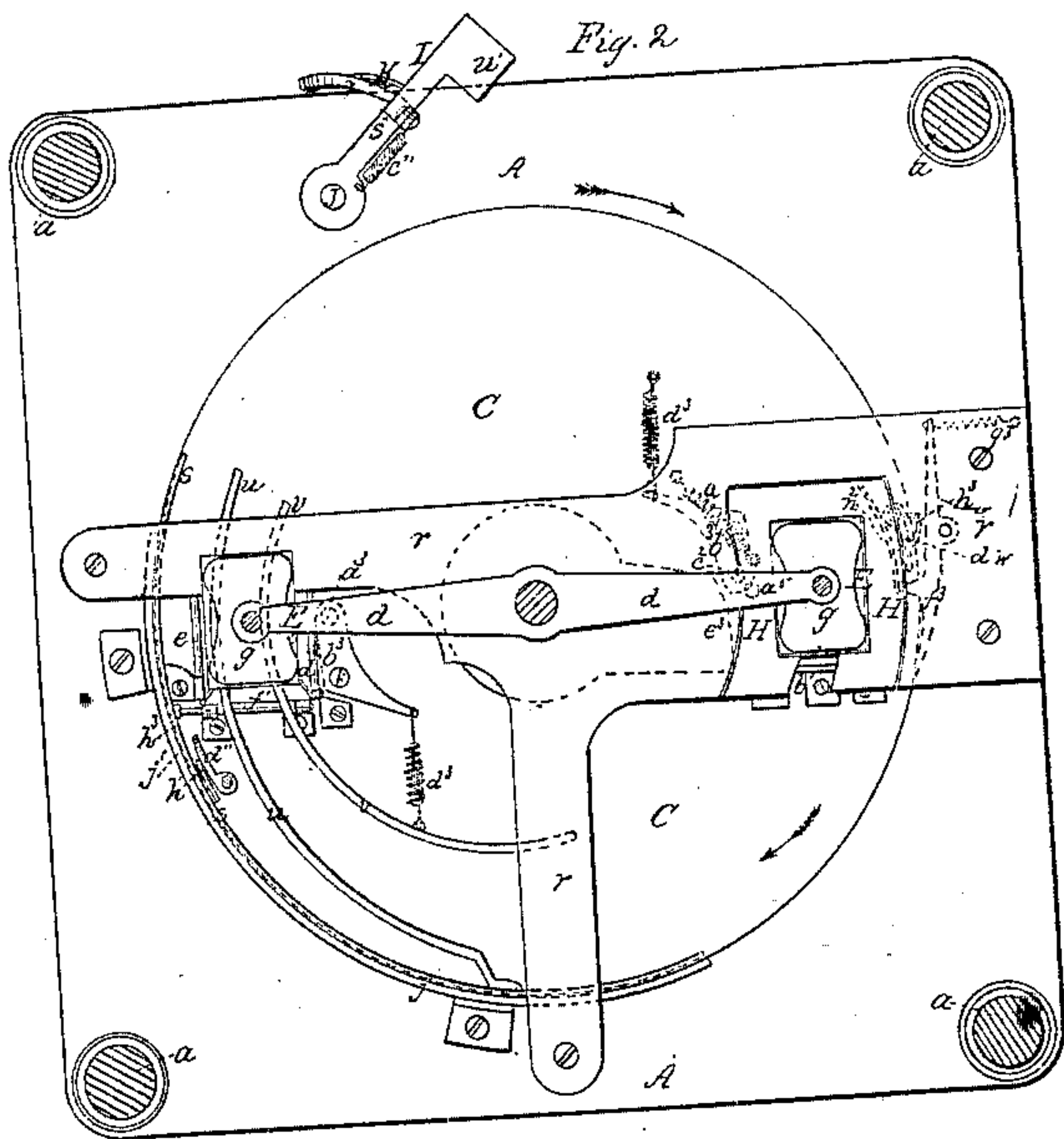
