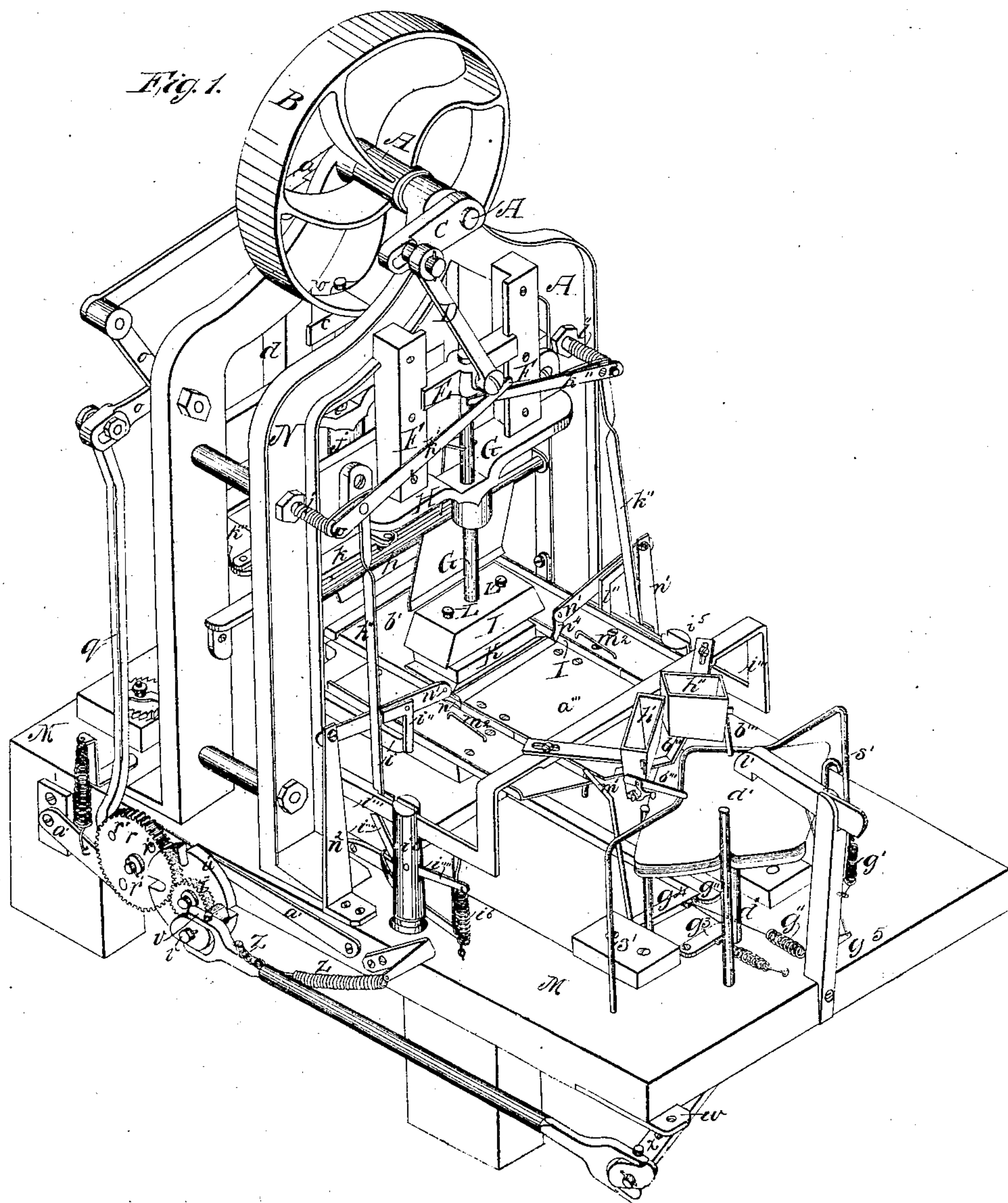


No. 9,812.

PATENTED JUNE 21, 1853.

R. L. HAWES.
MACHINE FOR FOLDING AND MAKING ENVELOPS.

2 SHEETS—SHEET 1.



UNITED STATES PATENT OFFICE.

R. L. HAWES, OF WORCESTER, MASSACHUSETTS.

ENVELOP-FOLDING MACHINE.

