

April 15, 1930.

J. H. MARSH

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AUTOMATIC ENVELOPE STUFFING MACHINE

Filed May 11, 1927

3 Sheets-Sheet 1

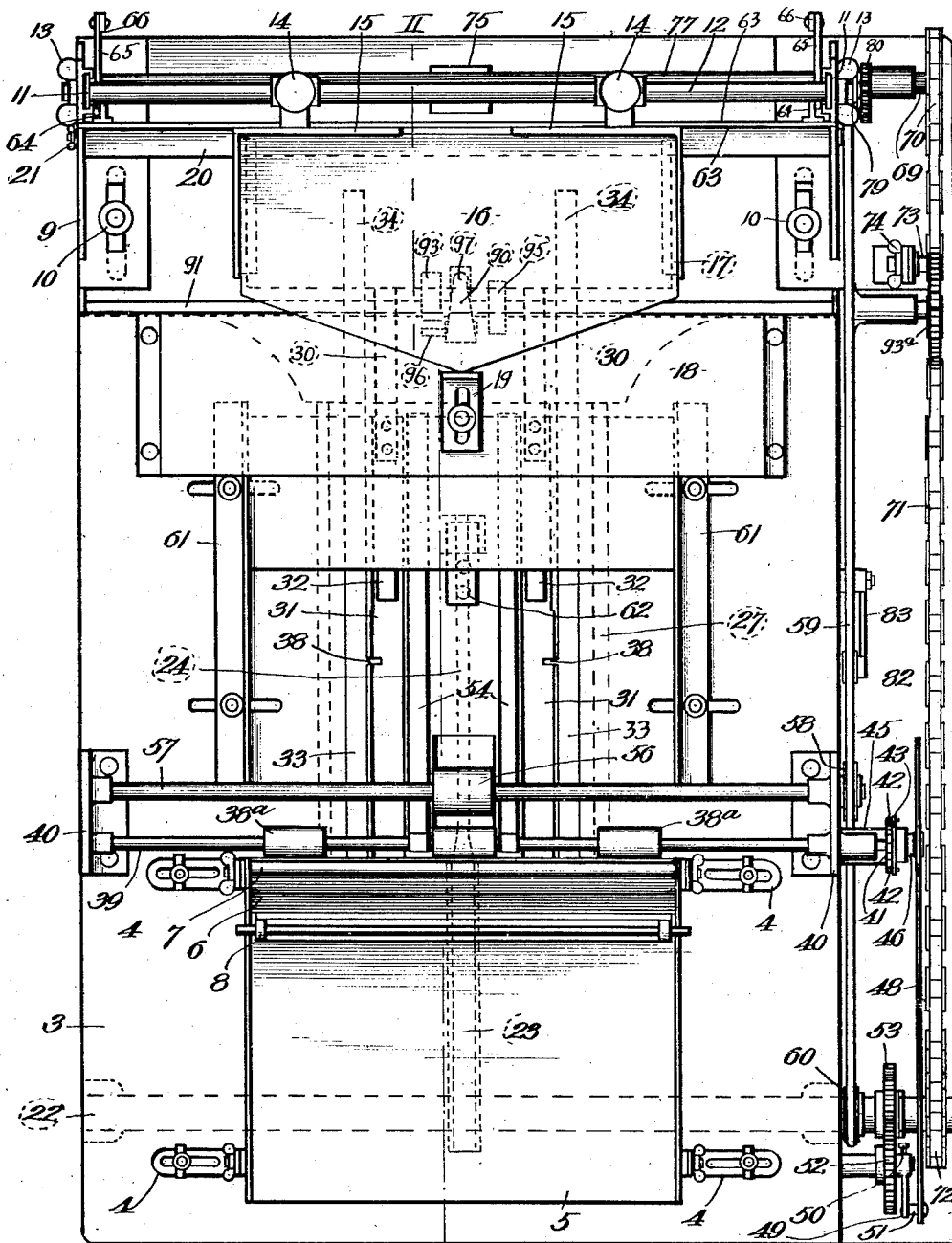