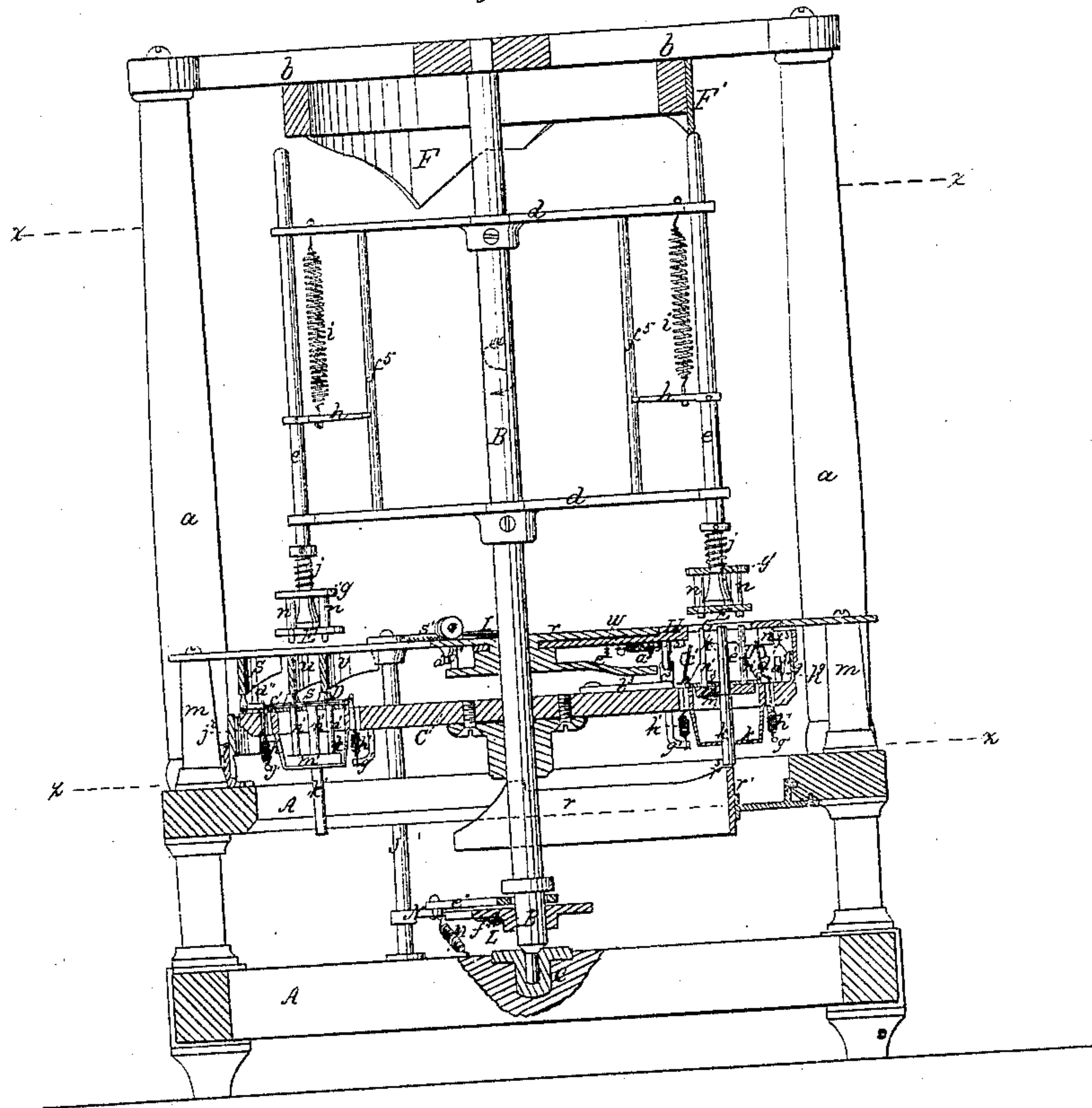


