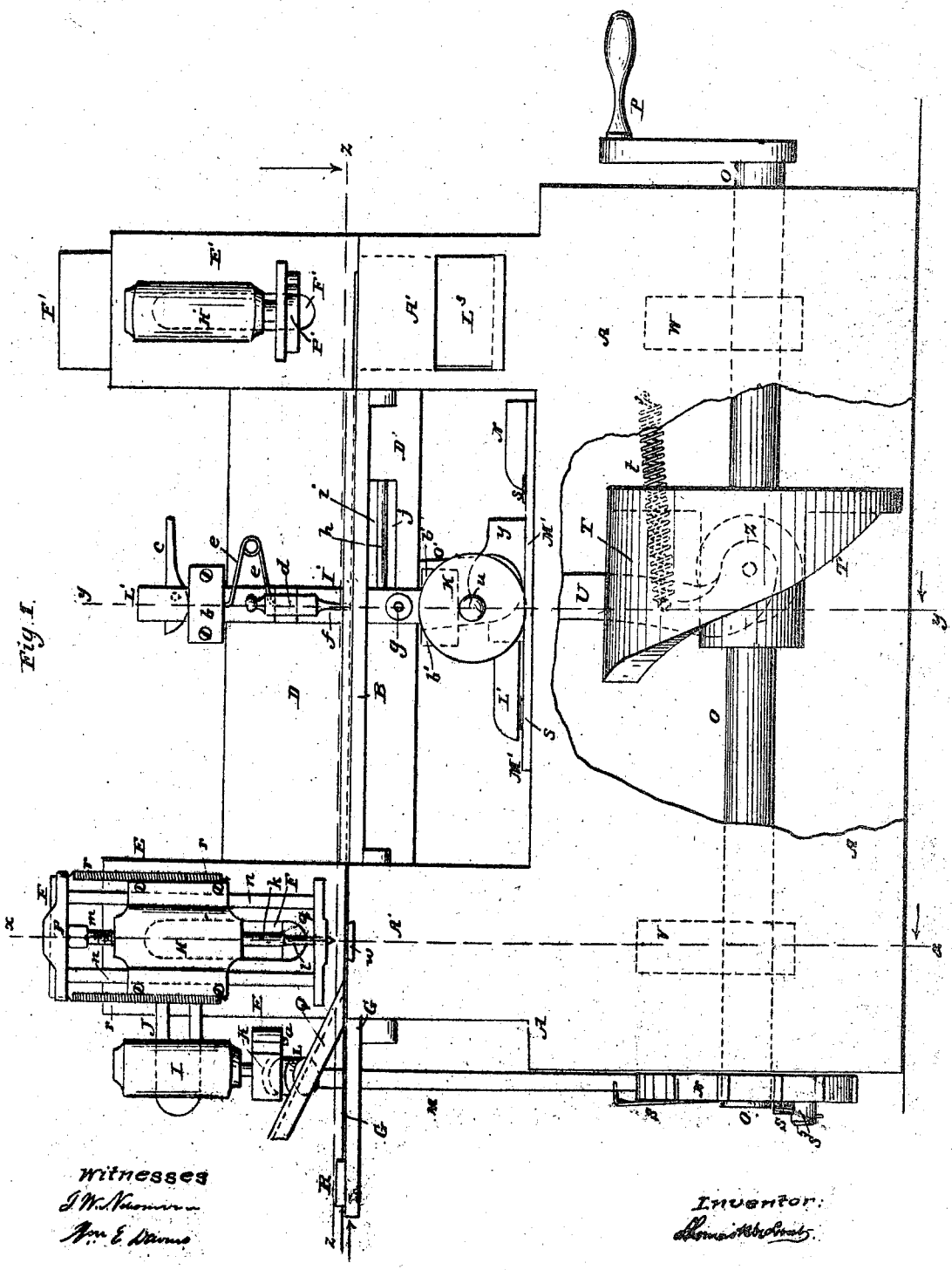
T. B. DE FOREST.

3 Sheets—Sheet 1.

Tag Making Machine.

No. 40,827.

Patented Dec. 8, 1863.



Witnesses
J. W. Norris
Wm. E. Davis

Inventor:
T. B. De Forest

3 Sheets—Sheet 2.

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Tag Making Machine.

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Fig. 4.