Specification of Letters Patent No. 9,812, dated June 21, 1853.

To all whom it may concern:

Be it known that I, R. L. HAWES, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Folding and Making Envelops; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference thereon, forming a part of this specification.

The nature of my invention consists in providing in one self feeding machine, the ability, when motion is given it, to take one sheet of paper at one time, and carry it forward to impress or form a base, and thus to retain it until it is carried onward to the finisher, whence it is discharged, a finished or folded and pasted envelop. The paste being applied in its progress as will be hereinafter fully described.

To enable others skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

Of said drawings Figure 1, is an isometrical view taken from the corner of the front or gearing side and the front end of the machine showing all parts from this point which are visible. Fig. 2, is an elevation of the back part of the machine showing those parts which appear back of the frame or from the back through the frame. Fig. 3, is a plan view of the machine showing such parts as appear below the red line (A, A, Fig. 2,) the parts above that part being removed. Fig. 4, is a plan view showing such parts as appear below the red line (B, B, Fig. 2) the parts above that line being removed. Fig. 5 is a plan view of the under side of the foundation of the machine with such parts as are thereto connected—being a broken section from the center of the machine when the same is inverted; and Fig. 6, a side elevation.

Like parts in each of these figures are designated by the same letters.

In order to be the better understood. I have divided the machine into parts by describing one part separate from the other, afterward bringing the several parts together, and showing their operation collectively.

Part 1.—This part I will call the first folder or crimper. This receives its motion from the main shaft A. This shaft is to be

put in motion by power applied in the usual manner to the pulley (B) upon the main shaft (A) which has a crank (C) and to this is attached the connecting rod (D) which is itself connected to the cross head (E). This cross head is arranged to slide on its ways (F, F,) and carries with it the piston (G,) attached to it which piston is further guided by a stationary cross brace (H). Thus a perpendicular motion is given to the cross head and piston from the crank before named through the connecting rod (D). At the lower end of the piston is a double follower or platen; this is arranged by making the upper part, or that which is attached to the piston, hollow on its under side, so that, the lower or dropping part may pass into it when the pressure is applied. The upper part is known as (I) and the lower part as K and the two sliding rods which connect them together as (L) and through this connection the two constitute but one piece. The use of this double follower is to press the paper down into a recess or chamber prepared for it, in the bed and by the paper being thus pressed the square or first crimp is put in it to form the face of the envelop. The paper is intended to remain in the chamber as formed, for the purpose of being conveyed to the second folder, which could not be done without the use of the lower follower (K) which has the power to drop a short distance upon its slides (L) so as to keep the sheet from rising with the follower after the crimp has been put in. The crimp is put in by pressing the outer edge of the upper follower (I) hard into the chamber which it just fits, and from this fact, the sheet might rise with it, were it not that the lower follower, by its following and falling upon it will retain it until the upper follower has left it; thus the crimped sheet remains in its place in the chamber for the next operation presently to be described.

Part 2.—This relates to the second operation or folding the envelop to a finished state. The crank (a) is placed upon the main shaft (A) and by its connecting rod (b) is attached to the cross head (c). This cross head works upon its vertical ways (d, d,) and carries with it the piston (e) which piston is more firmly held in its place by the cross brace (f). At the lower end of this piston is a follower (g) upon which is attached the folding blades (h) four in num-

ber, or one for each of the four sides. The reciprocating bed (presently to be described) being placed with the chamber containing the crimped sheet under this follower (*g*),

5 the piston may descend carrying with it the folding blades. The crimped envelop having been left in the chamber with its four ends to form the laps standing upward, while the square part is still on the bottom

10 of the chamber.

The folding blades (*h*) have a flanch or lip at the top, by which they are kept in their places and attached to their follower (*g*). Upon the outside of each of these

15 blades is a guide (*i*) to cause the blades to be thrown inward, toward the center, as they are in their descent upon the envelop. The blades are also guided by the frame

20 *k*, which frame has guides placed upon it to impinge against the guides (*i*) and cause them to effect the inward motion before referred to. These four blades when drawn

25 inward will just fit the inside of the four sides of the chamber in which the paper is crimped and lies at rest; but when raised the lower ends of them are expanded; thus in the downward motion the blades pass