E. Allen. *Sheet 1 of 2 Sheets.*
Envelope Mach.

N^o 57617. *Patented Aug. 28. 1866.*
Fig. 1



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E. Allen. Sheet 2 of 2 Sheets.
Envelope Mach.
N^o 57617. Patented Aug. 28. 1860.

Fig. 3

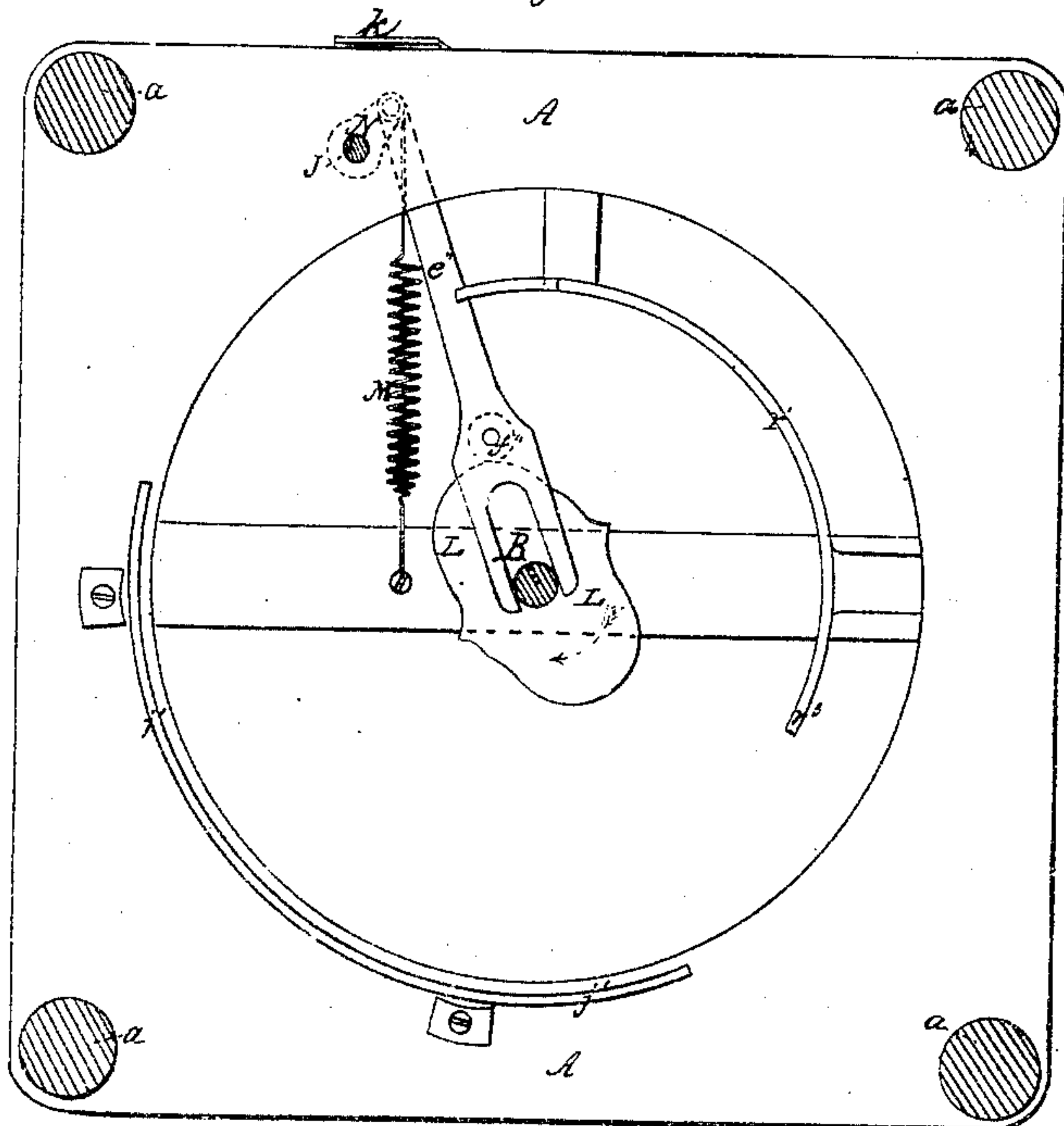


Fig. 4

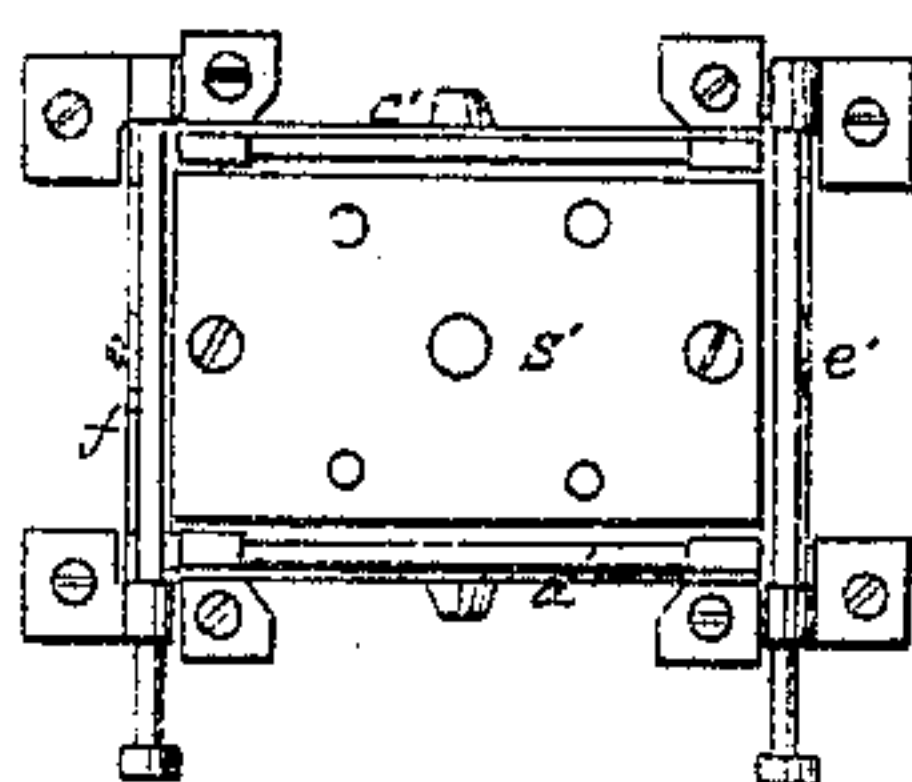


Fig. 5

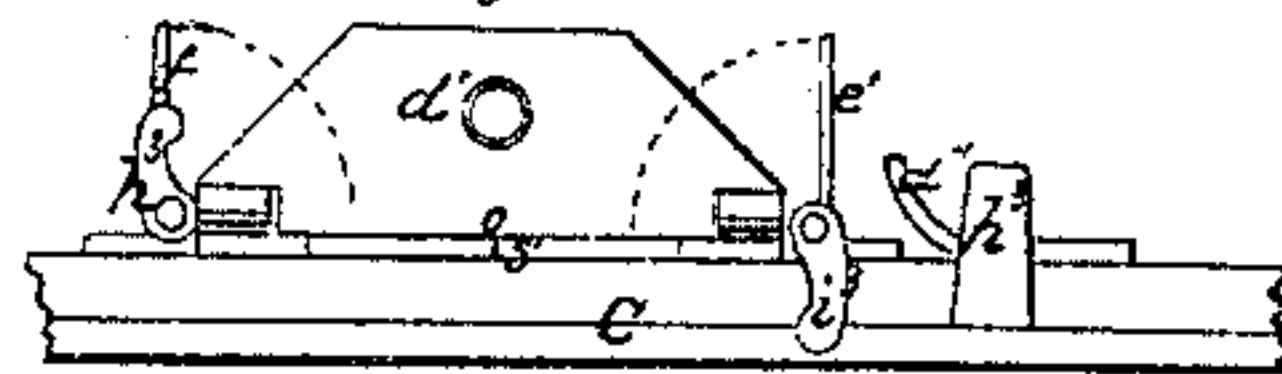


Fig. 6

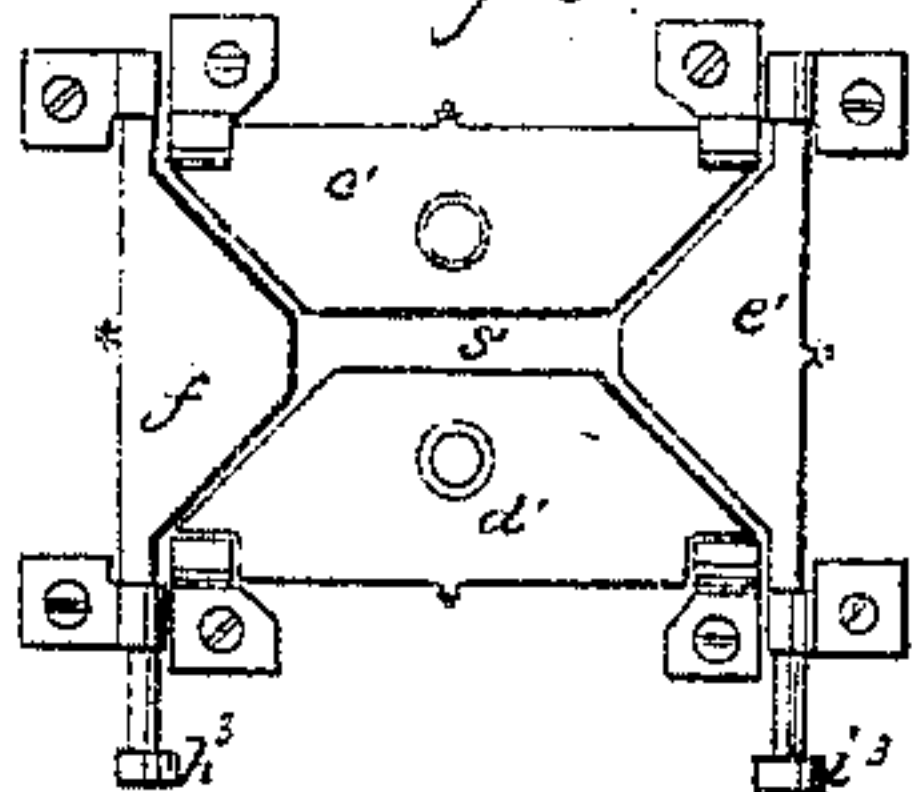


Fig. 7

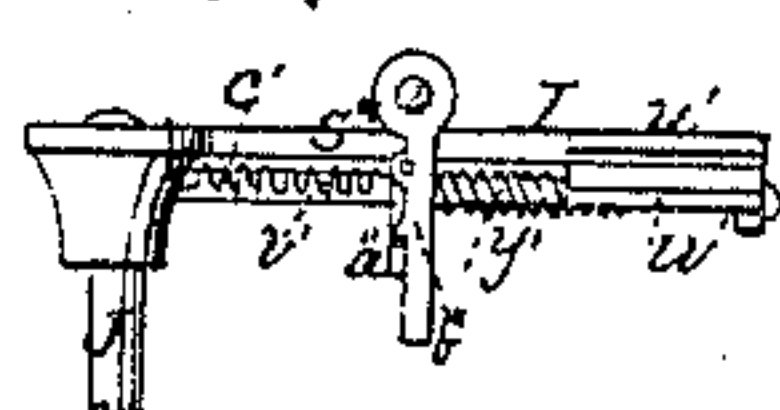
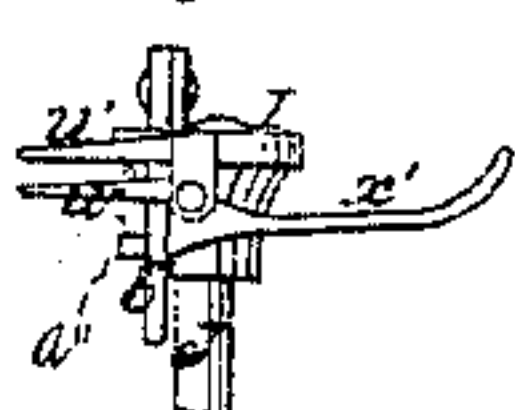


Fig. 8



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UNITED STATES PATENT OFFICE.

EDWIN ALLEN, OF NORWICH, CONNECTICUT.

MACHINE FOR MAKING ENVELOPES.

Specification forming part of Letters Patent No. 57,617, dated August 28, 1866.

To all whom it may concern:

Be it known that I, EDWIN ALLEN, of Norwich, in the county of New London and State of Connecticut, have invented a new and Improved Machine for Making Envelopes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a central vertical section. Fig. 2 is a horizontal transverse section taken in the line *xx* of Fig. 1. Fig. 3 is a horizontal transverse section taken in the line *zz* of Fig. 1. Fig. 4 is a plan view of the folders in an open position. Fig. 5 is a side view of the same. Fig. 6 is a plan view of the folders in a closed position. Fig. 7 is a side view of the grippers which take the envelope from the machine. Fig. 8 is an end view of the same.

Similar letters of reference indicate corresponding parts in all the figures.

