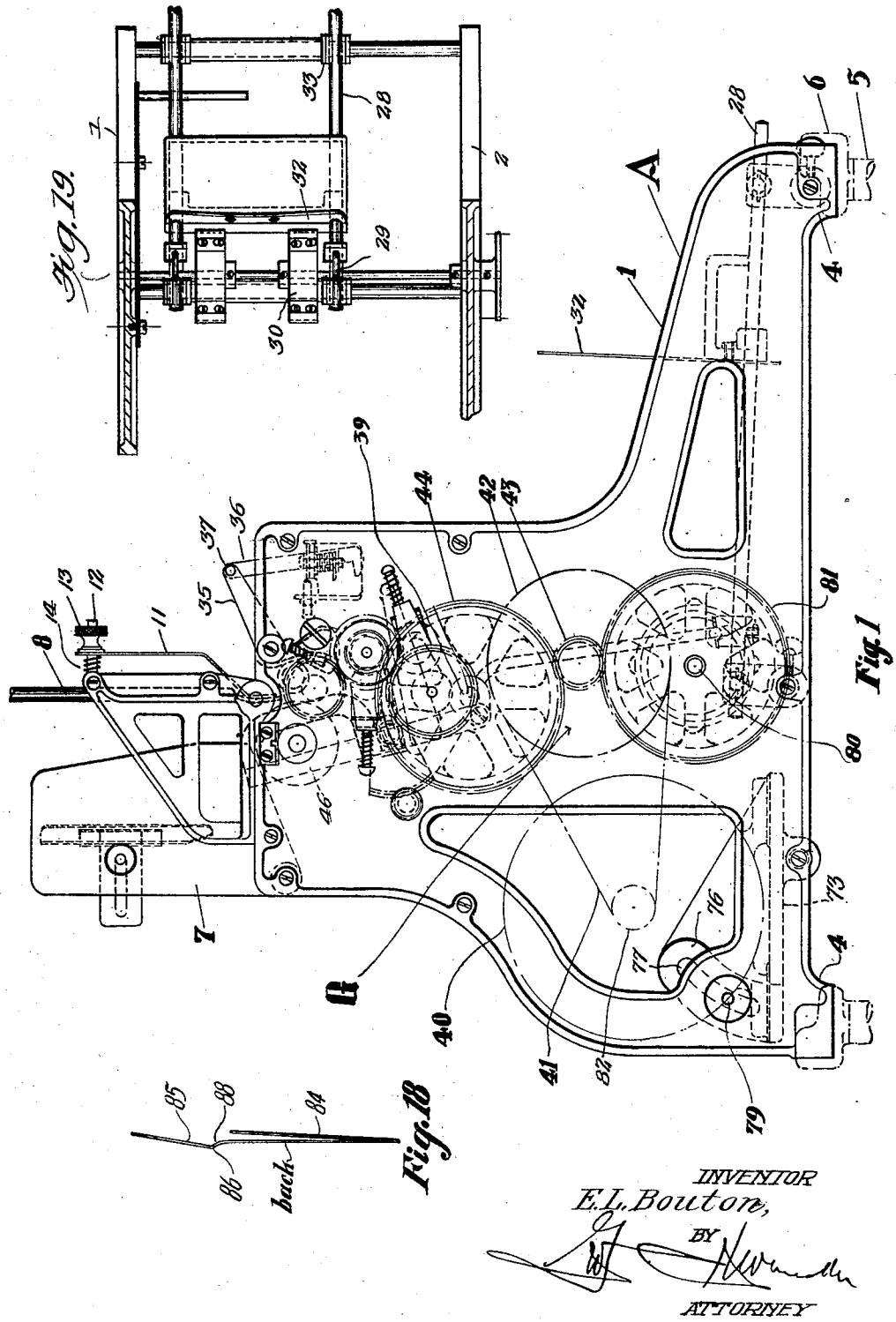
April 28, 1931. E. L. BOUTON 1,803,050

ENVELOPE OPENING MACHINE

Filed Nov. 16, 1928 4 Sheets-Sheet 1



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ENVELOPE OPENING MACHINE

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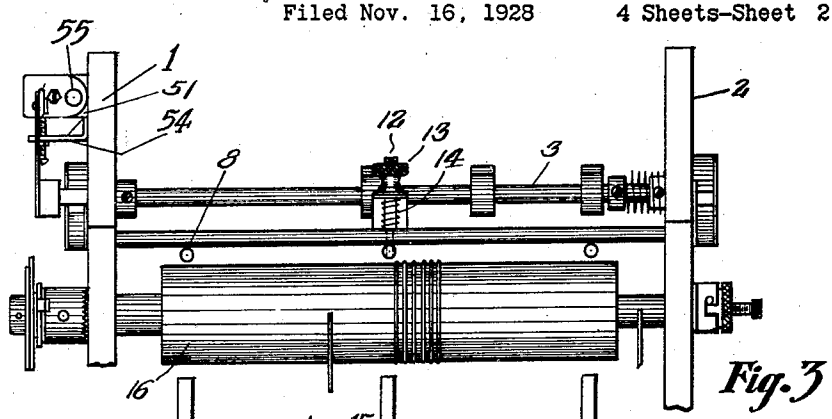


