(No Model.) 4 Sheets—Sheet 1.

F. T. NICHOLSON.

ENVELOPE MACHINE.

No. 486,233. Patented Nov. 15, 1892.

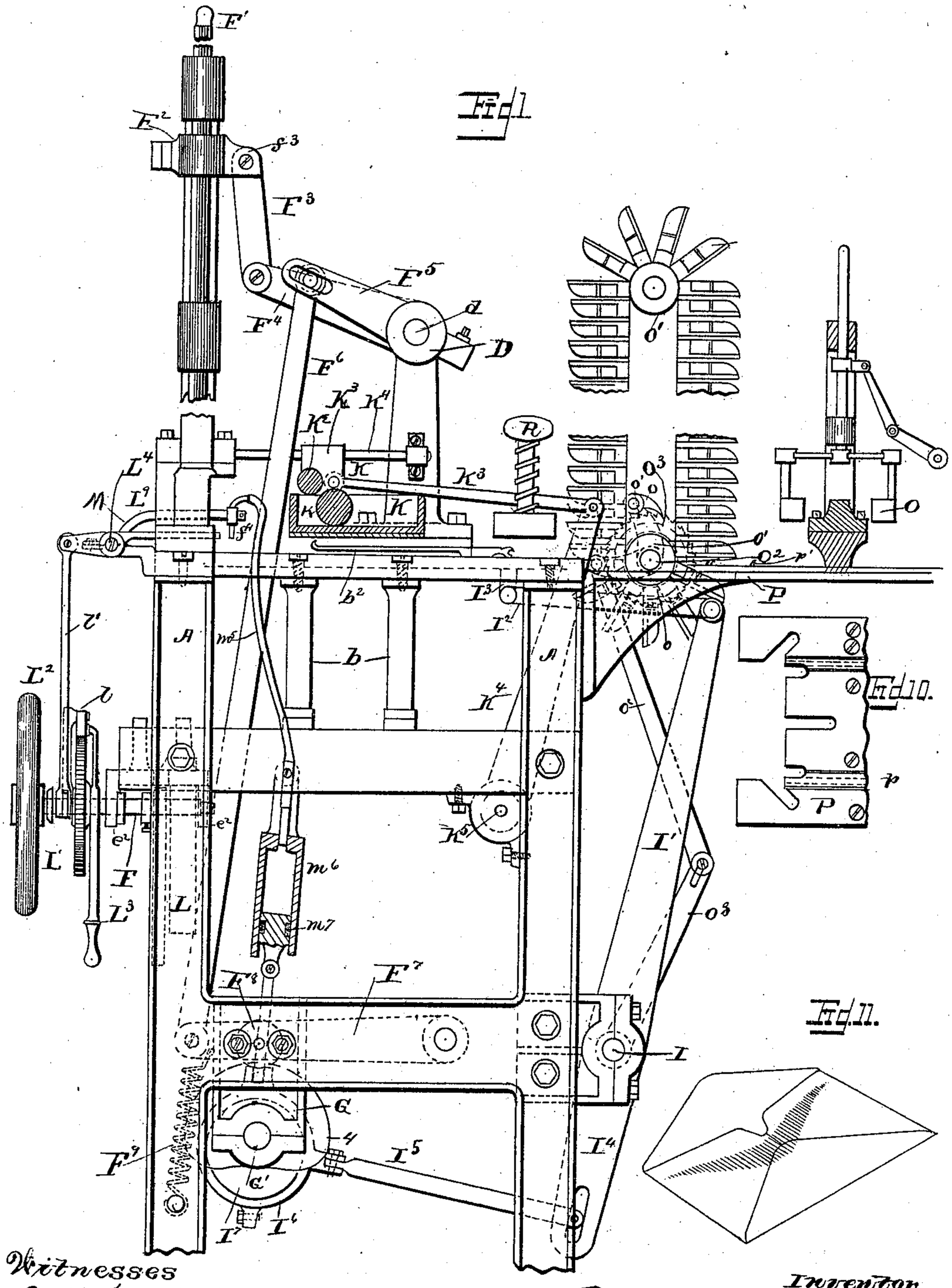

Fig. 1.

Fig. 10.

Fig. 11.