This invention relates to an envelope-machine of novel construction, in which two or more sets of folders are employed in such manner as to render the machine capable of producing a much greater number of envelopes in a given time than the machines in common use, in which only one set of folders is used.

The leading feature of the invention consists in the arrangement of two or more sets of folders upon or in a horizontal table, by the rotation of which the several sets of folders are brought, one after another, opposite to a feeder or feed-table for the reception of the blanks, and caused to fold them as the rotation proceeds.

Other features of the invention consist in the mechanism employed to produce the operation of the folders and in the device and means of operating the same, whereby the folded envelopes are delivered from the folders and discharged from the machine.

To enable others to understand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

A represents the bed-piece, which constitutes the base of the machine, and supports the working parts thereof. Projecting upward from the four corners of this base are upright posts *a*, united at the top by horizontal diagonal bars or braces *b*, crossing each at

their centers, and having a supporting vertical socket or bearing, which receives the upper end of a vertical rotating shaft, B. The lower end of the said shaft works in a bearing or step formed in the center of a transverse bar, *c*, placed in the lower part of the base A.

Firmly secured upon the shaft B, at a little distance above the upper side of the base A, is a circular horizontal table, C, and situated opposite each other upon this table C, near the periphery thereof, are two sets of folders, D, the construction and operation of which will be hereinafter fully set forth.