30 out side of the flaps of the paper and by being drawn inward carry them or bend them to the center, and are then pressed down upon the edges all around, thoroughly, putting in and completing the fold

35 from the crimp. In order to prevent accident the blades are not all allowed to come down at one time upon the paper but are

40 so arranged as to come down one at a time, thus bending but one side of the envelop or flap at one time, but all ultimately arrive and press at one time upon the four sides

45 of the folded paper. To effect the action of one of these blades at a time, one is left shorter than the other, so that the longest may strike first and so on successively. These blades are held in place upon their

50 follower by vertical rods (*l*) passing through their flanches; on which rods are provided pressure springs (*l'*) two of which are used to each of the three of the sliding blades, the other blade being stationary as far as rising and falling is concerned, which hold them down except when

55 in action or pressed down by the follower and piston; then they give way until ultimately the whole of the blades rest upon and press the fold down as before referred to. Within the center of the blades and attached to the end of the piston is a flattener or presser (*m*) shown in dotted lines and at

60 the time the blades are pressing upon the edges of the folded envelop this flattener comes down and finishes it by pressing the flaps down and causing the paste to adhere where it is intended, to fully secure the flaps which are to be fastened together.

65 This flattener is attached to the end of the

piston (*e*) while the follower is allowed to slide upon the said piston by a friction collar impinging against it at (*Z'''*).

Part 3.—This part will include the reciprocating beds and their driving gear. The

70 crank (*a*) has connected with it upon its outward pin a second connecting rod (*n*) and this connects with and gives motion to an elbow lever (*o*), and pending from one arm of this elbow lever by means of the pin

75 (*p*) is a catch or pawl (*q*) which is adjustable on the pin of the elbow lever so as to regulate the extent of its motion up and down; (*r*) is a cog wheel which rotates on a shaft secured to the bed of the machine

80 and which is provided with pins (*r'*) projecting inside toward the frame and (*u'*) is a wheel also rotating on a shaft secured to the frame of the machine which is provided with a pinion (*t*) which meshes into the cog

85 wheel (*r*). By the impinging action of the catch or pawl (*q*) on or against the pins of the wheel (*r*) the wheel (*r*) is rotated one fourth of a revolution which by its connection rotates the wheel (*u'*) one half of a

90 revolution, and the wheel (*r*) is held in position by another or auxiliary pawl (*a'*) which catches on the pins (*r'*). The motion thus communicated to the wheel (*u'*) at every revolution of the main shaft (*A*) is

95 converted into a reciprocating motion to operate the upper and lower platforms (*a''* *a'''*) as follows—*v'*, is a wrist or crank pin firmly secured to the wheel (*u'*) in an adjustable manner and connected with it and

100 the short arm of a lever (*x*) is a connecting rod (*v*), which connection is made with universal joints so that the rod (*v*) will adapt itself to the motion of the lever and wheel. On the lower side of the lower plat-

105 form is a projecting stanchion *V* which is connected with the other arm of the lever *x* by the rod (*y*) which completes the whole connection, thus by these several parts the bed gets its reciprocating motion and is

110 moved in and out at the desired time. A spring (*z*) with a chain (*z'*) which was omitted in the description above is attached to the connecting rod (*v*) to assist in drawing the crank pin *v'* over the center or dead

115 point.

The reciprocating bed is of two platforms one above the other, but both are one general reciprocating frame permanently fixed

120 each to the other; this frame has many parts fixed to it which will be presently described. The lower part of this bed is affixed to ways upon the bed or main foundation (*M*) upon which ways it travels back and forth, and otherwise it is a moving foundation for the

125 upper platform and other moving parts. The lower platform will be known as (*a''*), and the upper as (*a'''*) which is a main operating part. At the back end of this upper platform is a vertical vibrating table that

130

is a table within the box or chamber rising from the extreme rear end of the lower platform. This table recedes before the double followers (I K) and with the sides from which it recedes leaves a chamber in which the said follower presses the paper and crimps it as before stated. This table is shown in Fig. 1, and also in dotted lines in Fig. 2. Grooves are made in the upper face of the platform (a''') to receive the cleaving points presently to be described.