Fig. 1. II

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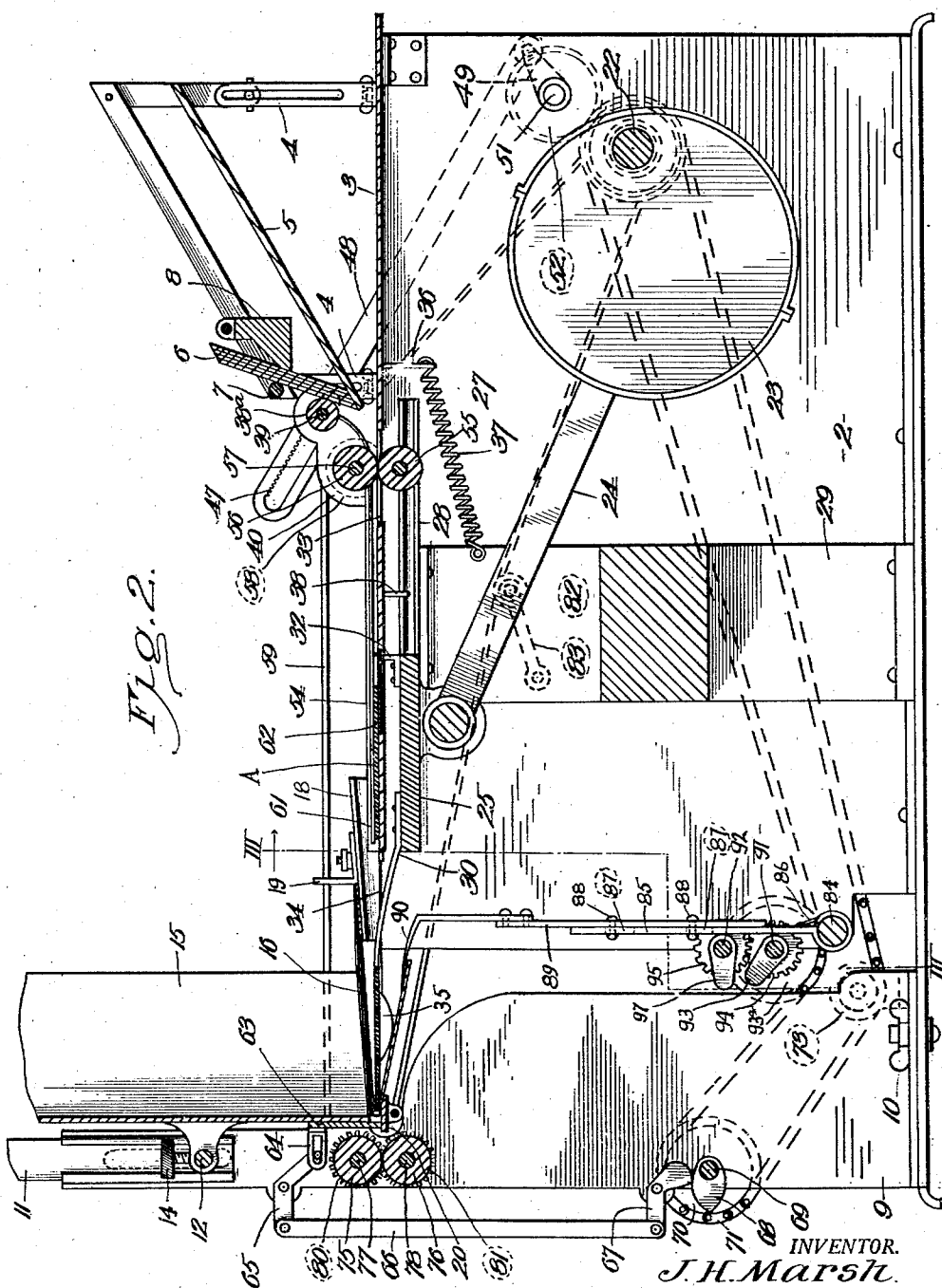
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