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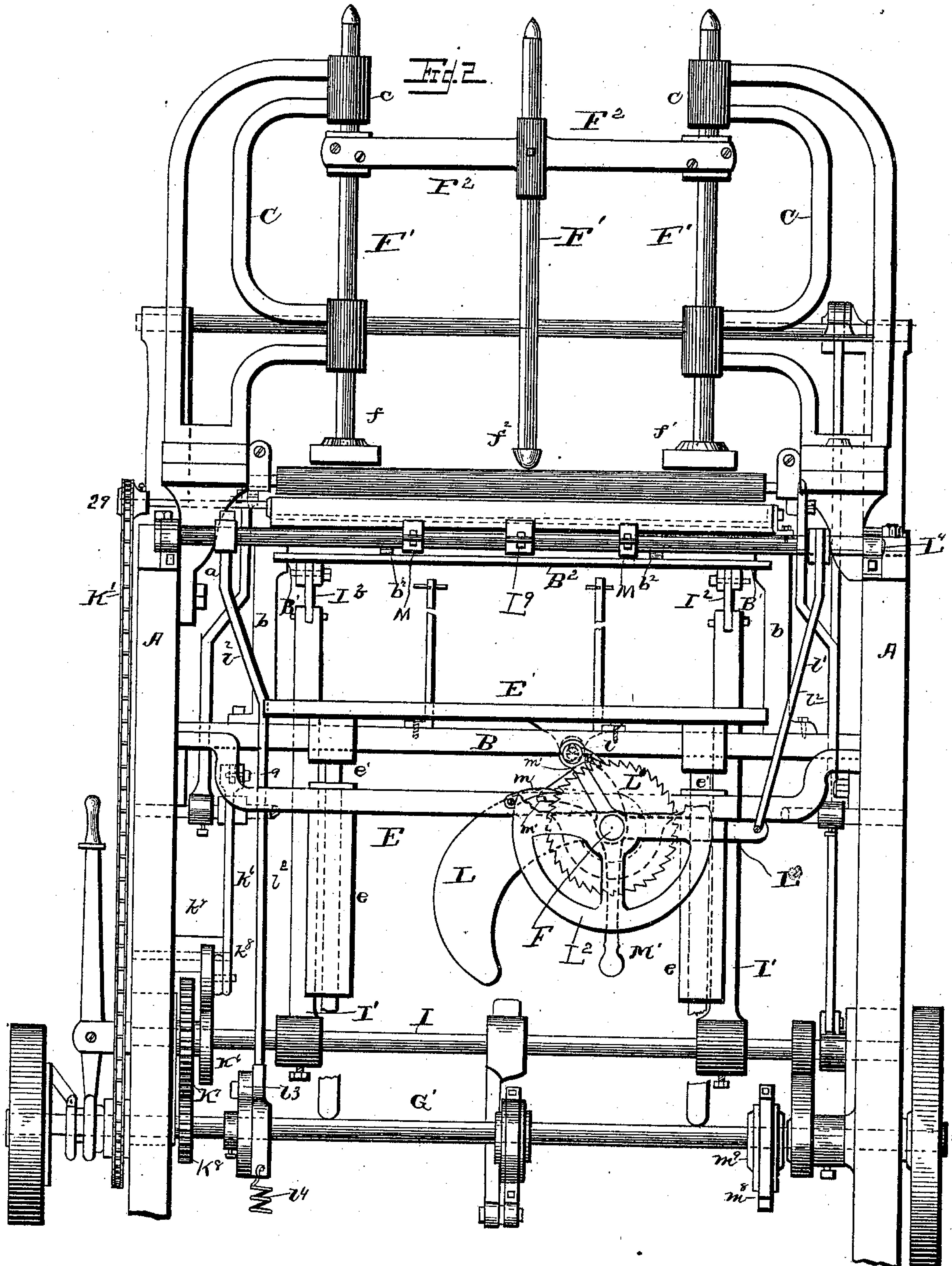
Fig. 2.



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ENVELOPE MACHINE.

No. 486,233. Patented Nov. 15, 1892.

Fig. 3.