The upper platform may be divided into two parts viz.—the rear part or upper face of the chamber and the front part a''' , and has a plow like front. The front part is a conveying table for the paper (b'') turned up as a first retainer of the paper. Besides the frame work on the lower platform there are two vertical tubes or cylinders ($c' c''$) secured thereto which receive stanchions attached to and projecting one from the chamber table and the other from the platform (a''') these stanchions rest upon helical springs (shown in dotted lines) in the cylinders and the latter one supports the main weight of the upper platform (a''') and the former only the chamber table. The chamber table (b') and its stanchion is kept in place, down from the time it is forced down by the double follower or crimper until it is released by the operation of the springs (1, and 2,) and the lever (3) on the reciprocation of the platform (a''). Said lever (3), as the chamber table is pressed down by the double follower, enters a notch in the stanchion and the table is thus held in position, down in the chamber, until the platforms return in the opposite direction. The upper platform (a''') is supported in (e'') by the helical spring or an accommodation spring merely to let the upper platform sink a little when the double follower impinges against it at the alternate time, or when the table of the chamber is at the second or finishing point; that is, under the blades to get its last fold.

Part 4 of the supply table.—This will be known as (d') with its stem (d'') extending through the main foundation of the machine where it connects with a weight (e') by a strap running over a pulley (e'') this table by the weight (e') is always kept up against the finger (t') so as to confine the pile of papers upon it while the platforms are on their backward movement. The t' finger is so connected with the lower platform as to release its pressure on the paper when the platforms are on their forward motion so as to allow the plow shaped end to lift a sheet as follows—(g^5) is an elbow lever having its fulcrum on the stanchion supporting the finger to one arm of which and the short arm of the finger is connected a spring (g'), and to the other arm and the lever (g^4) is connected a similar spring (g''), and ful-

crumed on the frame of the machine, and connected to the arm (g^4) and to the frame, is a lever (g^3), and attached to the lower bed is a hooked rod (g'''). By these several connections of the finger the movement of the platforms causes the hooked rod (g''') and springs, alternately, to operate on the finger in such a manner as to allow the plow end of the upper platform to pass under the top sheet on the forward motion of the platforms and to retain the sheets on the table when the platforms are on their backward motion. The sheet of paper is carried on toward the impressor and folder deposited on the plow end of the platform by the edge of the sheet resting against the ledge on the plow.

Part 5. The pasting apparatus and its means of operation.—Two fountains (h', h'') are supplied with paste; each fountain is furnished with a roller having a ratchet and pawl by the turning of which rollers a constant and fresh supply of paste is kept up. The way of raising and lowering these fountains is shown in the drawings; the two levers (k' and k'') passing from either side of the machine to the center, cross at the center so that the cross head (E) may impinge upon and press them down and the springs (l' and l'') will cause them to return when the pressure ceases. These levers operating on the levers (i''') through the intervention of the rods ($k''' k'''$) will cause the fountains to rise and fall at every revolution of the main shaft. The levers (i''') being fulcrumed on the uprights or stanchions (N, N,) so as to rise and fall in slots in the stanchions (i^5) in which stanchions are fulcrumed elbow levers (i'''') provided with springs (i^6) which cause the said levers (i''') to which the fountains are attached to rise when released by the rising of the two levers (k') and (k''). Thus the paste cups or fountains are at the proper time raised and lowered so as to supply paste to the sheets and to lift the sheets from the table onto the plow end of the upper platforms. Paste is supplied to the rollers of the fountain at every revolution of the main shaft as follows—As the fountains descend the pawls turn the rollers one tooth forward by the ends of the levers (b''') impinging upon the stationary rods (s'). I will here remark that all these several parts of the pasting apparatus, being light it is found that each of them acts better by the aid of a small spring to cause them to quickly return after having performed the duty assigned them; it will also be understood that these parts are in duplicate that is one set for each side of the machine.