Fig. 3

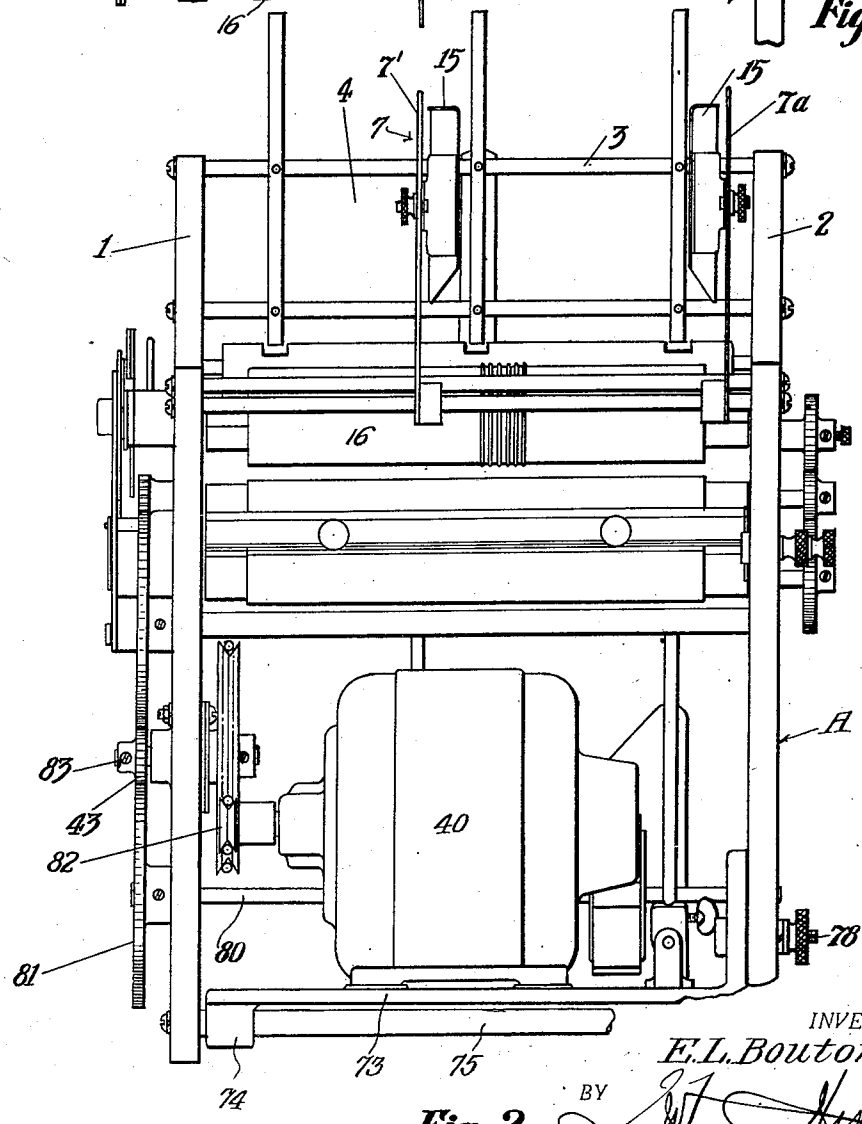


Fig. 2

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ENVELOPE OPENING MACHINE

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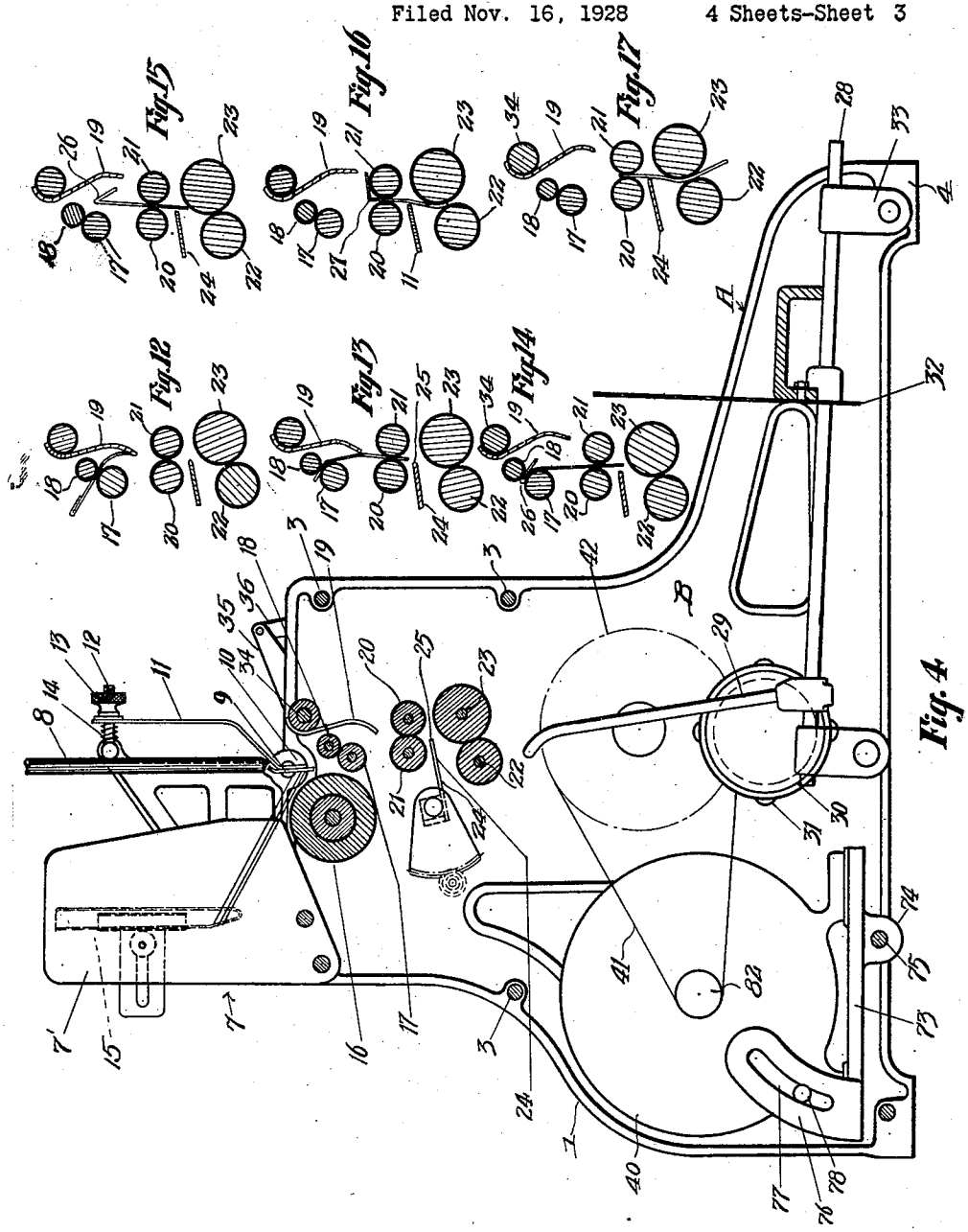