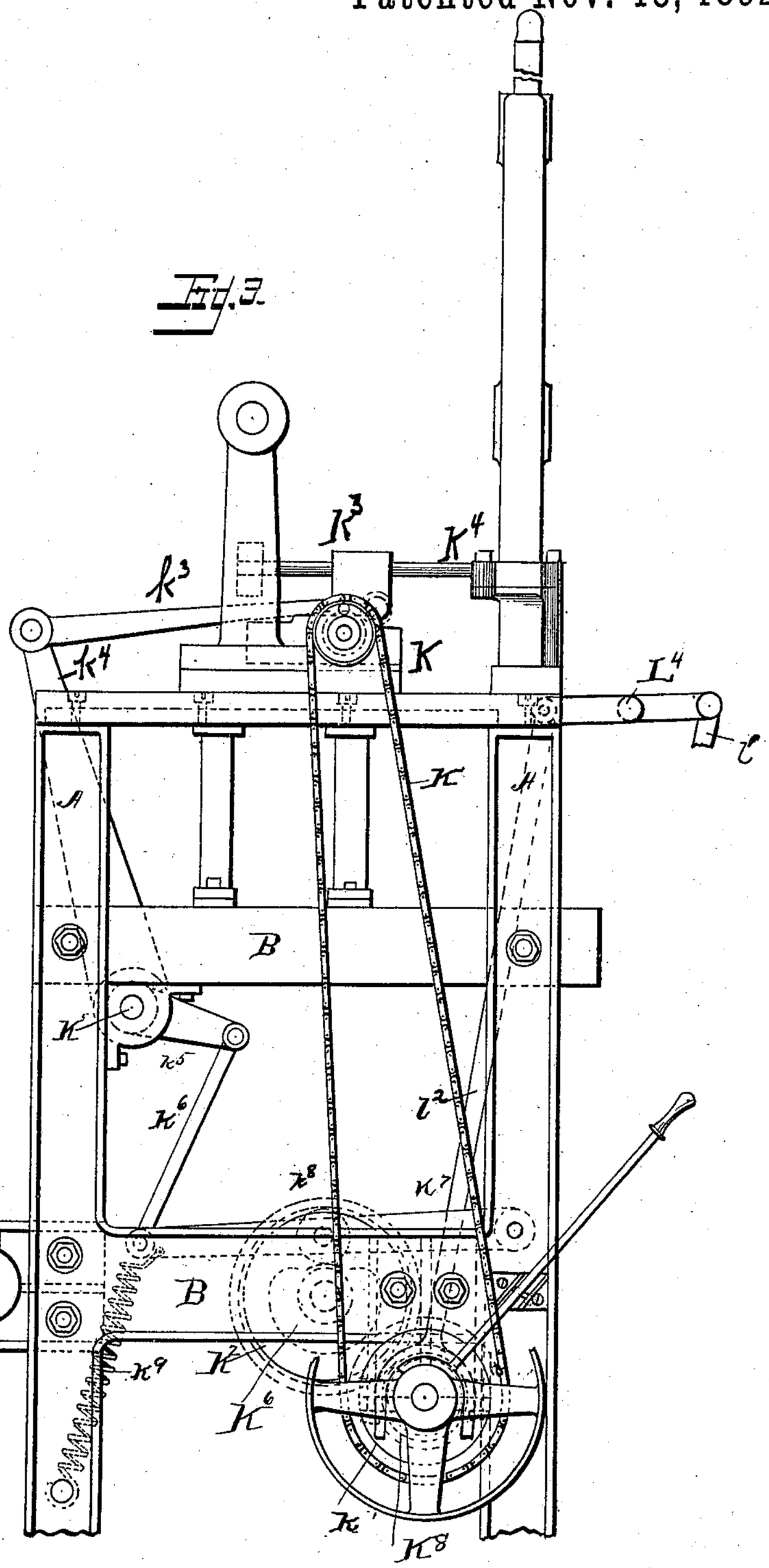

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Fig. 7.

