4 Sheets—Sheet 1.

E. W. GOODALE.

Machine for Making Envelopes, Bags, &c.

No. 13,647. Patented Oct. 9, 1855.

Fig. 1.

Side Elevation.

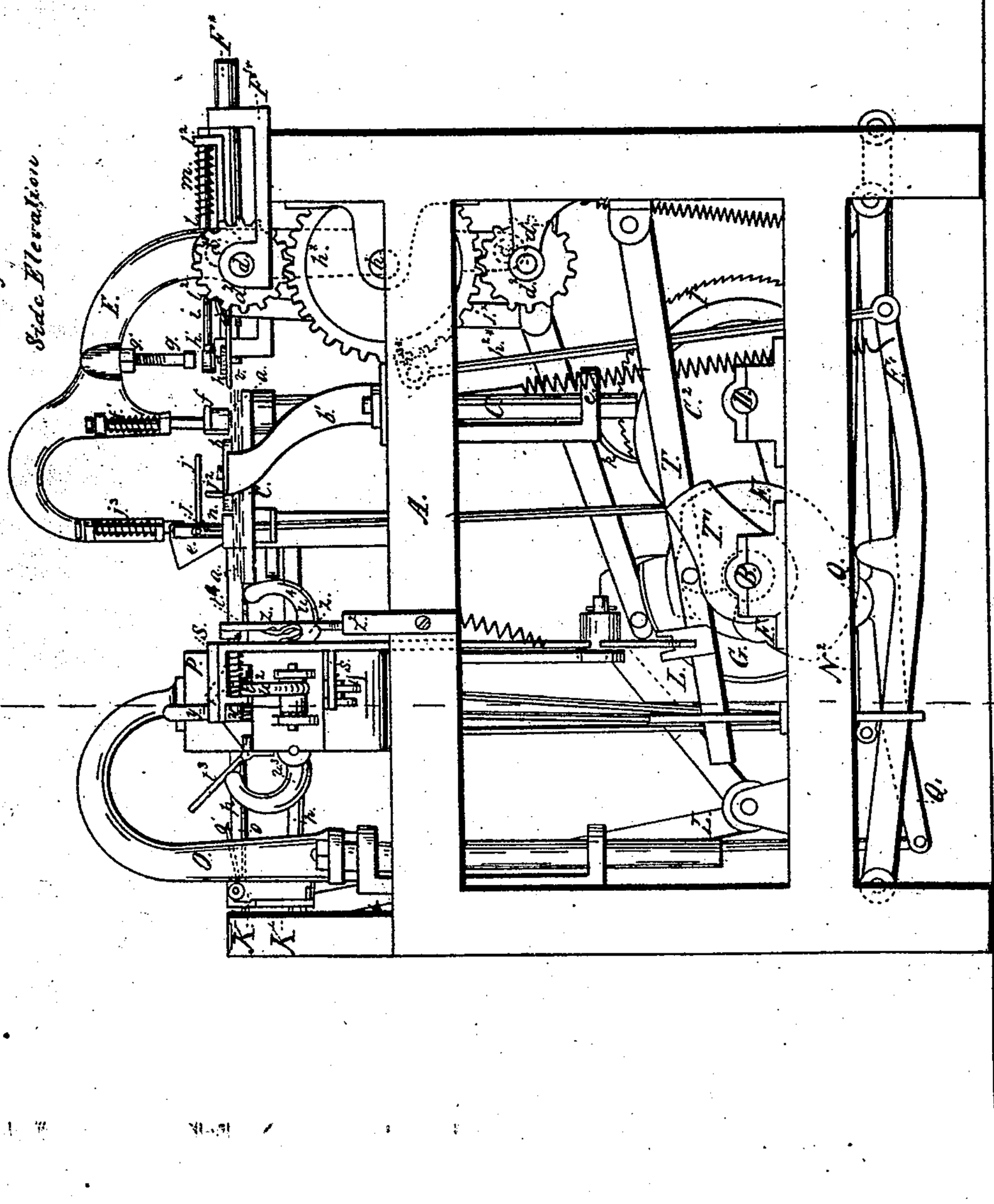

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Fig. 7.

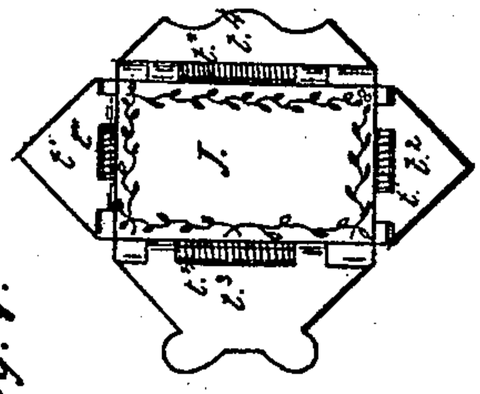

Fig. 6.