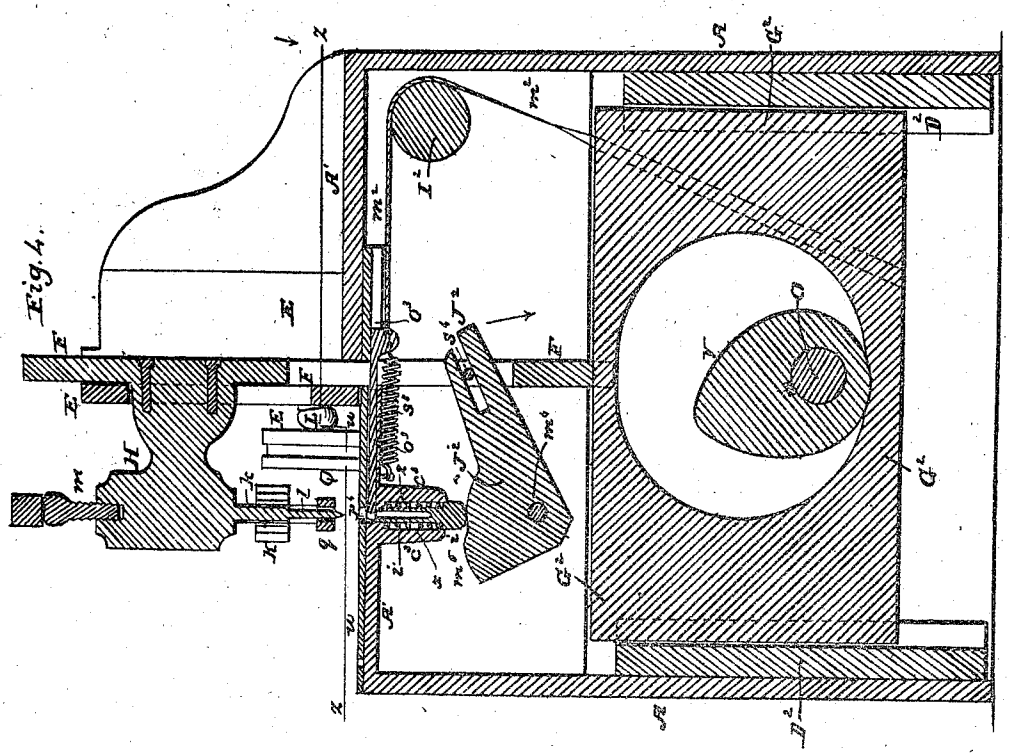
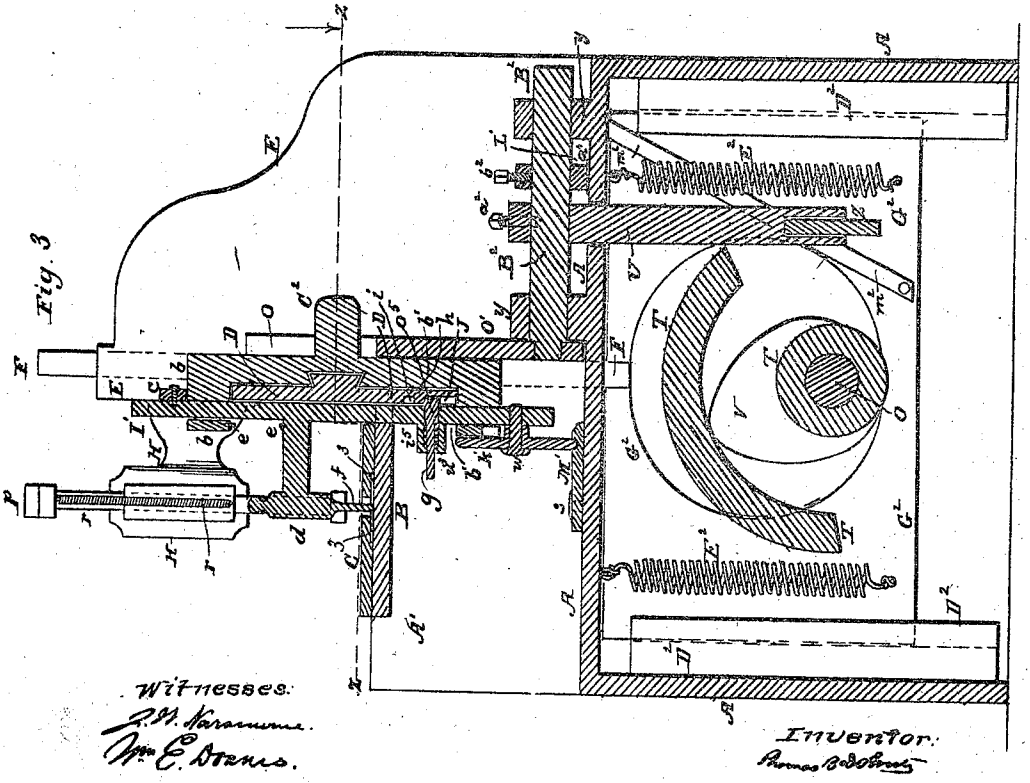


