being adapted to accomplish its function through a member having oscillatory movement.

14. In a mail handling machine, the combination of letter folding mechanism, envelope flap opening mechanism, envelope back opening mechanism, and letter inserting mechanism, each of said mechanisms being adapted to accomplish its function through a member having oscillatory motion, and a common means for actuating all of said mechanisms.

15. In a mail handling machine, the combination of an envelope receiving stack adapted to receive the loaded but unmoistened envelopes with the flap projecting outwardly substantially at right angles from the back, and moistening apparatus, the flap of a moistened envelope being closed to seal the same while in the envelope receiving stack.

16. In a mail handling machine, the combination of an envelope receiving stack adapted to receive the loaded but unsealed envelopes with the flap projecting outwardly substantially at right angles from the back, means for carrying a loaded envelope across the face of said stack, and a moistening device, the flap of a moistened envelope being closed to seal the same by the next envelope to be moved across the face of the receiving stack.

17. In a mail handling machine, the combination of a reciprocating letter folding blade, an envelope feeding stack arranged and constructed to force the envelopes toward the path of movement of said folding blade, means restraining the envelopes, and a member for removing each outermost envelope in turn and holding it in the path of movement of said folding blade.

18. In a mail handling machine, the combination of an envelope receiving stack adapted to receive the envelopes with the flap open, a moistening device, means for applying pressure to the back of the stack, means for closing the flap after the moisture has been applied, and means for retaining the envelopes in the stack against said pressure whereby the flap is caused to firmly adhere.

19. In a mail handling machine the combination of an envelope feeding stack, an envelope receiving stack adjacent to and parallel with said feeding stack, means for removing the outermost envelope from the feeding stack with the flap in a straight out position parallel with the face of the envelope, means for sliding such envelope across the stacks into position before the receiving stack, means for forcing the envelope into the receiving stack and at the same time moving the flap to a right angled position with the face of the envelope, and means for closing the flap.

20. In a mail handling machine the combination of an open-ended envelope feeding compartment adapted to hold a stack of envelopes, means for pressing the stack forwardly, means for retaining the outermost envelope, and means for opening the flap of the outermost envelope while in the stack to a position parallel with the face of the envelope.

21. In a mail handling machine the combination of an open-ended envelope feeding compartment adapted to hold a stack of envelopes, means for pressing the stack forwardly, means for retaining the outermost envelope, means for opening the flap of the outermost envelope to a position parallel with the face of the envelope, and means entering the back of the envelope to open the same and also to carry it from off the stack.

22. In a mail handling machine the combination of an open-ended envelope feeding compartment adapted to hold a stack of envelopes, means for pressing the stack forwardly, means for retaining the outermost envelope, means for opening the flap of the outermost envelope to a position parallel with the face of the envelope, an open-ended envelope receiving compartment adapted to hold a stack of envelopes, means for transferring an envelope from the feeding compartment to a position in front of the receiving compartment, and means for pressing the envelope into the receiving compartment, the flap on said envelope being at the same time moved to a right angled position with respect to the face of the envelope by contact with the edge of the receiving compartment as it is pressed therein.

23. In a mail handling machine, the combination of an envelope receiving compartment in front of the open end of which an envelope is adapted to be placed with its flap in a straight out position, substantially parallel with the face of the envelope, and means for pressing the envelope into the receiving compartment, the flap being moved to a right angled position with respect to the face of the envelope by contact with the edge of the receiving compartment as it is pressed therein.

24. In a mail handling machine, the combination of an envelope receiving compartment for receiving the envelopes with the flaps projecting outwardly substantially at right angles from the back, and means for

carrying an envelope across the face of said compartment, the outstanding flap of the last envelope to have been placed in the compartment being closed by the envelope which is being moved across the face of said compartment.

25. In a mail handling machine, the combination of an envelope feeding stack, an envelope receiving stack, a blade having a reciprocatory motion across the faces of said stacks which is adapted to carry the envelope from the feeding stack to the receiving stack.

In testimony whereof, I have hereunto signed my name.

WM. H. ALDEN, JR.