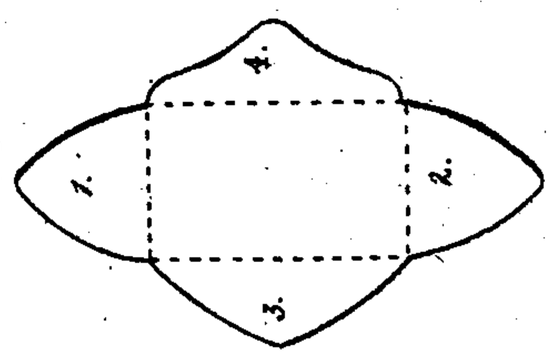

Fig. 2. Plan.

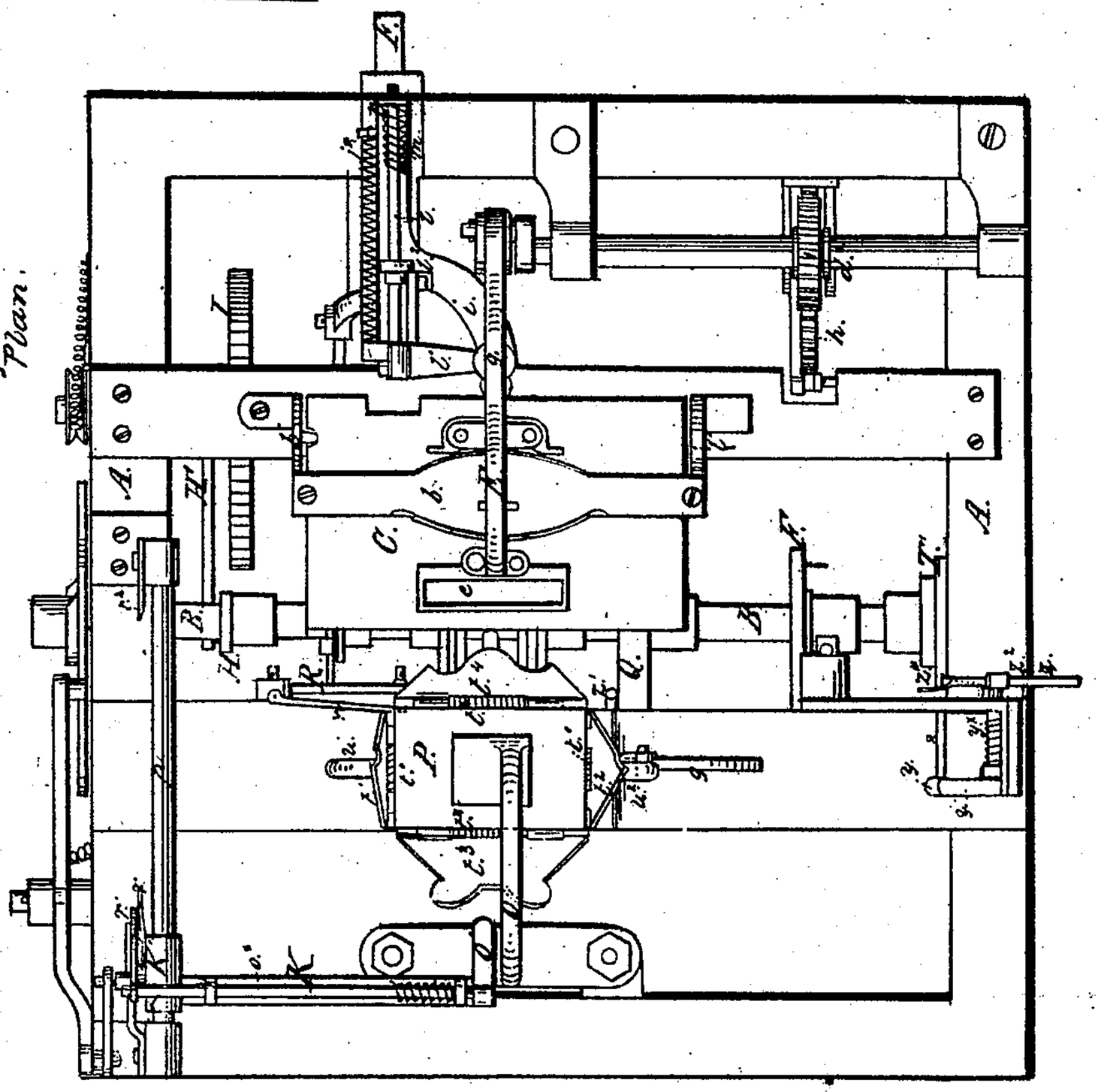

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Fig: 8.