Rigidly fixed upon the vertical rotating shaft B, above the table C, and one above the other, are two horizontal parallel cross-bars, *d*, which are situated at some distance apart, and have vertical holes formed in their ends, in which are placed the vertical sliding rods *e*, which move up and down in the said ends, and have the plungers E secured upon their lower extremities. Upon each side of the shaft B is an upright rod, *f*⁵, which extends from one cross-bar *d* to the other, and is firmly attached thereto.

Rigidly secured to each sliding rod *e* is a short horizontal bar, *h*, which has a vertical notch formed in its inner end, into which is fitted one of the rods *f*⁵, these rods *f*⁵ thus acting as guides to keep the rods *e*, with the plungers E attached thereto, from turning around, a spiral spring, *i*, extending from each short bar *h* up to the upper cross-bar *d*, in order to provide for the upward movement of the rods *e* and their plungers E.

Projecting downward from the horizontal braces *b*, and secured thereto by any suitable means, are two stationary vertical cams, F and F', which are curved horizontally in the arc of a circle concentric with the shaft B, and are placed opposite each other, the cam F being nearly over the die-plate H, the lower edges of these cams F F' being so formed as to move the sliding rods *e* downward at the proper time, the upper ends of the said rods, as they rotate around the central shaft, B, coming in contact with the said stationary cams.