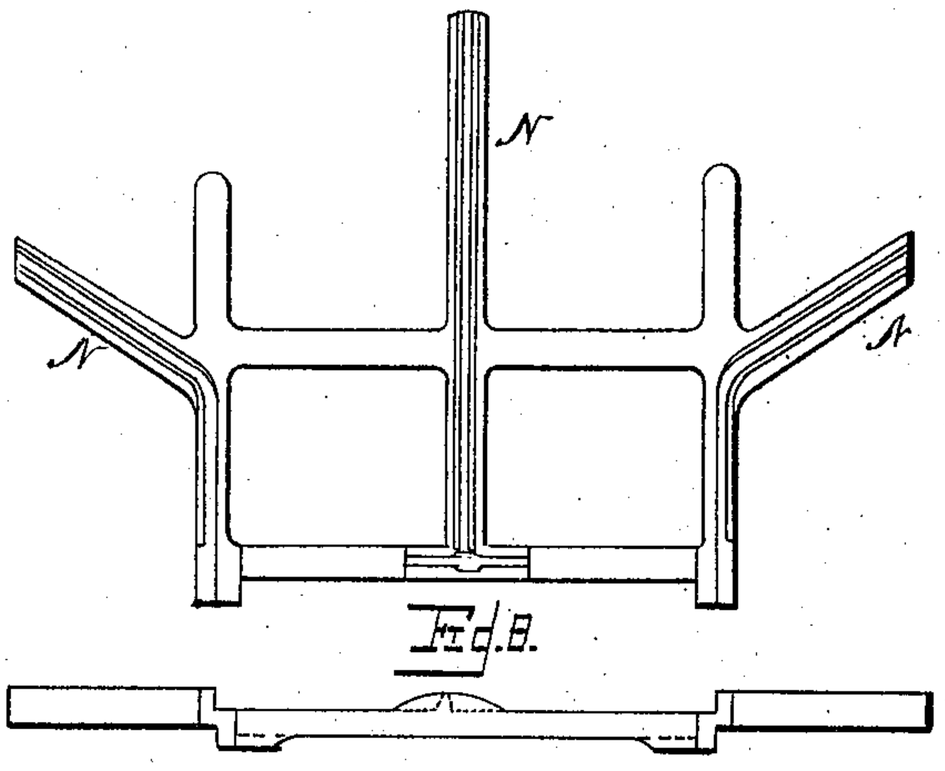


Fig. 8.

Fig. 9

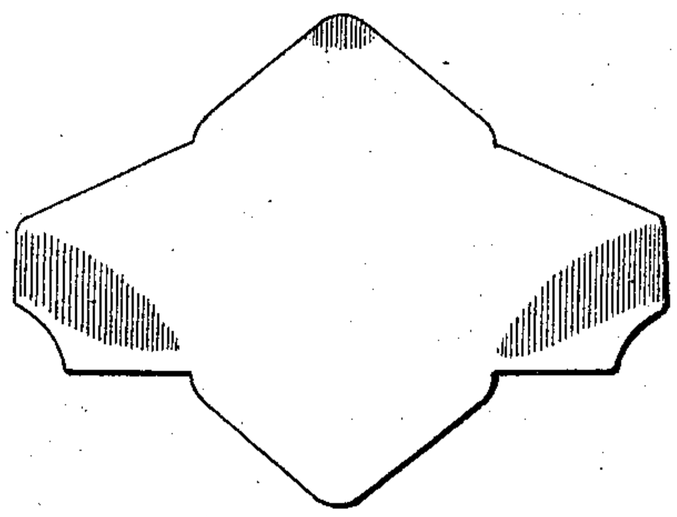


Fig. 6.