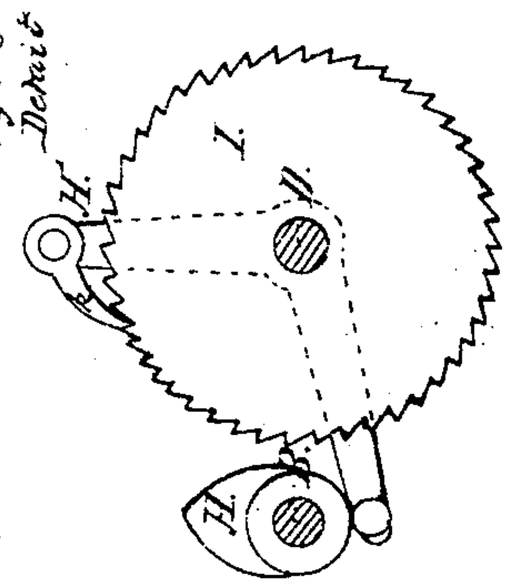
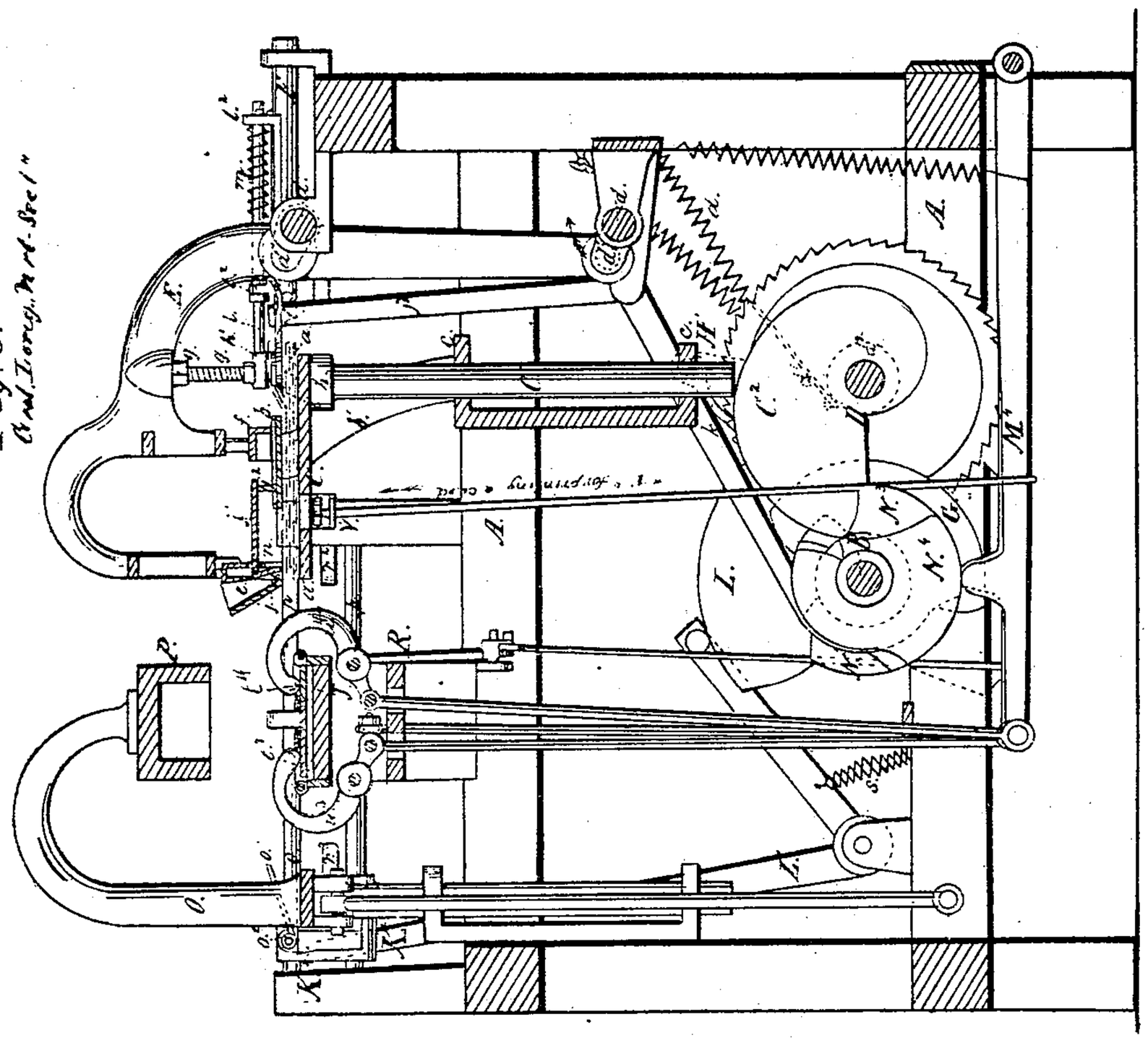


Fig: 3.