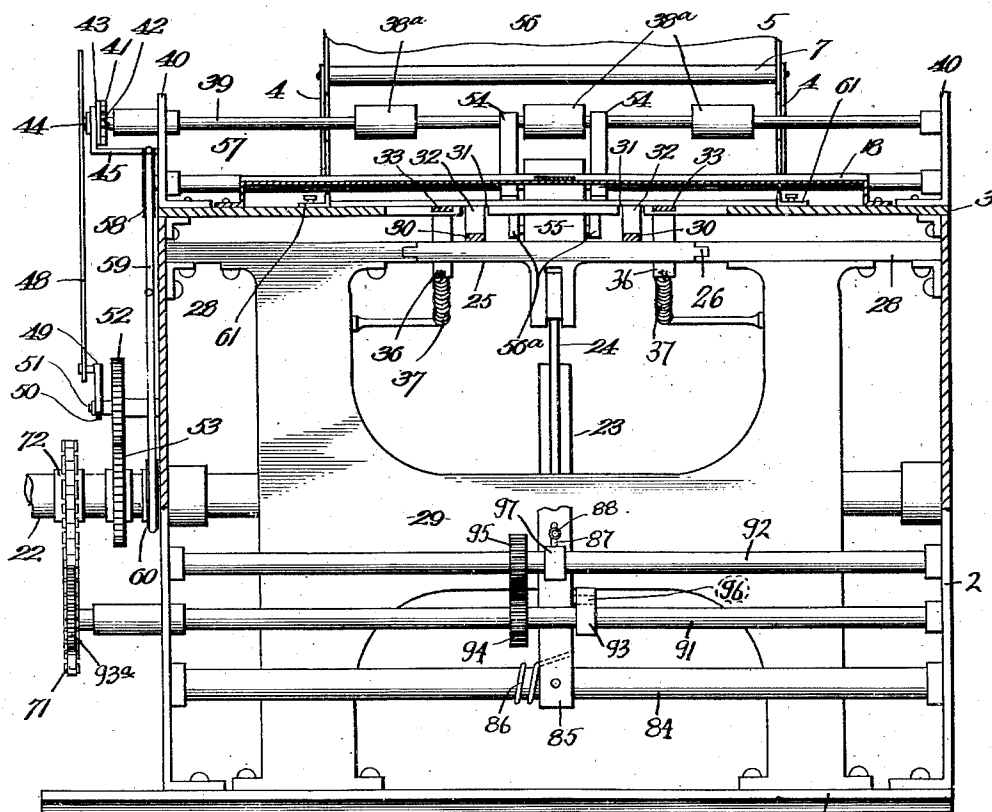


Fig. 3.

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AUTOMATIC ENVELOPE-STUFFING MACHINE

Application filed May 11, 1927. Serial No. 190,518.

This invention relates to envelope stuffing machines, and forms a continuation in part of my co-pending application for patent filed August 17, 1925, Serial No. 50,667. One of the objects of this invention is to provide a machine for efficiently charging envelopes with folded circulars or the like, which is adjustable to accommodate envelopes of different sizes or which may be used to stuff a plurality of circulars into a single envelope. More specifically the object of the invention is to provide a travelling finger to thrust a folded paper edgewise into an open envelope, the finger continuing its travel to partially eject the stuffed envelope from the machine and then be withdrawn. By thus utilizing a finger pushing against the circular to discharge the envelope from the machine, it will be noted that it is impossible for the machine to discharge empty envelopes. With all machines with which I am familiar, it is possible for an unfilled envelope to be discharged and this is of course extremely objectionable as postage is wasted and time and trouble needlessly expended.

With the general object of producing an efficient and economical machine of the character outlined, the invention consists in certain novel and useful features of construction and organization of parts; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which:—

Figure 1 is a top plan view of a machine embodying the invention.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a section on the line III—III of Figure 2.