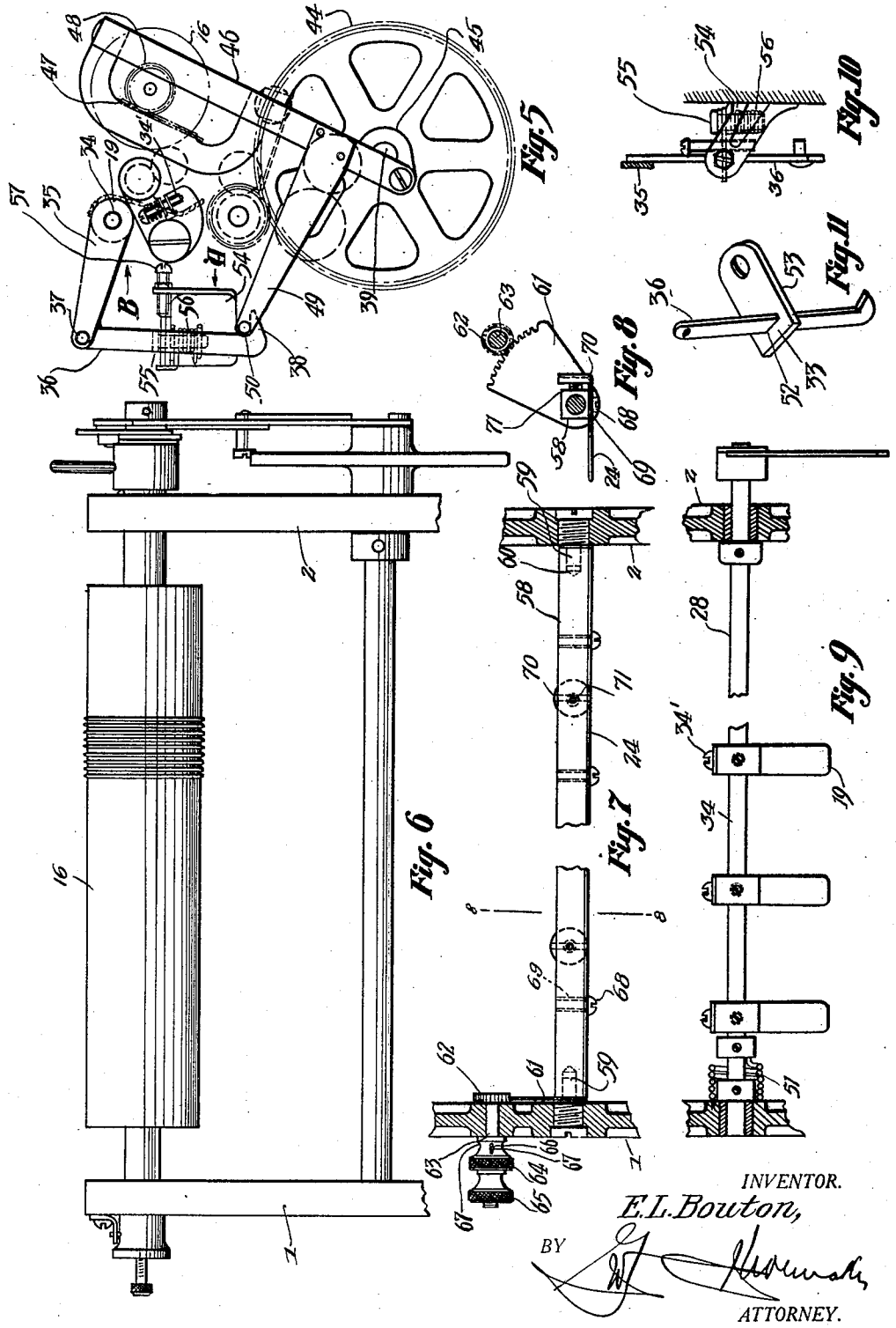
Fig. 4

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ENVELOPE OPENING MACHINE

Filed Nov. 16, 1928 4 Sheets-Sheet 4



Patented Apr. 28, 1931

1,803,050

UNITED STATES PATENT OFFICE

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ENVELOPE-OPENING MACHINE

Application filed November 16, 1928. Serial No. 319,986.

This invention relates to envelope opening machines, and more particularly to a machine in which the unsealed flaps of envelops are reversed from normally closed position to open position preliminary to passing the opened envelopes to a filling machine where the open envelopes are automatically filled, such a filling machine being illustrated and described in my application, Serial No. 342,982, filed February 27, 1929.