Situated upon the lower end of each vertical sliding rod *e* is a flat horizontal plate, *g*, which has a sliding movement upon the sliding rod, and is provided at each of its four corners

with a downwardly-projecting pin, *n*. The lower ends of these pins *n* are of less diameter than their main length and pass through vertical holes in the plungers *E*, the plates *g* being pressed downward by spiral springs *j*, coiled around the rods *e*, as shown in Fig. 1. Supported upon short posts *m*, which project upward from the upper surface of the base *A*, and situated at a little distance above the upper surface of the table *C*, is a flat horizontal plate, *r*. One side of this plate *r* supports the vertical curved cams or guides *s u v*, which are secured by any suitable means to the under surface thereof, and operate the folders, as will be presently explained.

In the stationary horizontal plate *r* is a broad slot, the inner and outer edges of which are formed on the arcs of circles concentric with the shaft *B*, and in which is situated the horizontally-moving die-plate *H*. This die-plate *H* is secured upon a horizontal arm, *w*, which is fitted to turn upon the hub of the cam *L*, the said hub being concentric with the central shaft, *B*. The slot in which the die-plate *H* is placed is open at one end to allow the said die-plate to be moved out therefrom when required in the operation of the machine. A spiral spring, *a'*, one end of which is fastened to the stationary plate *r* and the other end to the arm *w*, tends to draw the die-plate *H* back into the slot when it is moved out therefrom. Formed in this die-plate is a slot or die, *G*, through which the blanks are pressed by the plungers *E* at the commencement of the folding operation, and which is longer and broader than the plungers by at least twice the thickness of the paper of which the blank is formed. *b* is a small opening formed at one end of the die *G*, which allows the shafts *e* to pass out from the dies in carrying the blank therefrom.

The sets of folders *D* are each composed of a bottom plate, *s'*, situated over a rectangular hole or slot in the table *C*, and of four pivoted folding-wings, *e' d' e' f*, the folding-wings *e'* and *d'* being situated opposite each other to fold the longitudinal flaps of the envelopes, and the folding-wings *e' f* being also opposite each other, but at right angles to the wings *e' d'*, and folding the end flaps of the envelope. Each of these folding-wings is pivoted at its lower or outer edge in suitable bearings fixed upon the upper surface of the table *C* and upon the under side of the said table. Immediately under each of the said folding-wings is a small downwardly-projecting arm or staple, *g'*, to the lower extremity of which is attached a spiral spring, *h'*, which passes up through a hole in the table, and has its upper end attached to the lower or outer edge of the folding-wing above it. By this means the said folding-wings are kept in an upright position, except when pressed downward by the curved stationary cams or guides *s u v* and the similar stationary cam or guide *j'*, secured to the base *A*.

Projecting downward from the under sur-

face of the table and underneath each folder *D* is a hanger, *k*, and working in a hole formed in the bottom of this hanger *k* is a short vertical shaft, *k'*, which has a horizontal plate, *m'*, secured upon it above the said bottom, and projecting upward from this plate *m'* into holes formed in the bottom plate of the folder above it are four upright pins, *n'*, which are so situated as to be immediately under and opposite the downwardly-projecting pins *n* of the plates *g*, and to meet the same when they are forced upward. The upper end of the shaft *k'* also projects up into a hole in the bottom plate of the folder, so that it may move more steadily in sliding up and down. These shafts, with their plates *m'* and pins *n'*, descend by their own weight and rest upon the bottoms of the hangers *k*, except when moved and held upward by the stationary cam *r'*, to deliver the folded envelope from the sets of folders *D* to the nippers *I*, which convey it away from the machine.

Situated in suitable bearings formed in the base *A*, and at one side of the table *B*, is a vertical shaft, *J*, to the upper end of which is rigidly secured a horizontal bar, *s''*, and upon the outer extremity of this bar *s''* is a flat nipping-jaw, *u'*. A small lug or ear projects downward from the rearmost corner of this jaw, and extending from this lug to the upper end of the shaft *J* is a small shaft, *v'*, to the outer end of which, underneath the jaw *u'*, is secured a similar jaw, *w'*, which acts, in conjunction with the jaw *u'*, to grasp the envelope. A spiral spring, *y'*, is coiled around the shaft *v'*, with one end attached thereto and the other attached to the bar *s''*, in such manner that the said spring draws or forces the jaws together.

In order to open the jaws when required, a curved arm, *x'*, projects back from the shaft *v'*; and secured to the edge of the base *A*, behind the shaft *v'*, is a stationary upright cam, *K*, so that when the nippers are moved back, as will be presently set forth, the arm *x'* is brought in contact with the said cam *K*, and thus brings the jaws *u'* and *w'* apart.

Inasmuch as it is necessary to hold the jaws open previous to their grasping the envelope, a spur, *a''*, projects forward from the inner end of the arm *x'*, and a catch, *b''*, operated by a spiral spring, *c''*, is pivoted upon the front side of the bar *s''*, and has a notch or shoulder formed upon it, which holds the spur *a''* down to retain the jaws in an open position. A small projection, *d''*, secured to the table *B* in rear of each holder *D*, trips the spring-catch *b''*, to allow the jaws to close and grasp the folded envelope.