The base of the machine is indicated at 1 and mounted on said base and extending parallel to each other are a pair of sides 2 which at their upper ends carry top plate 3. Mounted on the top plate 3 are two pairs of horizontally and vertically adjustable frames 4 which carry a circular support 5, it being understood that the circular supports may be pulled away from or toward each other to accommodate the width of circulars to be stuffed and that the angle of inclination of

said supports may be changed by vertical adjustment of the members 4. A quantity of circulars is indicated at 6, it being noted that said circulars stand at an angle and abut against a cross bar 7 carried by the circular supports 5 and that said circulars are held in this position by means of a weight 8 sliding along the upper bars of said circular support 5.

At the front end of the machine and spaced from the front ends of the sides 2 are a pair of standards 9 which are slidingly adjustable on the base 1 by means of suitable clamp nuts 10, said standards 9 having sliding engagement with a pair of upright bars 11 which at their lower ends carry a cross bar 12, threaded at their ends for reception of thumb nuts 13 to clamp the members in any suitable position of vertical adjustment as will hereinafter appear. Mounted on the bar 12 for sliding adjustment are a pair of clamp members 14 each of which carry right-angle shaped envelope supports 15. A quantity of envelopes 16 are stacked between the guides 15 with their flaps open and with their mouths down, the end extremities of said envelopes resting on suitable shelves 17 carried by the guides 15 and indicated in dotted lines in Figure 1, and the envelope flaps are supported by an arch plate 18 carried by the top 3 of the machine, said flaps being held in alinement by an adjustable guide 19 mounted on top of said arch plate 18. The bottom or closed edge of the stack of envelopes is supported on a plate 20 pivotally carried by the side frames 9 and adjustably clamped by means of a thumb nut 21 (Figure 1) in any suitable position of adjustment as it has been found that the rear edges of the envelopes must be supported at different angles depending upon the character of the paper and the thickness of the circulars to be stuffed therein, it also being noted (see Figure 2) that the envelope guides 15 are adjusted toward and from the plate 20 according to the number of plies of paper to be ejected from the machine when an envelope has been stuffed.

Journalled in the side members 2 adjacent the rear end of the machine is a main driving

shaft 22 connected to any suitable source of power, and said drive shaft centrally of the sides 2 carries an eccentric 23 having an arm 24 pivotally connected to a slide block 25 having side extensions 26 for reciprocation in grooves 27 formed in the opposite edges of a pair of sub-frame members 28. The sub-frames 28 are supported at their outer edges by the sides 2 and at their inner edges are mounted on the upper ends of an H-shaped frame 29 resting on the base 1 of the machine.

Mounted on the slide block 25 adjacent its front end are a pair of forwardly and upwardly bowed stuffing and ejecting fingers 30, the lower edges of said fingers being in horizontal alinement with the top of the machine 3, said fingers projecting through slots 31 in the top 3 when the slide block 25 is in its retracted position. It is here pointed out that the distension of the envelope shown in the drawing is greatly exaggerated in that the flap of the envelope extends upwardly at too great an angle as in actual practice the weight of the envelopes confines the circular so that when the fingers 30 push thereon it cannot buckle upwardly. It will be evident however that if the circular is a card or is relatively stiff there is no possibility of inaccurate operation or jamming from buckling circulars. Mounted adjacent the rear edge of said slide block are a pair of auxiliary stuffing fingers 32, although the chain fingers of my co-pending application may be used, said fingers also travelling in the slots 31 of the top 3. The distance between the front edges of the fingers 30 and 32 being sufficient to accommodate the greatest width circular to be used in the stuffing machine, and the eccentric 23 and parts being so proportioned that the front end of the fingers 32, when the slide block is in its retracted position, will lie just rearwardly of the front edge of the circular support 5.