The present invention is not to be confused with envelope opening machines which are adapted to cut, slit or open envelopes that have been sealed, but on the contrary is adapted to treat envelopes which are unsealed and in which the flap thereof is folded down adjacent the body of the envelope and must be swung to open position before the envelope can receive its contents.

The present invention is designed to receive the envelopes with their flaps in a folded condition in stack formation, and by feeding the same, one at a time, from the bottom of the stack, to pass the envelopes automatically through a series of operations and finally discharge the envelopes from the machine in stacked relation and with the flaps in open position, so that the stacks of opened envelopes may be promptly removed and placed in a magazine of the envelope filling machine without the necessity of any rearrangement or further operations on the part of the operator.

An object of my invention, therefore, is to automatically treat envelopes so that when they are delivered from the machine the flaps stand in a vertical position and in substantially the same plane as the back of the envelope, ready to receive their contents. By the back of the envelope I here refer to that side of the envelope which customarily receives the address.

Another object is to properly stack the opened envelopes as they leave the machine so as to eliminate further handling thereof by the operator of the machine, except to transfer the stack of envelopes to the filling machine.

An additional object is to so open the flap of the envelope that it will maintain its opened position permanently and will not assume its normal folded position after leaving the machine.

A still further object is to initially separate the flap of the envelope from the body thereof in the event the gummed surface of the flap has adhered to the body, this operation taking place prior to the ironing or pressing out of the flap, so as to insure proper engagement of the pressing rolls with the flap after the same has been opened.

It is well known that envelopes which have been maintained in stacked relation for any period of time are likely to have the gummed surface of the envelope flap adhere slightly to the body thereof. If such an envelope is passed through known machines of the present character, there is grave danger that the flap will not be initially separated from the body, and consequently any further operations which are designed to reverse the position of the flap are futile, due to the fact that the flap still adheres to the body of the envelope. In the present instance, however, I have made provision for such contingency by providing means which flex the body of the envelope relatively to the flap thereof, and in this manner any adhesion of the flap to the body is broken, so that the subsequent operations of flattening out the flap can be properly performed.

In opening or reversing the position of envelope flaps for the first time, it will be found that adjacent to the line of fold of the flap the body of the envelope is bulged inwardly and forms an obstruction to any material that is inserted into the envelope. Such a bulge is highly detrimental to the successful operation of the automatic machines for inserting folders or other mail matter into envelopes, due to the fact that such mail matter engages on top of the bulge and is not inserted completely into the envelope. Such operation often causes fouling of the machine, and it is a still further object of the present invention to so treat the envelope that this bulge is entirely eliminated and no obstructions remain in the path of the mail matter being inserted into the envelope.

Other objects and advantages of the pres-

ent machine will be readily ascertained as the description proceeds, and while I have illustrated the preferred embodiment of my machine I desire it to be understood that changes in details of construction, size and formation of the various parts may be resorted to without departing from the spirit or scope of the claims hereto appended.

In describing the machine, reference will be made to the accompanying drawings, in which corresponding parts are similarly numbered throughout the several views, and in which,

Figure 1 is a side view of the machine with certain parts thereof indicated in dotted lines to more clearly illustrate the co-relation of the various parts.

Fig. 2 is an end view of the machine, looking from the left hand end of Fig. 1.

Fig. 3 is a fragmentary plan view, illustrating the automatic trip mechanism.

Fig. 4 is a longitudinal sectional view through the machine, taken immediately to the rear of one of the side frames of the machine.

Fig. 5 is a detail view showing the feed roller drive and the automatic trip mechanism and their operative relation.

Fig. 6 is a front view of the mechanism shown in Fig. 5.

Fig. 7 is a front view of the ironing blade by means of which the envelope fold line is broken, parts thereof being shown in section.

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

Fig. 9 is a detail view of the deflecting arms and their mountings as seen from B in Fig. 5.

Fig. 10 illustrates an additional detail of the tripping mechanism and its manner of support as seen from A in Fig. 5.

Fig. 11 is a detail perspective view of the latch of my tripping mechanism.

Figs. 12 to 17, inclusive, are diagrammatic illustrations of the progress of an envelope through the machine and the various operations that are performed thereon to accomplish the desired results.

Fig. 18 is a sectional view of an ordinary envelope with its flap opened, and illustrates the bulge that is present in the body thereof adjacent the flap folding line.

Fig. 19 is a plan view illustrating the envelope stacker construction.

Referring more particularly to the drawings, I provide a frame generally indicated at A and comprising the side walls 1 and 2 which are spaced from each other by means of suitable tie rods 3. The frames are provided with supporting feet 4, which may be supported on a stand 5 having at the upper ends thereof sockets 6 adapted to receive the feet 4. It is to be understood, of course, that the manner of supporting the machine is immaterial and that the machine may be supported directly by means of the feet 4.

Supported adjacent the upper ends of the frames 1 and 2 is an envelope magazine 7 which consists of side walls 7′ and 7ª spaced from each other a distance sufficient to accommodate the envelope being treated, and the magazine 7 further consists of front guide rods 8 suitably supported by the side frames and terminating short of the upper edge of the side frames 1 and 2.

Adjacent the lower end of the front guide rods 8 I provide a guide plate 9 pivoted on a bearing 10 so that the angle thereof may be varied to properly feed the envelope into the feeding rolls. This adjustment of the guide plate 9 is accomplished by securing thereto an arm 11 provided with an aperture adapted to receive a bolt 12 carried by the front guide rods 8, the bolt 12 receiving a thumb screw 13 adapted to bear against the arm 11 on one side and having a spring 14 coiled about the bolt 12 and bearing against the arm 11 on the opposite side, so that the normal tendency of the spring 14 is to urge the arm 11 away from the front rods 8 and accordingly urge the guide plate 9 toward the first feed roll. By turning the thumb screw 13, therefore, the angular adjustment of the guide plate 9 is accomplished.