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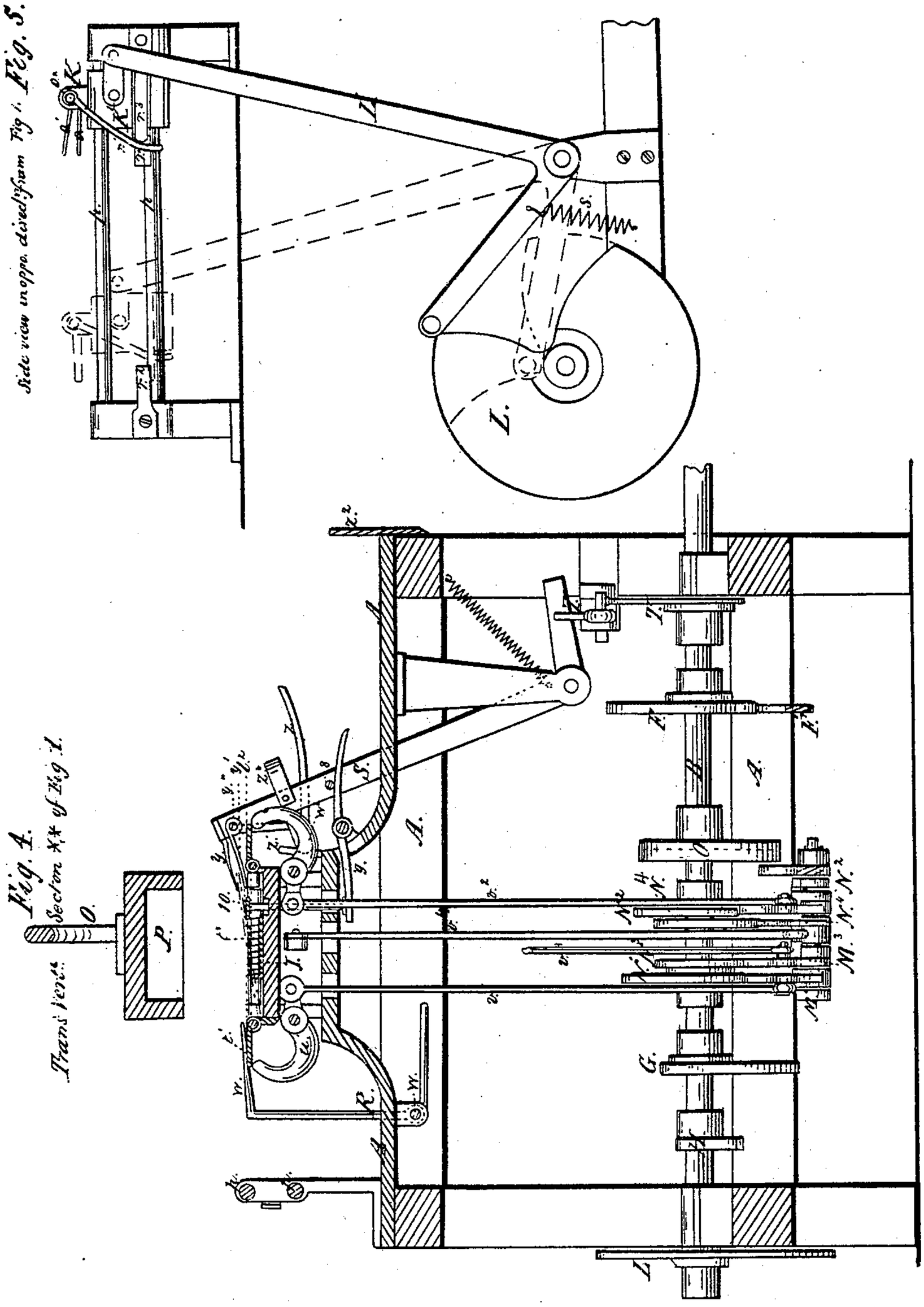

UNITED STATES PATENT OFFICE.

E. W. GOODALE, OF CLINTON, MASSACHUSETTS.

MACHINE FOR MAKING ENVELOPS, &c.

Specification forming part of Letters Patent No. 13,647, dated October 9, 1855; Reissued April 16, 1861, No. 1,170.

To all whom it may concern:

Be it known that I, E. W. GOODALE, of Clinton, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Making Envelops or Bags of Paper or other Material; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a side elevation of an envelop machine constructed according to my invention. Fig. 2, is a plan of the same. Fig. 3, is a central longitudinal vertical section of the same. Fig. 4, is a transverse vertical section of the same, in the line *, *, of Fig. 1. Fig. 5, is a side view of a portion of the machine seen looking in the opposite direction to Fig. 1. Fig. 6, shows an envelop blank unfolded. Fig. 7, shows the faces of the folding stand and the plunger P. Fig. 8, exhibits a detail view of a portion of the machine.

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

This invention consists in certain novel devices and in certain arrangements and combinations of known devices, by which a piece of plain paper of proper form may be made into a perfect envelop either plain or embossed with stamp and with gluten for self sealing.

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

A, A, is the frame work of the machine, B, is the main shaft, which carries a number of cams by which motion is given to the different parts of the machine.