Fig. 3



Witnesses.

P. M. Varnum.

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Thomas B. De Forest

T. B. DE FOREST.

3 Sheets—Sheet 3.

Tag Making Machine.

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Fig. 5.

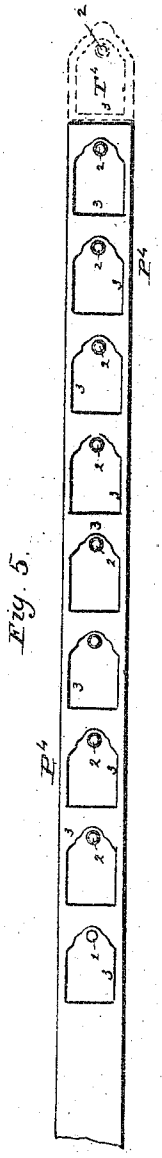
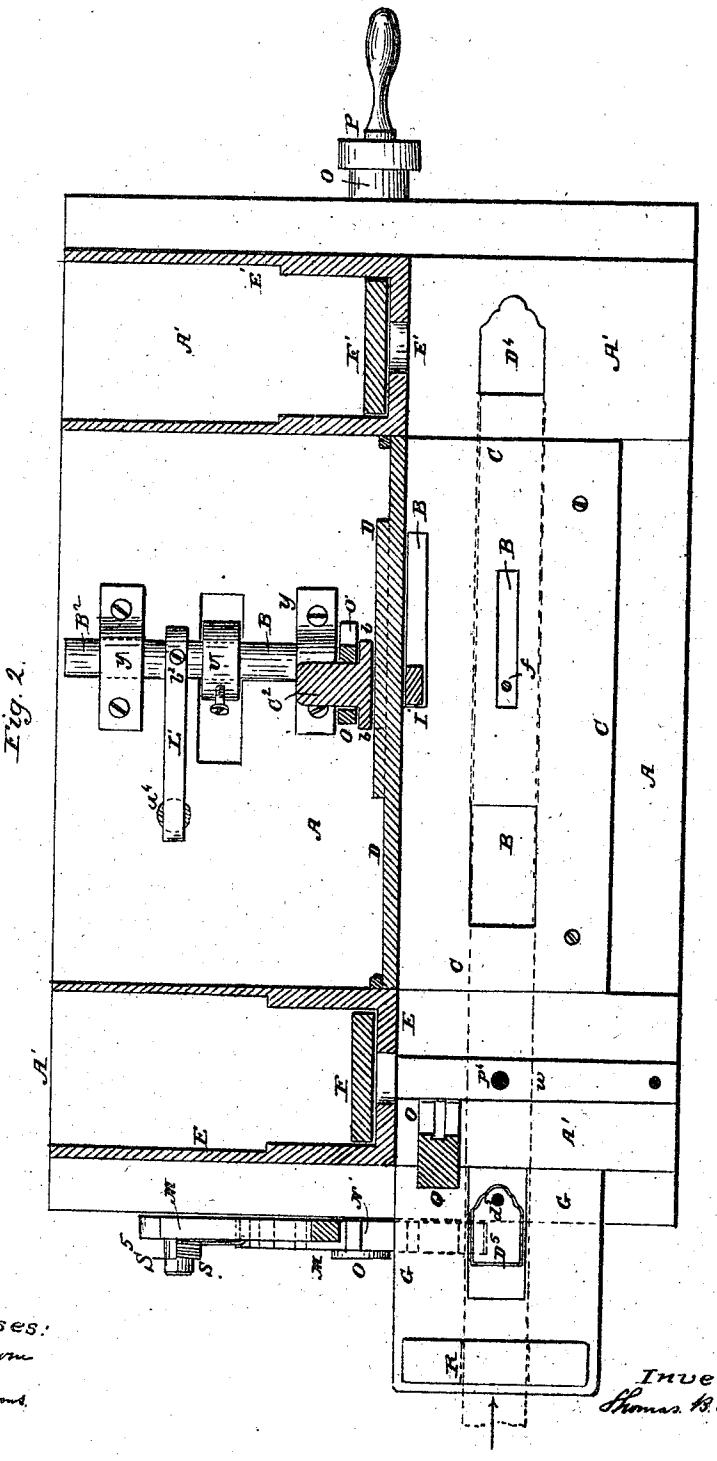


Fig. 2.