Envelopes are adapted to be placed in the magazine 7 in stacked formation, and the space between the side walls and the front rods of the magazine is of such extent that the envelopes will assume the position shown in Fig. 4, with the bottom edge of the lowermost envelope of the stack resting on the feed roll. The details of construction of the magazine and the adjustment of the guide plate form the subject matter of my co-pending application hereinbefore referred to, and further description of the same is believed to be unnecessary, since this construction forms no part of the present invention.

It will be clear, however, that the top edge of the envelope is engaged by means of the adjustable supporting arms 15, which hold the envelopes in position, as clearly illustrated in Fig. 4.

Extending between the spaced side frames 1 and 2 are a plurality of feed and pressing rolls, the feed roller being indicated at 16, and located immediately below and at the front edge of the magazine 7 and in close proximity to the guide plate 9. This roller is adapted to support the lower edge of the bottom envelope of the stack, and being spaced slightly from the edge of the guide plate 9, permits passage of the lower envelope therebetween.

Located adjacent the feed roller 16 are pressing rolls 17 and 18, which contact with each other and which are adapted to receive the envelope from the feed roll 16, the rolls 17 and 18 being likewise supported between

the spaced frames 1 and 2. The pass between the rolls 17 and 18 is substantially horizontal, so that the envelope in passing from the feed roll 16 to the said rolls 17 and 18 assumes a a substantially horizontal position. Upon passing through the rolls 17 and 18, the lower end of the envelope engages deflecting arms 19 which are of curved formation, as clearly shown in Fig. 4, so that the body of the envelope is flexed, as clearly shown in Fig. 12. The arm 19 is designed to deflect the lower edge of the envelope into position to be received between other rolls 20 and 21, the pass between which is located immediately below the arms 19, so that the lower edge of the envelope is directed between the rolls 20 and 21, clearly illustrated in Fig. 13.

Below the rolls 20 and 21, I provide an additional pair of rolls 22 and 23, contacting with each other and between which the envelope is fed from the rolls 20 and 21, it being noted that the distance between the rolls 20—21 and 22—23 is less than the height of the envelope, and the purpose of such arrangement will be described more fully hereinafter.

Between the rolls 20—21 and the rolls 22—23 I provide an adjustable ironing blade 24, the inner edge 25 of which is located in vertical alignment with the pass between the rolls 20—21, but slightly in advance of the pass between the rolls 22—23, as clearly illustrated in Fig. 4 of the drawings, the purpose of this blade being to engage the back of the envelope after the flap has been opened fully between the rolls 20—21, and by pulling the back of the envelope across the edge 25 of the ironing blade 24, the fold line 26 of the envelope is bent rearwardly from the vertical position, thereby insuring that the fold line is broken so that the flap will not resume its folded position when the envelope leaves the machine.

After the envelope has passed through the rolls 22 and 23 it is dropped downwardly into a stacking trough indicated generally at B. This stacking trough comprises horizontally spaced rods 28 on which are mounted the receiving arms 29 which are so located that they direct the lower edge of the envelope into contact with a rotating stacking roller 30 provided with spaced projections 31 thereon which are adapted to engage the envelopes and force them toward the back plate 32 which is slidably mounted on the rods 28. It is to be understood that the back plate 32 at the beginning of operation of the machine is adjacent to the receiving rods 29 and that after the envelopes fall between the rods 29 and plate 32 the stacking roll 30 automatically pushes the plate 32 rearwardly until it reaches the stop 33, at which time the stacked opened envelopes are removed from the machine and transferred to the magazine of the filling machine.

From the foregoing it will be clearly seen that the envelope upon being fed from the magazine 7 is passed through a series of rollers, the first pair of which tend to direct the envelope in a substantially horizontal position and against the deflecting arms 19, which curve the body of the envelope and direct the lower edge thereof into the rolls 20—21. From these rolls the envelope is fed through the rolls 22 and 23 and the fold line of the envelope is engaged and broken over the edge 25 of the ironing blade 24, after which the envelopes are directed in permanently opened condition to the stacking mechanism B.

The purpose of arranging the pass between the rollers 17 and 18 in substantially horizontal position and subsequently flexing the body of the envelope by means of the deflecting arms 19 is to preliminarily disengage the flap from the body of the envelope so that the flap will subsequently straddle the roller 20, as clearly shown in Figs. 15 and 16, and be in proper position to pass the ironing blade 24 so that the fold line of the envelope will be broken.

In Fig. 14 I have clearly illustrated the manner of preliminarily disengaging the flap of the envelope from the body thereof by flexing the envelope body away from the flap. However, should the deflecting arms 19 remain in the position illustrated in Fig. 4 as the envelope passes to the rolls 20—21, the flap would again be folded into closed position thereby. Accordingly, I have made provision for automatically moving the deflecting arms 19 out of the path of travel of the envelope after the envelope has been flexed and the lower end thereof fed between the rolls 20—21.

I will now proceed to describe the automatic means for oscillating the deflecting arms. By reference to Fig. 5 it will be seen that the deflecting arms 19 are secured to the oscillating shaft 34 by means of set screws 34', which provides for adjustment thereof; and extending from the shaft 34 is the lever 35, which is in turn pivoted to a vertically disposed arm 36 at 37, and terminates in a horizontally extending hook 38.