The top 3 is also formed with a pair of channels for slidably receiving a pair of circular supporting and auxiliary envelope distension members or fingers 33 which merely rest in said channels with their upper surfaces flush with the face of the top, their length and weights being such that they cannot kick up at either end, said members being reduced at their front ends as at 34 and terminating in wedge-shaped envelope distending means 35. The members 33 are formed at their rear extremities with downturned portions 36 projecting below the plane of the sub-frames 28, and connected to said portions are retractile springs 37 secured to the H-shaped frame 29 to project said fingers in advance of the slide block 25. In order to retract the fingers 33, they are formed intermediate their ends with offset downwardly extending lugs 38 having their ends in the path of travel of the slide block 25.

As one of many convenient means for feed-

ing the circulars one at a time from the guide 5 onto the top plate 3, I have illustrated a series of intermittently driven rubber or other suitable feed rollers 38^a mounted on a cross shaft 39 journaled in a pair of extension frames 40 mounted on the top 3. The cross shaft 39 extends beyond one of the frames 40 and terminates with a ratchet wheel 41, which is adapted to be driven in one direction by a pair of dogs 42 carried by a disk 43 mounted on the end of a stub shaft 44 journaled in an extension 45 of the frame 40. The other end of said stub shaft 44 is equipped with a rack gear 46 (Figure 1) for engagement with the teeth 47 of a rack bar 48. The rack bar 48 extends downwardly and rearwardly and its end is journaled on a crank arm 49 adjustably mounted as at 50 to vary the length of the stroke according to the width of the circular to be fed. The crank arm is carried by a shaft 51 journaled in one of the sides 2 of the machine and said shaft 51 is driven through a gear 52 enmeshed with a corresponding gear 53 on the main shaft 22 of the machine.

Loosely encircling the intermittently driven shaft 39 and extending forwardly and normally resting on the top 3 of the machine are a pair of guide straps 54 which extend forwardly and terminate under the arch plate 18 supporting the flaps of the envelopes. The parts are so proportioned that just after the fingers 32 have passed behind the front edge of the circular support 5, the rollers 38^a are operated to feed a circular onto the top 3, said circular being guided and prevented from buckling upward by the straps 54. In order to complete such feeding and to rapidly place the circular in position prior to the commencement of the forward stroke of the slide block 25, a pair of auxiliary feed rollers 55 and 56 are provided. The roller 55 is journaled between a pair of arms 56^a (Figure 3) depending from the top of the machine, while the roller 56 is mounted on a shaft 57 journaled in the frames 40, and at one end is provided with a pulley wheel 58 for driving engagement with a belt 59 encircling a similar pulley wheel 60 on the main shaft 22. It will thus be evident that one circular at a time will be fed onto the top 3 under the guide straps 54 into position for engagement by the fingers 32. As the slide block advances the fingers 32 push the circular, and in order to straighten up said circular should the same have one edge further advanced than the other, a pair of adjustable guide plates 61 are mounted on the top of the machine to accommodate the width of the circular to be stuffed.

Mounted in the center of the top 3 and marking the forward limit of travel of the fingers 32 is a light spring stop 62 normally slightly projecting from a recess in the top 3, said stop being depressed by the passage of a

circular and immediately springing out of the recess after the circular has passed by. Thus the stop 62 prevents rearward movement of said circular which might otherwise be imparted thereto through frictional engagement with the curved surfaces of the stuffing fingers 30 upon the rearward travel of the slide block.

The operative parts of the machine, as illustrated, have not yet reached their forward limit of travel, it being understood that the stuffed envelope is to be pushed between the lower edges of the envelope supports 15 and the plate 20, this distance being initially regulated to accord with the thickness of a stuffed envelope. It has been found with a machine of this character that an automatic barrier must be provided which will open sufficiently to permit the passage of three or more plies of paper, depending upon the thickness of the circular, and then will immediately close and lightly rest on the face of the envelope to prevent the passage of a superimposed envelope. In other words, without an automatic barrier or gate the stuffed envelope will through frictional engagement with the superimposed envelope draw such empty envelope from the machine. In order to provide an automatic construction of the character outlined, a sliding gate 63 is mounted between the faces of the envelope supports 15 and the rear edges of the supporting frames 9, said gate having a pair of slotted extensions 64 for engagement with one end of a pair of bell crank levers 65, connected by downwardly extending links 66 to a pair of bell crank levers 67 mounted on the frames 9. The bell crank levers 67 terminate in rounded ends for operation by a pair of cams 68 mounted on a cross shaft 69 journaled in the frames 9, one end of said shaft 69 having a sprocket gear 70 for driving engagement with a sprocket chain 71 encircling a similar sprocket 72 on the main shaft 22 of the machine. As means must be provided to adjust the chain according to the position of adjustment of the frames 9 to accommodate wider or narrower envelopes, said chain on its slack side engages an idler gear 73 vertically adjustable as at 74.