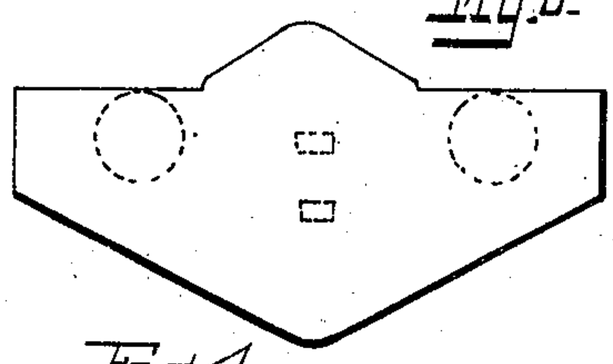


Fig. 4

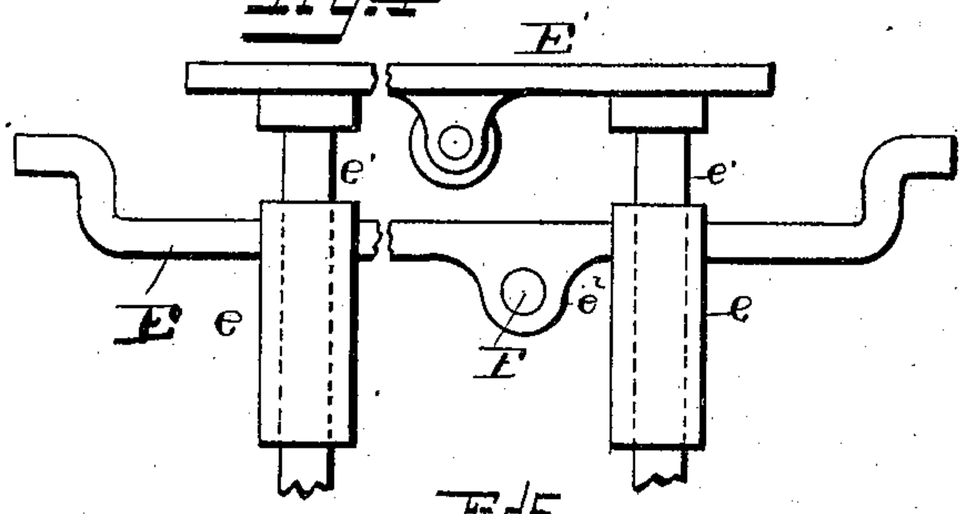
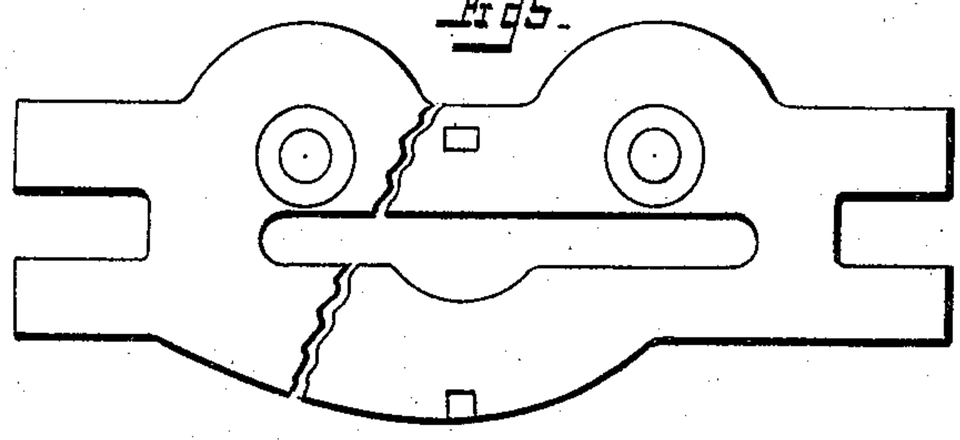


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 486,233, dated November 15, 1892.

Application filed August 4, 1891. Serial No. 401,665. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS T. NICHOLSON, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Manufacturing Envelopes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

The primary object of this invention is to produce an envelope of commercial form in which the final closing or sealing flap shall be clean or free from gum, the line of gum or other sealing material being located on the body of the envelope, thus not only obviating the inconveniencies arising from the wetting of the gum with the tongue, but also lessening the liabilty of removing a portion of the gum, which would of necessity make the seal insecure.

It has heretofore been proposed to make envelopes in accordance with the above broad idea, but certain practical difficulties have presented themselves which precluded the successful manufacture of such envelopes on a commercial scale and in competition with the ordinary gummed-flap envelope. Such diffculties I attribute to the fact that heretofore the envelope has been gummed and folded in the ordinary manner with the exception of the gum on the sealing flap and then after the envelope was entirely formed the line of gum was applied to the body of the envelope in position to register with said sealing-flap when folded down. In overcoming said difficulties I first apply lines of gum to the face or address side of the envelope-blank in position to register with each other and with the sealing-flap when the envelope is folded, then dry said gum, and finally apply the ordinary lines of gum to the opposite side of the blank and fold and form the same in the ordinary manner, save that the sealing-flap is left clean and free from gum; but, if desired, the sealing-flap may be coated with an invisible, tasteless and harmless paper-size, to prevent the moisture which is applied to the same from being quickly absorbed as might otherwise be the case.

In carrying my invention into practice, use is made of a special machine, to be presently described, to which the blanks are fed after the manner of an ordinary envelope-machine, which special machine first applies the gum to the face or writing side of the envelope, then dries and reverses the blanks, delivering them in position for an ordinary envelope gumming and folding machine, which receives them and completes the formation of the envelope in the well-understood manner.