Part 6. Of passing and holding the sheet.—For this purpose three sets of holders are used, to ply in connection with the upper platform or reciprocating bed. The

first pair are forked rods ($m' m''$) secured to the front part of the bed or main foundation (M). These are for passing the sheet after being lifted from the feed table to the platform (a''') during the passage of the platform they pass up the slots in it and by acting against the edge of the sheet pass it along over the stationary brackets m^2, m^2 . Where the sheet remains until the platforms are on their forward motion again then the sheet is retained by means of the other pair of holders and the platform passes under it. These, the second pair, consist of levers ($n' n'$) fulcrumed to the stanchions ($n^2 n^2$) provided with small cleaving points (n^4) at their ends which fall in grooves in the platform; hinged to these levers ($n' n'$) are elbow levers ($i'' i''$) which are operated upon by guides ($i' i'$), secured to the platform, which raise and lower the cleaving points by acting upon the elbow levers (i'') as the platform moves so as to hold and release the sheet at the proper time. There is another pair of levers or fingers (o^2) and (o^2) which are operated in a similar manner to those above mentioned by the short levers ($o' o'$) impinging against the guides ($q' q'$), secured to the chamber part, the fingers (o^2) are made to rise and fall in such a manner as by the forward motion of the bed to catch and brush off the finished envelop from the chamber as fast as raised by the action of the rising table within said chamber.

35 The board (t^2) is hinged to the reciprocating chamber at the rear end and is provided with a movable ledge or flange (t^3) which flange is connected with said board by metal plates and its motion is limited by pins in the board passing through slots in said plates as at (t^5); this arrangement is for the purpose of allowing it (the board) to pass along freely with the reciprocating platforms and retain the envelop until ready to be discharged therefrom when the ledge or flange falls by its own weight after leaving the rear edge of the frame and allows the envelop to slide off. All these several parts are placed upon and are connected with the foundation (M) and the main frame (N,) the first being horizontal and the last vertical.

The operation of the machine is as follows:—The sheets of paper previously cut to the proper size and shape to form envelops are placed in a pile on the feed table d' . Motion being given to the machine the first revolution of the main shaft, causes the paste fountains to descend and the paste on the rollers produces sufficient adhesion to raise or lift one of the sheets of paper from the pile and also causes the platform to pass forward and the plow end of the upper platform passes under the raised sheet.

65 The second revolution carries the platform

back and its ledge acting against the edge of the sheet causes the sheet to be drawn backward with the platform over the stationary rods $m' m'$. The third revolution carries the sheet back once its length and over the stationary inclined brackets $m^2 m^2$ by the action of the rods $m' m'$, (when the platform is on its forward motion) which retains the sheet while the platform passes under it. The fourth revolution carries the platform back and the sheet is carried with the platform by the action of the stationary brackets $m^2 m^2$. The fifth revolution the double follower descends which gives the first impression to the sheet and carries the platform forward and the action of the cleaving points n^4, n^4 , against the edges of the sheet hold the sheet while the platform passes under it; the sheet is now over the recess or chamber ready to receive the second impression or crimp. The sixth revolution causes the double follower to descend into the chamber carrying the sheet with it and gives the crimp to the sheet, the sheet being left by the follower in the bottom of the chamber, after which in the same revolution the platform is carried back bringing the chamber under the finishing folder. The seventh revolution causes the finishing folder to descend and folds and completes the envelop, as before described. The platform is then on its forward motion, the chamber table is raised with the finished envelop; the discharging fingers $o^2 o^2$ catch the edges of the finished envelop and slide it off on to the inclined board t^2 , from whence it is discharged at the rear end of the machine.

During every seven revolutions the several operations upon a sheet to complete an envelop as described are performed; and at the alternate revolutions of the main shaft the platform is carried forward and backward; and at every forward movement of the platform a sheet is taken up and a finished envelop discharged.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is—

1. The combination of the self adjusting feed table d' with the paste fountains $h' h'$, arranged as that they will descend and press a freshly pasted surface of their rollers upon the top sheet and raise it to permit the table b'' to pass beneath and take away a sheet at every second revolution of the main shaft.

2. I claim the combination of the platform a''' with the hooks $m' m'$ and the retaining fingers $n' n'$ and the fingers for discharging $o^2 o^2$ for the purpose of properly conveying and discharging the sheet or envelop.

3. I claim the combination of the platform a''' with the follower or first presser I and its weight or retainer K, as described.

4. I claim the finishing folder, consisting

of knives *h h h h*, with their adjustable springs and guides in combination with the finishing plunger *m*, to press the envelop and cause the three flaps to adhere together
5 or one to the other.

5. I claim the arrangement for raising the table *b'* in combination with the fingers

o² o², for discharging the finished envelops, all of which is herein before fully described and set forth.

R. L. HAWES.

Witnesses:

GEO. M. RICE,
WM. RICE.