From the above it will be apparent that the fingers 30 position a stuffed envelope under the gate 63 which immediately drops and frictionally engages the face of the envelope to continuously close the slot and prevent an empty envelope from being drawn from the machine, especially when the ply of paper drops from the stuffed portion of the envelope to the single thickness of the flap. The forward travel of the stuffed envelope as imparted by the fingers 30 is just sufficient to engage the edge of the envelope with a pair of ejecting rollers 75 and 76 journaled on cross shafts 77 and 78 mounted in the frames 9, the cross shaft 77 being equipped with a pulley wheel

79 encircled by the belt 59 and also having a gear wheel 80 for engagement with a similar gear wheel 81 on the shaft 78, it being understood in this connection that the ejecting rollers are constantly driven and complete the ejection of a stuffed envelope from the machine. Engaging the slack side of the belt 59 which also drives the shaft 57 is an idler pulley 82 mounted on an arm 83 pivoted to the side of the machine and being equipped with a spring to maintain the proper tension on the belt according to the position of adjustment of the frames 9 with regard to the width of envelopes to be stuffed.

As one means of opening the mouth of the lowermost envelope, I have provided a mechanical opener although, of course, an air jet as shown in my co-pending application or any other suitable mechanism may be employed to perform such function, as follows: Extending crosswise of the machine adjacent the front edges of the sides 2 is a fixed shaft 84 and pivoted on said shaft centrally of the machine is a strap 85, held pressed forwardly by a coil spring 86 on the shaft 84. The strap 85 is formed with a pair of slots 87 for slidably receiving pins 88 carried by a sliding strap 89 fitted flatwise against the strap 85 and said sliding member 89 carries a forwardly and upwardly bowed envelope opening finger 90.

Journaled in the sides of the machine 2 are a pair of cross shafts 91 and 92, the shaft 91 extending through one side of frame 2 and being provided with a sprocket gear 93^a meshed with the driving chain 71. At any suitable point the shaft 91 is provided with a gear wheel 94 meshed with a similar gear wheel 95 on the shaft 92. The shaft 91 is equipped with a cam 93 for engagement with an extension 96 (see Figure 2) to effect lifting movement of the sliding strap 89 and the shaft 92 is provided with a cam 97 to swing the strap 85 around the shaft 84 and thus effect movement of the opening finger 90 rearwardly, the cams 93 and 97 being so timed that upon withdrawal of the stuffing fingers 30, the cam 97 pushes the opener rearwardly and the cam 93 lifts the slide member 89 and holds it elevated until the cam 97 has released the pivoted portion 85 at which time the spring 86 throws the envelope opener 90 forcibly forward and drives its point into the mouth of the envelope. The cam 93 will at this time have released the opener to permit it to drop by gravity and distend the mouth of the envelope as illustrated.

With the parts in the position shown in the drawings, the slide block 25 is travelling forward and the cam 68 is just about to open the gate 63. Just before the stuffed envelope strikes the gate, the cam 68 through the connections described opens the gate, the fingers 30 through contact with the circular push the stuffed envelope under the gate 63,

and just as soon as the edge of the envelope passes below the gate, the cam 68 releases the gate to permit the same to rest by gravity on the face of the envelope to prevent exit of an unstuffed envelope. The slide block 25 continues to travel forwardly until the constantly driven rollers 76 and 77 receive and eject the envelope.