C, is a table, which carries a pile of blanks *a*, *a*, Figs. 1 and 3, from which the envelops are to be formed, the said blanks being supposed to be cut to the proper form before being introduced into the machine. The table C, is attached to an upright shaft C′, which works in proper guides *c*, *c*, and rests on a scroll cam C^2, fast upon a horizontal shaft D, which is parallel with and near to the main shaft B. This shaft D, has not a complete rotary motion but only turns far enough to enable the cam C^2, to raise the table C, up to bring the top blank of the pile *a*, *a*, which is shown by red lines in Figs. 1 and 3, in contact with the under side of the gluten dish *b*, which is supported above the table by two standards *b′*, *b′*, which stand one on each side of the table; the said shaft being operated upon for the above purpose by a spring *d*, applied to a cord *d′*, which winds partly around a pulley d^2, shown dotted in Fig. 3, which is fast on one end of the said shaft. The action of the above spring and cord is such as to make it turn the shaft D to bring the rising part of the cam into operation and raise the shaft *c′*, of the table, and the effect is to press the paper upward toward or against the bottom of the dish *b*, so that when one sheet has been removed, another is brought to the same level.

The several blanks while upon or above the table C, are submitted to three distinct operations, viz: the pasting, for the purpose of uniting the three flaps which form the back of the envelop, the application of the gluten to the remaining flap, or as it is termed, the seal flap to make the envelop self sealing, and the stamping of the seal flap.

E, is a curved head of metal standing partly over the table C, and having attached to it the paste box *e*, which carries the paste to stick together the three first named flaps of the envelop, the gluten die, *f*, which takes the gluten from the gluten dish *b*, and puts it on the seal flap and a screw *g*, which gives pressure to the stamp which stamps the seal on the seal flap. The head E, is carried by two cranks *d′*, *d′*, of equal length on two horizontal shafts *d*, *d*, which are placed one above the other parallel with the shafts B and D. These shafts *d*, *d*, are geared together so as to move always in the same direction, by means of a spur wheel d^2, on each, gearing with a spur wheel *h**, which is fitted to turn easily on a fixed axle *h′**. This wheel *h**, carries an arm h^{3*}, which is connected by a rod h^{2*}, with a lever F′, which is operated upon by a cam F, on the main shaft to draw down the arm h^{3*}, and give the wheel *h**, about one-sixth of a revolution, thereby giving nearly one third of a revolution to the shafts *d*, *d*, and their cranks in the direction of the arrows shown near them in Fig. 3, to carry the head E from the position shown in Fig. 3, where the gluten die *f*, is in the gluten dish *b*, to that shown in Fig. 1, where the gluten die rests on the top sheet of the pile of blanks, the

head being returned again by the action of a spring *i*, which holds the lever up in contact with the cam.

The paste box *e*, is attached to the front part of the head E. It is of angular or V form in its transverse section as shown in Fig. 3, the apex of the V, being at the bottom. Its horizontal form should correspond with the line in which the paste is to be laid upon the blank, for instance if the envelop blank were of the form represented in Fig. 6, the horizontal form of the trough would require to correspond with the margin of the flap 3, which is the only part requiring to be pasted.

As the horizontal form of the box requires to be varied to suit the envelop, I have for convenience' sake represented it as being straight. The bottom of the box is closed except at the proper time to apply the paste, by means of a spring flap or swing valve *j*, see Fig. 1, but at the proper time for applying the paste, the said flap is opened by a lever *j'* attached to the said valve striking a small stand j^2, which is attached to the gluten trough *b*. When the opening occurs, the bottom of the paste box is in contact with the paper and pressing lightly upon it, the pressure being made yielding by springs j^3, applied to the trough. The gluten die *f*, is attached to the head E, behind the paste box. It consists of a solid piece of metal, wood or other suitable material faced if necessary with cloth or leather, its face corresponding in form with the margin of the seal flap, see 4, Fig. 6. Like the paste box it is arranged to press upon the paper with a yielding pressure by means of springs *f'*. The screw *g*, by which pressure is given to the seal flap stamp, is behind the gluten die and is screwed into the head and secured by a jam nut *g'*. The seal flap stamp consists of two dies *h*, *h'*, of which the former, having a hard steel face containing the reverse impression to stamp the seal outside of the seal flap is at the bottom and the latter containing the obverse impression and having a soft metal face is at the top. The die *h*, is attached to an arm *i*, which is secured to a slider F* arranged to slide in a suitable fixed guides F'*, and which receives a movement back and forth by means of an elbow lever j^*, operated upon by a cam G, on the main shaft B, and a spring j'^*, connecting the said slider with one of its guides. At the front extremity of the arm *i*, there is a wedge shaped piece *i'*, standing in front of the die, the duty of which is to pass under the top envelop blank on the pile to make room for the die *h*, to get under; the said top blank being at the time of the entrance of the said wedge below it, raised a little by the gluten die, as the latter commences rising after putting on the gluten; and the table, with the remainder of the pile of blanks, being at the same time lowered a little by the action of a small cam H, see Fig. 8 on the main shaft B, upon an elbow lever H', which is fitted loosely to the shaft D, and which carries a pawl *k*, which engages with a ratchet wheel I, which is fast on the shaft D. By the action of this cam, the lower arm of the elbow lever H', is depressed and the upper arm thrown forward for its pawl to turn the ratchet wheel and shaft D, and the cam C^2, a short distance in the proper direction for the upright shaft C', to descend the cam and carry down the table and its pile of blanks. The table C, and the pile of blanks are raised again after the prominent part of the cam H, passes the elbow lever by the action of the spring *d*, cord *d'*, and pulley d^2, before described. The combination of the ratchet wheel and the elbow lever and pawl allow of a greater or less movement being given by the cam H, to the cam C^2. The top die *h'*, is attached to an arm *l'*, which is carried by a small spindle *l*, working in bearings l^2, l^2, attached to the slider F*, the said spindle having a spring *m*, coiled around it to keep the die *h'*, a little raised from *h*, except during the stamping operation.