Witnesses:

J. W. Norcross

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Inventor:

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UNITED STATES PATENT OFFICE.

THOMAS B. DE FOREST, OF BIRMINGHAM, CONNECTICUT.

MACHINE FOR MAKING TAGS.

Specification forming part of Letters Patent No. **40,827**, dated December 8, 1863.

To all whom it may concern:

Be it known that I, T. B. DE FOREST, of Birmingham, of the county of New Haven, in the State of Connecticut, have invented a new and useful Machine for Making Tags or Labels; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention has for its objects the manufacture of what are known as "tags" or price-labels by an automatic machine, which will receive a strip of plain paper from a reel and punch, eyelet, ornament, and cut or stamp out pieces of a given size and design and discharge them complete and ready for use as tags, and which may be adjusted or arranged so as to omit the eyeleting or ornamentation, or both, to produce tags of different kinds.

And my invention consists in the combination of an automatic feed mechanism with an eyeleting mechanism, whereby the strip of paper or other material to be made into tags will be fed through the machine and have eyelets inserted in it at given intervals, as will be hereinafter more fully described.

And my invention further consists in the employment of an eyeleting mechanism, in combination with a feed mechanism, and a device or mechanism for cutting up or stamping out the material eyeleted and fed through the machine, as will be hereinafter more fully explained.

And my invention further consists in the employment of a cutting or stamping-out device or mechanism, in combination with an eyeleting mechanism, as hereinafter set forth.

And my invention further consists in the employment of a punch, operating to perforate the material previous to the insertion of the eyelet, (when one is inserted,) in combination with a feeding mechanism, all as hereinafter fully explained.

And my invention further consists in the employment of a presser-foot, in combination with the eyeleting mechanism, which presser-foot operates to prevent the lifting of the material being eyeleted, as will be hereinafter more fully explained.

And my invention further consists in the employment of guides or their equivalents, so arranged on each side of the material as to regulate the position of the strip of material being fed through the machine, and insure the punching and eyeleting thereof centrally, as will be presently fully explained.

And my invention further consists in the employment, in combination with a punch for perforating or forming the eye of the tag, of a device or mechanism for embossing or printing an ornamentation, as will be hereinafter fully described.

And my invention further consists in the employment, in combination with the chute or channel through which the eyelets pass to the eyelet-inserting mechanism, of a jarring-hammer or its equivalent for jarring or shaking the said chute to insure the passage through it of the eyelets, as will be hereinafter fully described.

To enable those skilled in the art to make and use my invention, I will now proceed to describe my automatic tag-making machine, referring by letters to the accompanying drawings, forming part of this application, and in which Figure 1 is a front elevation of my new machine. Fig. 2 is a horizontal section at the line *z z*, Fig. 1. Fig. 3 is a vertical section at the line *y y*, Fig. 1. Fig. 4 is a vertical section at the line *x x*, Fig. 1, and Fig. 5 is a plan view of a strip of material from which the tags are formed, and which will be more particularly alluded to hereinafter. The arrows on the drawings in black indicate the directions from which the machine is viewed in the sectional views, and the arrows in red indicate the direction of motion given to the material as it is fed through the machine.

Wherever the same letters occur in the several figures they indicate the same parts of the machine.

A is the body or main frame of the machine, which may be supported by a pedestal or set of legs, or upon a bench, as taste or circumstances may suggest. From the top of the body A extend upward two smaller box-like portions, A′ A′. These boxes A′ A′ are located near either end of the main body A. They are equidistant longitudinally from the center of the body A, and are about equal in length to the width of said body A, and from their upper surfaces extend upward the stands E E′, in which work the two sliding carriages F and F′, in a manner presently to be described.