Fixed transversely upon the shaft *J*, underneath the table *C*, is an arm, *N*, to the outer end of which is pivoted one end of a horizontal bar, *e''*, the inner end of which is forked and placed astride of the lower end of the vertical shaft *B*. Upon the under side of this bar *e''* is situated a friction-roller, *f''*; and secured upon the shaft *B* is a cam, *L*, which acts upon

the said friction-roller to push the bar e'' outward to turn the shaft J, in order to move the nipping apparatus outward as required in removing the envelopes from the machine, the inward movement of the said nipping apparatus being produced by a spiral spring, M, one end of which is secured to the arm N and the other to the transverse bar c of the base A, as represented in Figs. 1 and 3.

A rotary motion in the direction of the arrow shown in Fig. 2 being given to the vertical shaft B, the table C and the other parts of the machine supported by the said shaft are also caused to revolve, the vertical rods or shafts e being forced downward at suitable points during their revolutions by the vertical cams F, and being kept in an elevated position the rest of the time by the spiral springs b' .

The operation of each set of folders D, with the plunger E and other parts connected therewith, is as follows, the blanks being fed alternately to each folder, and the folded envelope being removed from one folder while the folding of the succeeding envelope is being commenced by the other: The blanks from which the envelopes are formed are placed, in the first instance, upon a stationary feed-plate or feed-table, r^1 , formed by that portion of the horizontal plate r which is situated at the outer edge of the die-plate H, and are conveyed, one at a time, to the die-plate H by any suitable mechanism, and may be gummed by any proper means, either before being placed upon the die-plate or as soon as placed thereon, the central part of each blank—or, in other words, that part which forms the smooth side of the envelope—being situated squarely over the slot or die G. As the shaft B revolves and brings one of the plungers over the said die G, and brings one of the folders D beneath it, the slight elevation r^3 at the end of the cam r' forces upward the shaft k' below the folder, so that the upper ends of its pins n' are raised up flush with the top of the die-plate, whereupon the cam F, situated over the die G, acts upon the end of the rod e , to which the plunger is attached, and forces the said plunger downward, so that the blank is clamped between the upper ends of the said pins n' and the lower ends of the pins n , which project downward through holes in the plunger, as hereinbefore set forth. When this is done the shaft k' passes from the cam r' , and the cam F continues to force the plunger downward, so that it carries the blank down through the die G until it reaches the bottom plate, s' , of the set of folders D, the sides and ends of the die turning the flaps of the blank into a vertical position, and properly forming the corners of the envelope. Inasmuch as the folders, plungers, and other parts attached to the shaft B continue to rotate while the blank is being forced downward through the die, as just mentioned, it is necessary that the die-plate H should have a lateral movement corresponding to that of the

plunger E during such passage of the blank through the die. This movement of the die-plate is produced as follows: A small pin, a^3 , projects downward from the inner side of the arm w , and pivoted upon the upper surface of the table C, at the inner side of each set of folders D, is a horizontal pivoted bar, b^3 , which has at one end an upright pin, c^3 , and is operated by a spiral spring, d^3 , to press the said end against a stationary cam, e^3 , secured to the under side of the central part of the horizontal plate r , the bars b^3 being so situated that as they are carried underneath the arm w of the die-plate H the pin c^3 strikes the pin a^3 and moves the said arm w , with the die-plate H attached thereto, around with the revolutions of the table until the blank has been brought down upon the bottom plate, s' , of the folder, as just explained, on which the cam tilts or turns the said bar b^3 upon its pivot and moves the pin c^3 away from the pin a^3 , and thus allows the die-plate to be drawn back to its first position by means of the spiral spring a' . These parts are shown more clearly in dotted lines in Fig. 2.

In order to prevent the die-plate from being drawn back too quickly, and to prevent its slamming as it comes back to its place, a brake, f^3 , is pivoted underneath the horizontal plate r , with its end bearing against a downwardly-projecting rim, n^3 , formed upon the outer edge of the die-plate H and operated by a spring, g^3 , so that the friction of the brake upon the rim retards the motion of the die-plate as it returns to its place, as just mentioned. A short spur, h^3 , secured to the edge of the table C immediately in rear of each folder D, strikes the inner side of this brake while the die-plate is being moved laterally, as just described, and so releases the die-plate from the pressure of the brake during such forward movement. The die-plate having been thus returned to its first position and the blank brought down upon the bottom plate, s' , of the set of folders D, as just fully explained, the continued rotation of the shaft B brings the shaft e clear of the cam F, whereupon the spring i forces the said shaft e upward, thus raising the plunger clear of the blank, and the continued rotation of the shaft B causing the wings of the folder to successively turn down the flaps of the blank as follows: The pivot to which the folding-wing f , at the foremost end of the folder, is secured has rigidly attached to its outer end a short upwardly-projecting arm or spur, h^3 , the upper end of which strikes the inclined under side of the stationary cams s , and is turned downward in a horizontal position, which, of course, turns down the wing d' and completes the folding of one flap of the blank. The pivot of the rearmost wing, e' , has a similar arm or spur, i^3 , which projects downward and strikes the inclined upper side of the stationary cam j' , and is turned upward in such manner as to turn the wing e' down upon the other end flap of the blank as soon as the wing f has been brought to a horizontal position,