As the operations of those parts of the machine whose construction has been thus far described are all intimately related, it may be well to describe their operations and to show the state to which they bring the process of making the envelop before proceeding with the description of the construction of the other parts of the machine. I will first suppose the machine to be in the condition represented in Fig. 3. The top blank of the pile is at that time receiving the paste and having its seal flap stamped by the dies *h*, *h'*, and the gluten die *f*, is charging itself with gluten from the dish *b*, ready for applying the gluten to the next blank. As the movement of the head E, commences in a backward direction, or toward the position shown in Fig. 3, the top blank is removed by a pair of nippers *o*, *o'*, hereinafter to be described, the said blank being released from the stamping dies *h*, *h'*, by the spring *m*, raising the upper die *h'*, as soon as the screw *g*, leaves it. The gluten die charged with gluten is carried back by the head E, until it is deposited upon the blank which is now at the top of the pile. As soon as the gluten die has been pressed on to the blank, the movement of the cam C^2, by means of the ratchet motion on its shaft, takes place and the table C, with all the pile of blanks except the top one, descends, leaving the top blank sticking to the gluten die. Just at this moment the forward movement of the head E takes place and the dies *h*, *h'*, are brought forward by the movement of the slider F. Owing to

the attachment of the head E, to cranks the first part of its movement is in an upward direction, and after this upward movement commences, the wedge shaped extremity i', of the arm i, carrying the lower die h, enters between the top blank and the remainder of the pile, and is followed by the die h. When the head E, has moved a short distance the blank being arrested in its upward movement by striking the gluten dish b, becomes detached from the gluten die, but not before the dies h, h', have received the point of the seal flap or the part which is to receive the stamp, between them, the said dies still remaining open. The forward motion of the head E, continues, leaving the lower arm i, which carries the lower die h, resting on the pile of blanks. Just before the forward movement of the head E terminates, the lever j', strikes the stand j^2, and opens the spring valve j, of the paste trough to supply the paste necessary to stick the flaps 1, 2, and 3, (see Fig. 6) together. The latter part of the forward movement of the head being in a downward direction brings the screw g down upon the upper die h', and gives the pressure necessary to stamp the seal flap. It, at the same time, brings down upon the paper the edge of a thin plate or creaser n, which is attached to and parallel with the paste box, and creases the paper near the edge where it is pasted, to make it stick better. When the head E, returns again, the spring valve of the paste box, closes as soon as the lever j', clears the stand j^2.

During the return of the head E, the nippers O, O′, come into operation to remove the top blank to the folding stand J, which is placed a short distance in advance of the table C. The lower jaw O, of these nippers, is attached rigidly to a horizontal bar K, which occupies a transverse position in the machine, and is attached to a slider K′, shown best in Fig. 5, which is fitted to slide on two horizontal bars p, p, secured to standards erected on one side of the framework A. The upper jaw O′, is attached to a spindle O*, which is fitted to turn freely in bearings secured to the bar K, and it has a coiled spring applied in such a manner as to turn it in a direction to depress the jaw and close the nippers, when the upper jaw is not held up through the agency of a spring catch r, which is attached to the slider K′, and made to arrest a lever r', attached to the spindle O*, during whole time the nippers are intended to be held open. The nippers are caused to be opened and closed by the movement back and forth which they receive for the purpose of carrying the blank. The nippers go backward open to receive the blank and at the end of their movement in that direction are closed by the release of the lever r', from the spring catch r, the said release being effected by the said catch being thrown inward by passing inside a fixed inclined guide piece r^2. After the nippers have advanced with the blank far enough to place it on the folding stand J, the lever r', comes in contact with a fixed stop r^3, and the concluding portion of the movement of the slider K′, throws back the lever r', till it is caught by the catch r, which holds it open during the next backward movement. The movement of the slider K′, which carries the nippers is effected in proper time by its being connected by a link with the longer arm of an albow lever L′, the shorter arm of which carries a pin which bears on the periphery of a cam L, on the main shaft B, the said pin being kept always in contact with the cam by a spring or springs s, s.