The slide block 25 now commences its rearward travel, during such movement its rear edge comes into contact with the downwardly projecting extensions 38 of the circular guides and supports 33 and effects withdrawal of said supporting and guiding fingers against the action of their projecting coil springs 37. Just as the front ends of the auxiliary stuffing fingers 32 pass behind the front edges of the circular support 5, the feed roller shaft 39 is operated by its ratchet mechanism 41-44 to rotate rollers 39 to feed a circular from the support 5 to the constantly operated rollers 55 and 56. These rollers quickly complete the placing of the circular in position on the top of the machine. The slide block 25 now commences to move forwardly, the fingers 30 contacting with the circular A (Figure 2) which was held by the spring stop 62 from rearward movement upon the rearward passage of the fingers 30, and the auxiliary fingers 38 picking up the next circular which has just been placed in position by the rollers 55 and 56 as described.

At the instant the slide block commences to move forwardly, the opening finger 90 will have been moved rearwardly, upwardly and released by its cams 93 and 97 and will have engaged and distended the mouth of the lowermost envelope.

As the slide block commences to move forwardly the spring operated circular supporting fingers 34 which are always in advance of the stuffing fingers 30, will enter the distended envelope below the plane of travel of the circular, and will thus provide a support for the circular A as it is picked up and advanced by said stuffing fingers 30. It will be noted that the spring operated fingers 34 having the wedge portions 35, will be projected as far into the envelope as possible under the force of their springs 37 depending, of course, upon the quality of the paper of the envelopes.

The continued forward movement of the slide block 25 will project into the envelope the circular A, the parts now having reached the positions shown in the drawings. It will thus be apparent that the fingers 30 are the real stuffing and ejecting fingers while the fingers 32 are only auxiliary devices to advance the circulars the predetermined distance necessary and to give the guides 61 an opportunity to straighten the circular prior to completion of its advance into the envelope.

From the above description it will be apparent that the prime object of the invention is accomplished by the fingers 30 which posi-

tively cannot eject from the machine an unstuffed envelope, which has been the real difficulty with all machines of this general character with which I am familiar, and that the automatic gate absolutely insures against the stuffed envelope dragging from position through frictional engagement the next adjacent envelope.

From the above description it will be apparent that I have produced a device which possesses all of the features of advantage pointed out as desirable and while I have described and claimed the preferred embodiment of the same I reserve the right to make all changes properly falling within the spirit and scope of the appended claims.

I claim:

1. In an envelope stuffer, an envelope support, adapted to hold an envelope with its mouth distended, and means operable between the planes of the sides of the distended mouth for advancing a circular into the envelope and for effecting movement of the stuffed envelope through direct contact only with the trailing edge of said circular.

2. In an envelope stuffer, an envelope support, adapted to hold a stack of envelopes with the mouth of the last envelope in distended position, means operable between the planes of the sides of the distended mouth for advancing a circular into the envelope and for effecting movement of the stuffed envelope from position by contact with the trailing edge of the circular, and means to prevent ejection of the next adjacent envelope.

3. In an envelope stuffer, an envelope support, adapted to hold a stack of envelopes with the mouth of the last envelope in distended position, means operable between the planes of the sides of the distended mouth for advancing a circular into the envelope and for effecting movement of the stuffed envelope by contact with the trailing edge of the circular, and secondary means for completing the movement of the stuffed envelope from position.

4. In an envelope stuffer, an envelope support adapted to hold an open mouthed envelope, means adapted to advance a circular into the envelope and for effecting movement of the stuffed envelope from position, and a support for the circular extending into the envelope.

5. In an envelope stuffer, a support for a stack of open mouthed envelopes, means adapted to advance a circular into the lowermost envelope and for effecting movement of the stuffed envelope, a support for the circular extending into the envelope, a gate for preventing ejection of the next adjacent envelope, and secondary means for completing the movement of the stuffed envelope from position.