as just described. The back of the wing *c'* then strikes, first, upon the curved outer side of the cam *v*, and then upon the inclined under side thereof, and is forced thereby into a horizontal position and completes the folding of one of the longitudinal flaps of the envelope, and immediately after this the back of the wing *d'*, striking first upon the curved inner side of the cam *u*, and afterward upon the inclined under surface thereof, is also brought into a horizontal position and completes the folding of the remaining flap. The folder then passes out from underneath the cams *j' s u v*, and the springs *h'* bring the wings back to a vertical position, thus uncovering the folded envelope. The shaft *e* is then forced downward by the stationary cam *F'* to bring the end of the pins *n*, which project through the plunger *E*, down upon the folded envelope, the shaft *e* then passing beyond the point of the said cam and rising again simultaneously with the upward movement of the shaft *k'*, produced by the stationary cam *r'* acting upon the lower end of the said shaft *k'*. The pins *n'* of the said plate, projecting upward through the holes in the bottom plate *s'* of the folder, push the envelope upward from between the wings thereof, the envelope being clamped while rising between the upper ends of the pins *n'* and the lower ends of the pins *n*, the springs *j'* allowing a suitable yielding movement to the pins *n* when desired, and enabling them to sustain the envelope at a little distance below the plungers. The envelope being thus elevated is brought opposite the nipping or removing apparatus *I*, the jaws of which have been previously opened by the action of the cam *K* upon the curved arm *x'*, as hereinbefore explained. The continued rotation of the cam *L* then allows the spring *M*, acting on the arm *k* of the shaft *J*, to turn the said shaft in such manner as to bring the jaws *u' w'* inward, one above and the other below the outer edge of the envelope, whereupon the spurs *d''* strike the catch *b''* and release the jaw *w'* therefrom, thus allowing the spring *y'* to bring the jaw *w'* up against the upper jaw, *u'*, so that the envelope is clamped between them. The cam *L*, acting on the bar *e''*, then turns the arm *k* outward, thus bringing the jaws back until the arm *x'* is raised by the cam *K*, which opens the said jaws to drop the envelope, and allows the catch *b''* to catch upon the spur *a''* to hold them open, as hereinbefore fully set forth. The folder *D* and the plunger *E*, with their appurtenances, then pass on to their first position with reference to the die-plate *H*.

Instead of only two sets of folders, with

the plungers and other appurtenances thereof, any desired number may be arranged upon the table *C* to operate in connection with the die *G* and the devices for removing the envelope from the machine, in the manner herein set forth.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Arranging the folding apparatus of an envelope-machine to revolve about an upright axis, substantially as herein specified.

2. The combination, in an envelope-machine, of one or more sets of revolving folding apparatus and a stationary feed-board or feed-table, substantially as and for the purpose herein described.

3. The combination, in an envelope-machine, of one or more revolving plungers, a fixed feed-table or feed-board, and a die-plate, which moves a certain distance with the said plunger or plungers, and afterward returns to a fixed position relatively to the said feed-board or feed-table, substantially as and for the purpose herein described.

4. The sliding pins *n* and *n'*, operating conjointly to deliver the envelopes from the folding apparatus, substantially as herein set forth.

5. The nipping-jaws *u' w'*, so arranged as to swing to and from the table *A*, to remove the envelopes from the folding apparatus, substantially as herein set forth.

6. The curved and inclined stationary cams *j' s u v*, arranged in relation to the wings *c' d' e' f* of the folding apparatus substantially as herein set forth, for the purpose specified.

7. The brake *f³*, applied and operating, in combination with the laterally-moving die-plate *H*, substantially as herein set forth, for the purpose specified.

8. The arrangement of the pivoted bars *b³* and their pins *c³* with reference to the downwardly-projecting pin *a³* and to the stationary cam *e³* to produce the lateral movement of the die-plate *H*, substantially as herein set forth.

9. The nipping-jaws *u' w'*, swinging on a vertical axis, and arranged with reference to the rotating cam *L*, bar *e''*, friction-roller *f*, and arm *N* substantially as herein set forth, for the purpose specified.

10. The spring *y'*, curved arm *x'*, and spring-catch *b''*, arranged with reference to each other and to the nipping-jaws *u' w'*, projection *d'*, and stationary cam *K* substantially as herein set forth, for the purpose specified.

EDWIN ALLEN.

Witnesses:

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