The folding stand J, upon which the folding of the envelop or bag is performed, is a table of metal of the same size and form as the finished bag or envelop is intended to be. Attached to the four sides of this stand are hinged four lappers t', t^2, t^3, t^4, which are substantially similar to what are termed the side lappers in the paper bag machine for which Letters Patent were granted to me bearing date May 24, 1855, and are operated in a somewhat similar manner to crease and fold the envelops by means of bent levers u', u^2, u^4, u^3, pivoted to the stand J, and rods v', v^2, v^3, v^4, connecting the said levers with long levers M′, M², M³, M⁴, operated upon by cams N′, N², N³, N⁴, on the main shaft B. The lappers are thrown back after the creasing and folding operations by springs t^*, applied to their hinges. Above the folding stand is a block or plunger P, of the same size as the stand. This plunger is attached to a sliding head O, which works on suitable vertical guides attached to the framework A of the machine and receives a vertical motion by being connected with a lever Q′ which is operated upon by a cam Q, on the main shaft. At the time the blank is laid upon the folding stand the lappers are all thrown open or apart and occupy a horizontal position, standing a distance above the stand J, equal to the thickness of the joint of the hinge. The blank is received upon these folders and immediately after the plunger P, descends and carries the central portion of the blank which is to form the front of the envelop down between the hinges of the lappers, the said hinges forming as it were the sides of a female die. As soon as the plunger has descended, the lappers t', t^2, t^3, rise simultaneously to a nearly vertical posision and thus crease the three laps 1, 2, 3, of the envelop in the line in which they are to be folded. After that has been done the plunger rises, when the three lappers afore-

said without going back fall over one at a time in turn as they are numbered, to the positions shown in red in Fig. 1, and fold down the three flaps, being also followed by the lap t^4, which folds the seal flap. The gluten which is applied to the seal flap is of such a nature as to dry quickly and having been applied earlier than the paste, becomes dry before the folding operation, so that it does not stick, while the paste remains wet to stick the three flaps 1, 2, 3, together. The seal flap receives no preparatory creasing operation like the other three flaps, and as when the folding operation takes place, the plunger P, is raised, something else is necessary to crease the paper in the proper line, and for this purpose I employ two creasers w, only one of which is shown in the drawing, (see Figs. 2 and 4,) arranged one at each side of the stand. These creasers consist each of a finger w, attached to a bent lever R, which is arranged to work transversely of the machine on a fixed pivot w'. These levers are connected with and operated by the lever M', by which the lapper t', is operated, to throw the fingers w, down upon the envelop at the time the lapper t^4, commences to operate. After the folding is completed, the lappers being released by their respective cams are suddenly thrown back or opened by the springs t^* in their hinges leaving the finished envelop free to be lifted up and removed by a pair of nippers y, y', arranged for that purpose, as shown in Figs. 4, 2, and 1.

The upper jaw, y, of the nippers y, y', shown best in Fig. 4, is attached to the horizontally bent end of a vertically vibrating elbow lever S. The lower jaw is attached to the upper jaw, in a manner similar to that in which the upper jaw of the nippers o, o', is attached to the lower jaw, being secured to a spindle y^*, having a coiled spring applied to close it and a lever z, to be caught by a spring catch z^*, best shown in Fig. 1, attached to the lever S, for the purpose of holding it open. The opening and closing of the nippers is governed by the movement back and forth which they receive for the purpose of taking away the envelops. They move open toward the stand and as soon as they have received the envelop between them the spring catch comes in contact with a fixed disengaging piece z', attached to the framework of the machine and is thereby thrown aside to liberate the lever z, by which they have been held open. Returning with the envelop, they remain closed until the lever z, strikes a fixed stop piece z^2, and is thereby arrested, until by the continued movement of the nippers it has been caused to open the nippers and been caught by the catch z^*. When the nippers open the envelop may be taken away by hand or drop out into a suitable receptacle. The movement of the elbow lever S, to carry the nippers back and forth is effected by a long lever T, upon which the lower arm of the elbow lever rests and a cam T', on the main shaft B. The lifting up of the envelop from the folding stand, as shown in Fig. 4, where the envelop is shown in red color high enough to be caught by the nippers y, y', which pass above the open lapper t^2, is effected by means of a small lifter 10, which works through the stand J, near the end next to the nippers. This lifter at all times except when it is required to raise the envelop is flush with the face of the stand but while the nippers are moving forward, it is raised, by a stud 8, on one side of the lever S, striking down one arm of a small lever 9, see Fig. 4, the other arm of which stands below the bottom of the said lifter.

The relation between the movements of the creasing and folding devices and the nippers y, y', and those of the devices for pasting, applying the gluten and stamping and the nippers o, o', is such that an envelop is undergoing the process of creasing and folding on the stand J, while a blank is being pasted, stamped, etc., on or above the table C; and the nippers o, o', and y, y', operate almost simultaneously, those y, y', being a little the quickest so as to remove the folded envelop from the stand J, before the next blank is placed there.