Referring to the accompanying drawings, Figure 1 is a side elevation, partially in section, showing the preferred form of machine; Fig. 2 is a front elevation of the same, and Fig. 3 an elevation from the side opposite Fig. 1, in all of these figures the underlying and obscure parts being omitted for the sake of clearness, and only those parts shown which are necessary for a complete understanding of the several mechanisms. Figs. 4, 5, and 6 are detail views of the elevator and its stirrup or cross-piece. Figs. 7 and 8 are details of the drying and reversing chain. Fig. 9 is a detail plan of one of the envelope-blanks, showing the contour of the lines of paste applied by the gummers. Fig. 10 is a detail elevation showing the shape of the openings in the table, through which the arms on the chain pass. Fig. 11 is a perspective view of an envelope constructed in accordance with my invention.

Similar letters and numerals of reference in the several figures indicate the same parts.

The letter A designates the sides of the main frame, preferably metal and formed with the usual open spaces, said sides being held rigidly in proper relative position by any suitable cross pieces or braces—such as B—and at the top are provided with seats for the superstructures, consisting, essentially, of the brackets C, having vertical bearings *c*, in which the pickers and gummers slide, and the bearings D, in which the rock-shaft *d* for operating the gummers works.

Mounted rigidly on the cross-pieces B are brackets, or, more properly speaking, standards *b*, which at the upper ends carry the

ways B′, in which the table B^2 slides, and which also support certain minor parts of the mechanism, as will be hereinafter mentioned.

At the front the side pieces A are united by a cross-piece E, which I shall herein term the "elevator-stirrup," the central part being depressed for the reception of the elevator-supports, as shown. This stirrup has two vertically-extending bearings *e*, in which slide the rods *e′*, carrying the elevator E′ at the end, and between these bearings are formed two horizontal bearings e^2, Figs. 1 and 4, to which the elevator cam-shaft F is journaled.

At the bottom of the frame and journaled in bearings G transverse thereto is the main operating-shaft G′, driven from any suitable source of power, and adapted, through cams and connections to be now described, to give a proper relative movement and operation to all the parts of the machine.

The gummers and pickers in the present instance are three in number, lettered, respectively, *f f′ f²*, and are adapted to apply gum to the two end flaps and center flap on the front of the envelope in such position as that when the envelope is folded the portions of gum so applied will register to form a complete line of gum on the body of the envelope, which registers perfectly with the sealing-flap. The gummers are of ordinary construction, being mounted on the lower ends of rods F′, connected by cross-piece F^2, which is clamped thereto in such manner that any particular gummer may be adjusted and having on the rear side lugs f^3, to which one end of a link F^3 is connected, the opposite end of said link being pivotally connected to an arm F^4 on the rock-shaft *d*. The rock-shaft *d* is further provided with a slotted arm F^5, to which is connected the long link F^6, the lower end of which is jointed to the lever F^7, pivotally connected to the frame, depressed by a spring F^9, and carrying an antifriction-roller F^8, which co-operates with the cam 4 on the main shaft for reciprocating the gummers and pickers at the proper moment. The gummers descend upon the pile of envelopes carried by the elevator, then, by reason of the viscosity of the gum itself, which may be supplemented by a suction device f^4, if desired, elevates the uppermost blank high enough for the conveying-hooks b^2 on the table B^2 to pass beneath the same and engage the blank and as the table is withdrawn carrying the same with it. The table is reciprocated by means of the rock-shaft I, carrying upwardly-extending arms I′, the upper ends of which are connected to the table by means of links I^2 and I^3. At the center the shaft I carries a downwardly-extending arm I^4, joined by a connecting-rod I^5 with the eccentric-box I^6, surrounding an eccentric I^7 on the main shaft. The connection between the arm I^4 and rod I^5 is a slot connection, enabling the throw of the conveying-hooks to be easily regulated to suit different-sized envelopes. Immediately over the table is located the gum or paste box K, having a feed-roller *k* working therein and driven by means of a belt or chain K′, passing around a wheel on said roller and around a corresponding wheel *k′* on the drive-shaft, Fig. 3. This roller *k* feeds the gum to a roller K^2, mounted in a traveling carriage K^3, sliding upon rods K^4 and adapted to carry said roller K^2 beneath and in contact with the gummers when in their highest position. To the carriage or carriages K^3, one being preferably located on each side, are connected links k^3, which in turn are connected to the crank-arms k^4 on the rock-shaft K^5, Fig. 3, operated by means of the arm k^5, link k^6, lever k^7, depressed by a spring k^9 and carrying antifriction-roller k^8, adapted to co-operate with the cam K^6 on the gear-wheel K^7, meshing with a corresponding gear K^8 on the drive-shaft, said gear K^7 being journaled upon a stud-axle on the frame, as will be readily understood from an inspection of Fig. 1.