The main power shaft is indicated at 39, and receives its power from an electric motor 40 through the belt 41 to the pulley 42 and from the pulley 42 through the gear 43 to the gear wheel 44 carried by the main power shaft 39. Rigidly secured to the power shaft 39 is an eccentric arm 45 to which is pivoted the pitman arm 46 carrying the rack bar 47 which is adapted to cooperate with the gear 48 on the shaft which carries the feed roll 16, so that upon rotation of the gear wheel 44 a reciprocating movement is imparted to the rack bar 47 and an intermittent rotary motion is imparted to the gear 48. A suitable pawl and ratchet mechanism serves to connect the rack bar to the gear 48, so that the gear 48 will be

given an intermittent motion. By this means an intermittent rotary movement is imparted to feed roll 16.

Further description or illustration of the means for driving the feed roll is not believed to be necessary, since this feature is likewise part of my co-pending application hereinbefore referred to, and it is described herein merely to show that the means for oscillating the deflecting arms 19 is operated from the main drive of the machine.

Extending from the pitman arm 46 is a rigid arm 49 carrying a stud or roller 50 on the end thereof which is adapted to engage the hooked end 38 of the arm 36 during portions of the cycle of operation of the pitman rod 46.

From the foregoing it is believed to be clear that upon rotation of the gear 44 and the imparting of intermittent rotary motion to the feed roll 16, the pitman arm 46 as well as the rigid arm 49 attached thereto will be given a circular motion, and that when the eccentric arm 45 is in substantially its lowermost position, the arm 49 is pulled away from and disengages with the hooked end 38 of the arm 36.

The shaft 34, which carries the deflecting arms 19, is normally urged by means of the spring 51 (Fig. 9) into position adjacent the feed rolls 17 and 18, as indicated in Figs. 12 and 13, so that when the stud 50 is disengaged from the hooked end portion 38 of the arm 36, the spring 51 rotates the shaft 34 so as to snap the arms 19 out of the path of travel of the envelope, as clearly illustrated in Fig. 14. Further rotation of the gear 44 will again cause the stud 50 on the rigid arm 49 to engage the hooked end 38 of the arm 36, and due to the circular motion imparted to the arm 49 will pull downwardly on the arm 36 and rotate the shaft 34 against the action of the spring 51, thereby oscillating the deflecting arms 19 again into the path of travel of the envelopes, where they are ready to receive the next envelope and deflect the edge thereof into the feed rolls 20 and 21. It will thus be seen that I have provided automatic means for removing the arms 19 from the path of travel of the envelope to allow the flap thereof to assume the position as shown in Fig. 15 for subsequent operation thereon by the rollers 20—21.

In order to accommodate the machine to envelopes of various sizes, some means must be provided for regulating the time at which the deflecting arms 19 are removed from or placed in the path of travel of the envelope, and in order to so regulate the operation of the deflecting arms 19, I have provided an adjustment of the arm 36 to determine the extent of engagement between the hooked end portion 38 thereof and the stud 50 of the rigid arm 49. From an inspection of Figs. 5, 10 and 11, it will be seen that the arm 36 passes through a rectangular slot 52 in the plate 53 and is adapted to reciprocate therethrough. This plate 53 is pivotally supported on the angular bracket 54 secured to the side frame 1 (Fig. 3), by means of the pin 55 about which is coiled the spring 56, which has one end thereof in engagement with the plate 53 and the other end in engagement with the angular bracket 54, so that the plate 53 is normally urged toward the deflecting arms 19, as shown in Fig. 5. Through the other arm of the angular bracket 54, I pass a screw 57 which is adapted to bear against the edge of the plate 53, thereby holding the plate 53 against the tension of spring 56 in the desired position. The plate 53, which has a pivot receiving opening of sufficient size to permit the necessary play of the parts, is urged by the spring 56 in a direction to move the hook or catch 38 of the pivoted arm or link 36 towards the path of movement of the roller 50 of the arm 49, and the screw 57 is adjustable to positively move the plate 53 in the opposite direction, and it forms a stop for holding the plate in its adjusted position. It will be readily seen that by operation of the screw 57 the plate 53 can be so adjusted as to vary the extent of engagement between the hooked end 38 and the stud 50 on the arm 49, and consequently the periods of time that the deflecting arms 19 remain in the path of travel of the envelope accordingly vary.

By referring to Figs. 7 and 8, it will be seen that I provide for an adjustment of the ironing blade 24 by securing the same to a squared shaft 58 which is supported for rotation by fulcrum pins 59 screwed into the side frames 1 and 2 and engaging recesses 60 in the ends of the squared shaft 58. Rigidly secured to one end of the squared shaft 58 is a gear segment 61 which is engaged by the pinion 62 carried on the end of a rotating shaft 63 and having a knob 64 thereon by means of which the shaft 63 and the pinion 62 can be rotated. In order to secure the shaft 63 in desired position, I provide a jam nut 65 threaded on the end of the shaft 63, which engages the knob 64, thereby holding the same in position. Rotation of the shaft 63 by the knob 64 is permitted, due to the fact that the shaft 63 is provided with a pin 66 passing through an elongated slot 67 in the knob 64. It will thus be seen that upon securing the desired position of the squared shaft 58 through adjustment of the knob 64, it is then merely necessary to lock the same in position by means of the jam nut 65, which forces the knob 64 into engagement with the frame 1. In this manner the angular position of the ironing blade 24 can be adjusted to suit varying conditions.

I further provide for horizontal adjustment of the ironing blade 24 so that it may be projected more or less into the path of travel of the envelope between the rolls 20—21 and 22—23, as conditions may re-

quire. The ironing blade 24 is secured to the squared shaft 58 by means of screws 68 passing through elongated slots 69 in the blade 24, as clearly illustrated in Figs. 7 and 8. The rear edge of the ironing blade 24 is adapted to project beyond the squared shaft 58 and is engaged by the head 70 of the screw 71, it being apparent from the foregoing that by loosening the screw 68 and turning the screw 71, the head 70 will force the blade 24 more or less into the path of the envelope.