6. In an envelope stuffer, a support for a

stack of envelopes, distension means for the mouth of the last envelope, a support for a stack of circulars, means for advancing a circular a predetermined distance toward the mouth distension means, and means for advancing the circular into the envelope and for effecting movement of the stuffed envelope, said means being operable between the planes of the sides of the distended mouth of the last envelope and in contact with the trailing edge of the circular.

7. In an envelope stuffer, a support for a stack of envelopes, the mouth of the last envelope being distended, means for advancing a circular a predetermined distance toward the open mouth of the lowermost envelope, means for advancing the circular into the envelope and for effecting movement of the stuffed envelope, said means being operable between the planes of the sides of the distended mouth and in contact with the trailing edge of the circular, and a gate to prevent ejection of the next adjacent envelope.

8. In an envelope stuffer, a support for a stack of open mouthed envelopes, the mouth of the last envelope being distended, means for advancing a circular a predetermined distance toward the open mouth of the lowermost envelope, means for advancing the circular into the envelope and for effecting movement of the stuffed envelope, said means being operable between the planes of the sides of the distended mouth and in contact with the trailing edge of the circular, a gate to prevent ejection of the next adjacent envelope, and means for completing the ejection of the stuffed envelope from the machine.

9. In an envelope stuffer, a support for a stack of open mouthed envelopes, the mouth of the last envelope being distended, a support for a circular extending into the envelope, means for advancing the circular a predetermined distance toward the open mouth of the lowermost envelope, means for advancing the circular into the envelope and for effecting movement of the stuffed envelope from position, said means being operable between the planes of the sides of the distended mouth and in contact with the trailing edge of the circular, and a gate to prevent ejection of the next adjacent envelope.

10. In an envelope stuffer, an envelope support adapted to hold an open mouthed envelope, means adapted to advance a circular a predetermined distance toward the open mouth of said envelope, a support for the circular extending into the envelope, means to advance the circular into the envelope and for moving the stuffed envelope, a gate to prevent ejection of the next adjacent envelope, and secondary means to complete the ejection of the stuffed envelope.

11. In an envelope stuffer, an envelope support adapted to hold an envelope with its mouth down and flap extended, a support for

said flap, means to distend the mouth of said envelope, and means to advance a circular into the envelope and move the stuffed envelope from position, said means being operable between the planes of the sides of the distended mouth and in contact with the trailing edge of the circular.

12. In an envelope stuffer, an envelope support adapted to hold an envelope with its mouth down and flap extended, a support for the flap, means adapted to distend the mouth of the envelope, a support adapted to hold a circular and extending into the envelope, and means adapted to advance the circular into the envelope and move the stuffed envelope from position.

13. In an envelope stuffer, a support for a stack of envelopes, the mouth of the last envelope being distended, means for advancing a circular a predetermined distance toward the distended mouth, a stop to prevent rearward movement of said circular, and means for advancing the circular into the envelope and for effecting movement of the stuffed envelope from position, said means being operable between the planes of the distended mouth and in contact with the trailing edge of the circular.

14. In an envelope stuffer, a support for a stack of envelopes with their flaps extended, distension means for the mouth of the lowermost envelope having a combined horizontal and vertical reciprocation, and means adapted to advance a circular into the envelope.

15. In an envelope stuffer, a support for a stack of envelopes with their flaps extended, an envelope opener, means to impart a rearward and upward movement to said opener, resilient means to impart forward movement to said opener, and means adapted to advance a circular into the envelope.

16. In an envelope stuffer, a support adapted to hold an envelope with its mouth distended and stuffed with a circular, and stuffed envelope discharge mechanism to effect edgewise movement of the stuffed envelope by contact with the circular, said discharge mechanism moving a distance less than the width of the envelope after the circular abuts the bottom of said envelope.

17. In an envelope stuffer, a support adapted to hold an envelope with its mouth distended and stuffed with a circular, and stuffed envelope reciprocatory discharge mechanism to effect edgewise movement of the stuffed envelope by contact with the circular, said discharge mechanism moving a distance less than the width of the envelope after the circular abuts the bottom of said envelope.

In testimony whereof I affix my signature.

JAMES H. MARSH.