The embossing of the envelop, when it is desired, may be performed during the manufacture by having the faces of the folding stand J, and plunger P, suitably engraved or otherwise prepared to produce the required impression. When this is intended it will be well to have the stand J, and the plunger P, heated by steam.

Instead of the spring flap at the bottom of the paste box a roller might be employed carrying a ratchet wheel which would be operated upon by a pawl carried by a lever arranged substantially in the position of j', and operated upon by coming in contact with a stand, j^2, in the gluten trough.

It is obvious that a machine which makes envelops will make bags, as the main difference between an envelop and a bag, is in the form of the laps. In making bags it is better to perform the cutting of the paper from a roll in the same machine but that cannot so well be done in making envelops owing to the difficulty of cutting them to the proper form by shears. I will briefly refer to some slight modifications which would be necessary to adapt the machine represented in the drawings to make bags. The seal stamp h, h', would be dispensed with and the head E would require to be either bent or so arranged as to allow the paper, as it was cut from a roll, by shears

such as are described in my Letters Patent of May 24th 1855, to pass at the side of it. The pieces of paper to form the bags will be cut-off while above the table C, and will receive the gluten and paste like the envelop, allowance being made in the paste box and gluten die for their particular form. The nippers *o*, *o'*, will serve not only to deposit the blank on the folding stand but will serve to take the paper from the roll, and measure it off to the proper length. The shears are arranged so as not to cut it off till after it is pasted and deposited on the folding stand. The arrangement of and number of the lappers to make a bag with a flap for sealing would be the same as for an envelop, the form however requiring to be somewhat different. In making small bags two may be made at once by sticking all four laps and cutting the bags in two parts after they leave the folding stand, by a pair of shears properly arranged. The bags may have a merchant's card or other inscription printed on them by a stamp V, arranged as shown in Fig. 3, to work through the table C, and operated for that purpose by one of the cam levers of the machine. This stamp will require to be inked by some suitable means.

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

1. The employment, in a machine for making envelops or bags, to support the blanks during either or all of the operations of pasting, stamping and applying the gluten, of a self adjusting table C, supported by a cam whose position is so controlled by a spring or its equivalent applied to its shaft, that, as the blanks are removed one by one the table is caused to rise to bring the next one to the proper height or position to be pasted, stamped or have the gluten applied, substantially as herein set forth.

2. Giving the self adjusting table a drop movement substantially as described, by means of the cam H, the lever H', pawl *k*, ratchet wheel I, or their equivalents, acting on the shaft of the supporting cam C^2.

3. Applying the gluten which makes the envelop or bag self sealing, to that part of the blank which is to form the seal flap or closing flap of the envelop or bag, by a die while in the machine at the commencement of the process, substantially as herein described, whereby the said die serves the two purposes of applying the gluten and of lifting the blanks one at a time from the pile or retaining the top one while the remainder of the pile is lowered away from it.

4. Applying the two dies *h*, *h'*, to two arms or jaws *i*, *l*, which are connected together by a hinge or its equivalent, arranged at the rear of the table C, and have a sliding motion back and forth, substantially as described, to move the said dies out of the way of every successive blank, till the latter has had the gluten applied, and been separated from the pile, and then to bring them forward again to receive the separated blank and to receive the pressure of the screw *g*, or its equivalent.

5. Attaching the paste box, the gluten die and the screw *g*, or other equivalent device which gives pressure to the stamp which produces the seal, to a head E, receiving such a motion as is herein described from a pair of cranks or their equivalent.

6. The employment of a pair of nippers *o*, *o'*, having a motion of a positive length in the line or parallel with the line in which the blank is required to move from the pasting to the folding apparatus, either to take a cut blank from a table, or to draw the material before it is cut, from a roll, and measure off the proper length to be cut, substantially as herein set forth.

7. The method of giving the necessary movement to the lappers t', t^2, t^3, t^4, by means of the bent levers u', u^2, u^3, u^4, and the springs t^* applied to their hinges, substantially as herein described.

8. The creasing fingers *w*, arranged and operating substantially as herein described, to hold the blank in position and crease it in the line for folding the seal flap substantially as herein described.

9. The nippers *y*, *y'*, arranged and operating in a lateral direction, substantially as herein described, to remove the finished envelops or bags at one side of the folding stand.

10. The lifter 10, applied substantially as herein described, to the folding stand and operated by the lever which carries the nippers *y*, *y'*, for the purpose of lifting the finished envelop or bag at one side thereof from the stand to enable it to be taken by the nippers.

11. Applying a stamp V, to work through the table C, substantially as described, for the purpose of stamping a card or other impression on a bag during the process of manufacture.

12. The general arrangement and combination of the several working parts of the machine, substantially as herein set forth.

E. W. GOODALE.

Witnesses:

SILAS PIPER,

C. F. W. PARKHURST.

[FIRST PRINTED 1912.]