It is found in operation that this adjustment of the ironing blade 24 is essential, due to the fact that the machine is adapted to operate on various stock, and it is evident that heavier stock will need more flexing to break the fold line of the envelope than is the case with light stock envelopes.

My machine is designed for operation by an electric motor, although it is to be understood that any source of power may be used. However, I have illustrated an electric motor 40 which is supported on a platform 73 provided with ears 74 which embrace the shaft 75 and about which the platform 73 is tiltable. Rigidly secured to and extending upwardly from the platform 73 is an upstanding lug 76 provided with an arcuate slot 77 therein which is adapted to receive the screw threaded stem 78 provided with a head which passes through the side frame 2 and has on the end thereof a knob. It will thus be apparent that by loosening the knob the platform 73 can be tilted to any extent necessary and secured in place by jamming the knob against the side frame 2. In this way, any stretching of the belt 41 may be taken up.

The stacking roll 30 is carried for rotation with the shaft 80 and has secured to the end thereof the gear 81 which is engaged by the pinion 43 which also engages the gear 44 of the main power shaft 39, the power being imparted from the electric motor 40 to the pulley 42 by means of a pulley 82 secured directly to the end of the motor shaft.

The pulley 42 is carried by a stub shaft 83 which extends through the side frame 1 and carries the pinion 43 on the end thereof. From the pinion 43 all of the operating parts of the machine are driven, and for purposes of simplification I have illustrated the gear train for driving the feeding rolls and the pressing rolls generally at G, (Fig. 1), but since any suitable drive may be used for imparting rotary movement from the pinion 43 to the various parts, it is not believed to be essential to describe the gear train in detail. I do desire to point out, however, that the rolls 22 and 23 are so geared that they rotate faster than the rolls 20 and 21, the purpose of this variation in speed being to draw the back of the envelope tautly against the ironing edge 25 of the ironing blade 24, so as to insure breaking of the folding line of the envelope, so that it will not resume its folded position when removed from the machine.

To recapitulate, the operation of the machine is as follows:

By referring to Fig. 4, it will be seen that the envelopes in stacked formation are placed in the magazine 7 and rest upon the feed roller 16 with the bottom envelope resting against the guide plate 9. As the feed roll 16 feeds the bottom envelope from under the stack of envelopes, the lower edge of the envelope will be guided by the plate 9 into the pass between the rolls 17 and 18, where it will pass in a substantially horizontal position until the lower edge engages the deflecting arms 19, which at that time are in a position closest to the rolls 17 and 18. The deflecting arms 19, due to their curvature, deflect the envelope into a substantially vertical position, and upon further movement thereof the lower edge is gripped between the rolls 20 and 21.

Continued movement of the envelope will pass the lower edge thereof between the rolls 22 and 23, and the back of the envelope will be pulled over the edge 25 of the ironing blade 24. Due to the fact that the edge 25 of the blade projects slightly beyond the path of travel of the envelope between the rollers 20—21 and 22—23, the body of the envelope will be curved or buckled over the ironing edge, and the fold line thereby permanently broken. To insure the breaking of this fold line, the rolls 22 and 23 are so geared that they revolve faster than the rolls 20 and 21, thereby tensioning the envelope over the edge 25 of the blade 24. From the rolls 22 and 23, which further press the flap of the envelope into the plane of the body thereof, the envelope drops to the stacking roll 30, assisted by the arms 29, and will thereby be stacked against the back plate 32, which moves rearwardly under the influence of the stacking roll 30 until it engages the stop 33, at which time the stack of permanently opened envelopes is removed from the machine.

As the lower edge of the envelope is caught by the rolls 20 and 21, the upper or flap end of the envelope is still in the bite of the rolls 17 and 18, as shown in Figs. 13 and 14, and due to the fact that the deflecting arms 19 have positioned the body of the envelope vertically while the flap is in a substantially horizontal position, as shown in Fig. 14, it will be seen that the flap is initially disengaged from the body of the envelope and upon being released by the rolls 17 and 18 will assume the position shown in Fig. 15, so that upon further movement thereof through the machine, the flap will straddle the roll 20, as shown in Fig. 16, and will thereby be pressed into the same plane as the body of the envelope.

Immediately upon the releasing of the flap end of the envelope from the rolls 17 and 18, or immediately prior thereto, the deflecting arms 19 are allowed to snap away from the rolls 17 and 18, as shown in Fig. 14, so that these deflecting arms will not interfere with the flap of the envelope.

Referring now to Fig. 18, I have illustrated a conventional form of envelope consisting of a body 84 and flap 85, the envelope being illustrated as having its flap turned to open position, the folding line of the flap being indicated at 86. It has been found that in opening an envelope for the first time, the act of reversing the flap 85 causes a bulge, as indicated at 88, in the body of the envelope adjacent the fold line 68, this bulge extending inwardly and tending to obstruct the mouth of the envelope. My invention entirely eliminates this bulge, due to the action of the pressing rolls and to the further action of the ironing plate 24 which insures the buckling or breaking of the fold line over the edge thereof, and permits the envelope to be ejected from the machine with the flap extending in the same plane as the back of the envelope. It is believed to be apparent that in attempting to fill envelopes by automatic machinery, this bulge as indicated at 88 is very objectionable in that it presents a ledge which is very likely to be engaged by the circulars or other mail matter being inserted into the envelope, and in such case the material would not be properly inserted into the envelope and fouling of the machine would occur.