The elevator operating and suction mechanism is as follows: The shaft F, before referred to, carries a cam L of the usual form in this class of machines, and in addition it carries a ratchet-wheel L′ and a hand-wheel L^2. Journaled on said shaft is a bell-crank lever L^3, one arm of which carries an operating-pawl *l*, which co-operates with the ratchet-wheel, and the other arm of which is connected by a link *l′* with a rock-shaft L^4, deriving its motion from the main shaft through a rod l^2, forked at the lower end to embrace said shaft and be elevated by a cam-pin l^3 thereon, but capable of an independent upward movement, the downward movement being secured by means of a spring l^4, all as shown clearly in Fig. 2. On the rock-shaft L^4 is a series of (preferably two) fingers M, adapted to rest upon the pile of envelopes carried by the elevator, and thereby directly control the speed at which the cam shall be rotated and the blanks brought up into position, for it is obvious that when said fingers are elevated the rock-shaft is moved but slightly, if at all, the throw of the operating-pawl being thereby diminished and the feed reduced or entirely arrested if the throw of the pawl is not sufficient to carry it beyond a single tooth.

Retrograde movement of the cam-shaft is prevented under ordinary circumstances by a pawl *m* on the frame; but in order to permit the operator to move the cam and shaft in either direction when desired a throw-out, consisting of the handle-lever M′, journaled on the cam-shaft and having projections *m′* lying behind each of the pawls, is provided. Thus by moving said handle-lever to the left the pawls are both thrown out of engagement, and the operator by means of the hand-wheel L^2 can easily shift the elevator to the desired position.

The suction-tube f^4 is carried by an arm L^9 on the rock-shaft L^4 and is connected by a flexible tube m^5 with the upper end of the pivoted cylinder m^6, in which works a piston

m^7, connected with the eccentric-box m^8, surrounding the eccentric m^9 on the main operating-shaft. With this construction when the pickers descend the suction-tube also descends, and both rise simultaneously, carrying the uppermost envelope with them in the well-understood manner. As before explained, the blanks are placed on the elevator with the face uppermost and are gummed on said face at the points indicated in Fig. 9, and after being so gummed they are carried by the conveyers toward the rear of the machine and into engagement with the links of a drying and reversing chain, as shown clearly in Fig. 1.

The chain is composed of a series of links journaled together, each link, as shown in Figs. 7 and 8, consisting of a series of arms or ribs N, adapted to support the envelope-blank by the ungummed portion, the whole chain being run on pulleys O O′ and moved with proper relation to the conveyers by mechanism to be presently described. When in horizontal position, the ribs on adjacent links touch each other or are brought very close together. Hence the envelope-blanks lying between the links are grasped and held firmly in position, and in order that they may be properly entered the lower pulley O is so positioned relative to the table and conveyer that the envelopes are inserted between the links before the same are closed after passing around the pulley.

The pulley O is mounted on a shaft O^2, which at one end carries a ratchet-wheel O^3, with which a pawl o on one end of a bell-crank lever o', is adapted to co-operate. To the opposite end of this bell-crank lever o' is connected a link o^2, the lower end of which is connected with a crank-arm o^3, clamped on the rock-shaft I. Hence when said shaft is moved to operate the conveyer it also operates to give the chain its movement. The blanks in passing up over with the chain are brought down with the rear side up and are adapted to be caught upon a table or support P, (shown in Fig. 10,) having longitudinal guideways p therein, in which work conveyers p', forming part of an ordinary envelope-machine, the gummers and pickers of which, together with the conveyers, are shown in Fig. 1; but as said machine works in the ordinary manner and is of ordinary construction further description or explanation of it is unnecessary.

As the envelope-blank is operated face uppermost it is found convenient and economical to print the same before it is folded. Hence in the present machine I locate a printer R in the space between the gum-box and drying-chain, which printer may be operated by hand or otherwise, if desired. Instead of carrying the blanks singly to the ordinary envelope gumming and folding machines, a pile of gummed blanks may be allowed to accummulate in a receiving-box such as is ordinarily employed for receiving envelopes from a conveying-chain and this pile of blanks may then be placed on the elevator of any suitable envelope gumming and folding machine, the sides of the blanks previously gummed and dried being turned down.

Envelopes formed in accordance with this invention possess obvious commerical advantages, and by employing the present machine the initial cost is but slightly increased, if at all. The gum being applied while the blank is open or flat will be evenly distributed, and by giving each portion the configuration indicated, a continuous line of gum is provided, when the envelope is folded, which exactly registers with the sealing-flap, no edges of gum being left exposed, and at the same time the flap is secured to the very edge, making a seal not easily broken or loosened by unscrupulous persons.

The style of envelope is immaterial, for it is obvious that the shape of the sections of gum applied to the various flaps of the blank may be altered to give the proper registration when the envelope is folded, thus in large envelopes, where the central bottom flap is very large and wide, it receives a very large portion of the gum instead of the small portion in Fig. 9.

Having thus described my invention, what I claim as new is—

1 In a machine such as herein described, the combination, with the gummers, elevator, and main operating-shaft, of the drying and reversing chain and the conveyer-hook reciprocating between the gummers and chain, whereby the envelopes are gummed and conveyed directly to said chain, substantially as described.

2. In an envelope-machine, the combination, with the main shaft, rock-shaft moved thereby, elevator, and shaft for moving said elevator, of the fingers on the rock-shaft, adapted to rest on the pile of blanks on the elevator, the ratchet-wheel on the elevator-moving shaft, the bell-crank lever having the pawl co-operating with said ratchet-wheel, and a link connecting said bell-crank lever and rock-shaft, substantially as described.

3. In an envelope-machine, the combination, with the main shaft, elevator, shaft for moving said elevator, and rock-shaft moved by the main shaft, of the fingers on said rock-shaft, adapted to rest on the pile of envelopes, a suction-tube carried by said shaft, the elevator-shaft-operating mechanism, and the link connection between said elevator-shaft-operating mechanism and rock-shaft, substantially as described.

4. In an elevator-shaft-operating mechanism for envelope-machines, the combination, with the elevator, the shaft for moving the same, having the hand and ratchet wheels thereon, the bell-crank lever pivoted on said shaft, the pawl on said bell-crank lever co-operating with the ratchet-wheel, and the stationary pawl for preventing retrograde movement of said wheel, of the throw-out pivoted

on said shaft, having a projection behind each of said pawls, and the operating-handle, substantially as described.

5. In a machine such as described, the combination, with the gummers, main shaft, and the drying and reversing chain, of the conveyers for transferring the blanks from the gummers to the chain, the rock-shaft moved by the main shaft and having the crank-arms for moving the conveyers, and the ratchet-wheel, pawl, and crank-arm on the rock-shaft for moving the chain during the forward movement of the conveyers, substantially as described.

6. In a machine such as described, the combination, with the gummers, main shaft, and the drying and reversing chain, of the conveyers for transferring the blanks from the gummers to the chain, the rock-shaft moved by the main shaft and having the crank-arms for moving the conveyers, the ratchet-wheel on the chain-drum, the bell-crank carrying the pawl co-operating with the ratchet-wheel, and the crank-arm on the rock-shaft connected with the bell-crank lever, the teeth on the ratchet-wheel and the pawl being in proper relation to operate during the forward movement of the conveyers.

7. In a machine such as described, the combination, with the gummers, main operating-shaft, the conveyers, the rock-shaft moved by the main shaft, and the arms on said rock-shaft connected with the conveyers, of the drying and reversing chain, the drum around which said chain passes, having the ratchet-wheel thereon, the bell-crank lever pivoted on the drum-shaft, the pawl on said bell-crank lever engaging the ratchet-wheel, the arm on the rock-shaft, and the link connected to the bell-crank lever and loosely connected to the arm, substantially as described.

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