From the foregoing it will be seen that I have provided a very simple, compact, and relatively inexpensive machine for rapidly handling a number of envelopes and delivering them from the machine with their flaps in a permanently opened condition, so that they can readily be placed in a suitable magazine in an envelope filling machine such as described in my co-pending application without the necessity of any rearrangement thereof.

It is further to be seen that I insure the proper operation of flattening out the flaps of the envelopes by preliminarily or initially disengaging the flap from the envelope body in case it has adhered thereto and subsequently performing further operations thereon which insure permanent opening of the flap.

In addition, my machine eliminates any bulge in the interior of the envelope that is ordinarily present when the flap is turned to its open position, and the envelope comes from the machine in such condition that there are no obstructions in the path of any matter that it is desired to insert in the machine, and that by eliminating this bulge, the chances of fouling envelope filling machines are greatly reduced.

What is claimed is:

1. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine, means for changing the direction of travel of the body of the envelope without changing the direction of travel of the flap, whereby the body is flexed away from the flap to initially separate the body from the flap, and pressing rolls for gripping the envelope adjacent the line of fold of the flap while the envelope is being flexed.

2. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, and deflecting arms normally in the path of travel of the envelope for flexing the bodies of the envelopes away from the flaps thereof.

3. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine, deflecting arms normally in the path of travel of the envelope for flexing the body of the envelope away from the flap thereof, and means for swinging the deflecting arms out of the path of travel of said envelopes.

4. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding the envelopes from said magazine, oscillating deflecting arms normally in the path of travel of said envelopes for flexing the body of the envelopes away from the flap thereof, and means for oscillating said arms out of the path of travel of said envelopes.

5. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding the envelopes from said magazine, oscillating deflecting arms normally in the path of travel of said envelopes for flexing the body of the envelopes away from the flap thereof, means for oscillating said arms out of the path of travel of said envelopes, and means for varying the oscillation of said deflecting arms.

6. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for intermittently feeding envelopes from said magazine, oscillating deflecting arms normally in the path of travel of the envelopes for flexing the same, pressing rolls for gripping the envelope adjacent the line of fold of the flap while the envelope is being flexed, means for intermittently removing said deflecting arms from the path of travel of the envelopes, and common driving means for the feeding means and the means for oscillating the deflecting arms.

7. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, means for changing the posi-

tion of the envelope flap from closed to open position, a blade over which the back of the envelope is drawn to permanently break the flap fold line, and spaced tensioning means for gripping the envelope in advance and in rear of the blade.

8. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, means for changing the position of the envelope flap from closed to open position, an adjustable blade over which the back of the envelope is drawn to permanently break the flap fold line, and means for gripping the envelope above and below the blade for tensioning the said envelope.

9. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, means for changing the position of the envelope flap from closed to open position, a longitudinally adjustable blade over which the back of the envelope is drawn to permanently break the flap fold line, and rolls arranged in pairs and engaging the envelope in advance and in rear of the said blade.

10. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, means for changing the position of the envelope flap from closed to open position, a vertically adjustable blade over which the back of the envelope is drawn to permanently break the flap fold line, and rolls arranged in pairs and engaging the envelope in advance and in rear of the said blade.

11. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from the magazine, means for changing the position of the envelope flap from closed to open position, a longitudinally and vertically adjustable blade over which the back of the envelope is drawn to permanently break the flap fold line, and rolls arranged in pairs and engaging the envelope in advance and in rear of the said blade.

12. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine, means for changing the position of the envelope flap from closed to open position, means for bending the envelope rearwardly over an ironing blade to permanently break the fold line between the envelope body and the flap, and means for tensioning the envelope while in engagement with said blade.

13. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine, means for changing the position of the envelope flap from closed to open position, means for bending the envelope rearwardly over an ironing blade to permanently break the fold line between the envelope body and the flap, and means for tensioning the envelope while in engagement with said blade.

14. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine including a plurality of pairs of feed rolls, means for initially opening the flap of the envelope, an ironing blade between two pairs of feed rolls and having its forward edge projecting beyond the line of travel of an envelope between the pairs of feed rolls and adapted to engage the rear face of the envelope, whereby the envelope is bent over the edge of the ironing blade to permanently break the flap fold line.

15. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes from said magazine, means for changing the position of the envelope flap from closed to open position, the feeding means including a plurality of pairs of feed rolls, an ironing blade having its edge projecting beyond the line of travel of an envelope between two of the pairs of feed rolls and engaging the rear face of the envelope, and means for driving one pair of feed rolls faster than the other, whereby the envelope is tensioned over the edge of the ironing blade.

16. An envelope opening machine comprising a magazine adapted to receive a stack of envelopes, means for feeding envelopes therefrom, a plurality of pairs of feed rolls between which the envelope is fed, means for flexing the envelope between two pairs of rolls initially disengaging the envelope flap from the body thereof so that the flap extends in a substantially horizontal plane and straddles one of the feed rolls of one pair, whereby further feeding of the envelope causes the flap to be flattened into the same plane as the plane of the envelope body, and further means for causing said flap to permanently remain in such plane.

17. The method of opening envelopes which consists in initially separating the flap from the body thereof and causing the flap to assume a substantially horizontal position, subsequently flattening out said flap into the same plane as the plane of the envelope body, and then bending the envelope rearwardly over a relatively sharp edge and at the same time moving the envelope across said edge, whereby the fold line of the flap is broken and the flap remains permanently in the plane of the body of the envelope.

In testimony whereof I have hereunto set my hand, this 17 day of October, 1928.

E. L. BOUTON.