B is a table, which is formed of a plain plate, arranged so as to extend from one of the boxes

A′ to the other on the same level with their top surfaces—that is, so as to form a continuation of the planes of the top surfaces of boxes A′ A′. This table B may be nearly equal in width to the distance (on boxes A′ A′) from the fronts of stands E E′ to the fronts of boxes A′ A′.

Immediately in the rear of table B, and arranged in a plane at right angles to the plane of B, is a plate, D, which extends from stand E to stand E′, and the front side of which is flush with the front sides of stands E E′. This plate D is formed with a dovetailing projection on its back side, (see Fig 3,) on which works the carriage *b b′*, which carries the feeder, as will be presently explained. The plate D extends a short distance down below the plane of table B, and on such extended portion, D′, (see Figs. 1 and 3,) are formed or arranged the grooves *i j* and the way *h*, the operation of which will be presently explained.

O is the main driving-shaft of the machine, which passes longitudinally through the main body A, as shown, and has suitable bearings in the ends thereof. At one end of said shaft O the power may be applied by means of an ordinary driving-pulley, or, as illustrated, by a crank-handle, if hand-power be used. I contemplate, however, always using some other motive power.

On the shaft O are secured three cams, T, V, and W. The middle one, T, is a face-cam, the shape of which is clearly illustrated, and works against a friction-wheel, Z, hung in the lower end of the arm U, (see Figs. 1 and 3,) which arm is kept up toward the cam T by a spring, *t*, and is fastened at its upper end to the rock-shaft B^2, and works said shaft in its bearings or boxes *y y*. To the front end of said shaft B^2 is keyed the lower end of a bifurcated box, *o′*, which, by the locking of the shaft B^2, is caused to vibrate its upper end, carrying with it the pin or stud C^2 of the sliding carriage *b b′*, which stud projects into the bifurcated or slotted portion of said arm O′. In the rear of arm U there is secured to the shaft B^2 another vibrating arm, L′, (see Figs. 1 and 3,) which serves as a stop and comes against a lug or pin, d^4, which projects up from the top of body A. (See Figs. 2 and 3.)

The arms U and L′ may be secured to the shaft B^2 by set-screws a^2 b^2, or in any other desirable manner.

The cams V W operate upon and move two reciprocating carriages, which in turn move the carriages F and F′ by being fast thereto. Only one of these carriages is shown in the drawings—the one which is worked by the cam V; but since the two are duplicates, a description of it and its operation will answer for both. It is seen at G^2, Figs. 3 and 4. In Fig. 4 the plane of section passes through the carriage G^2. In Fig. 3 it passes in front of it. This carriage G^2 is formed of a simple plate, rectangular in contour, having an elliptical hole cut through it near its center, within which the cam V works, and arranged to slide vertically in grooves in the bars D^2.

By the rotation of shaft O and the cam V, working within the opening cut through plate G^2, the plate on carriage G^2 is caused to descend at each revolution, being each time drawn up again by the action of strong spiral springs E^2 E^2, (see Fig. 3,) and the carriage or plate F being secured to the plate G^2, it follows that F is caused to move or reciprocate vertically in its bearings in the stand E. The cam W operates in a similar manner on another carriage like G^2, which, in like manner, drives the carriage F′ vertically up and down in its bearings in the stand E′.

F and F′ are provided, respectively, with arms or stands H and H′, which move with them, one of which, H, carries the eyeleting punch or upper die, *k l*. The other, H′, carries the cutting or stamping-out die P′.

From the arm or stand H there projects a slotted bar, J, on which is arranged (in such manner as that it can be set nearer to or farther from said stand) a head, I, which carries on its lower end an embossing or printing die, K, on which is formed the punching-out male die *a*. (See Fig. 1.)

As already mentioned, the carriage *b b′* is caused to slide on the dovetail bearing or plate D (see Fig. 3) by means of the vibration of arm *o′*. Now, through upper and lower portions of said carriage *b b′* there is arranged, in front of plate D, and so as to be capable of a vertical reciprocating motion, a bar, I′, (see Figs. 1, 2, 3,) at the lower end of which is a stud, *u*, on which is hung, so as to turn freely, a wheel, K′. This wheel K′ rests on an adjustable plate, M′, (see Figs. 1 and 3,) which is provided with a stop and lifter, N. Above the wheel K′ there is arranged in the bar I′ a spring bolt or latch, *g*, (see Figs. 3 and 1,) the back end of which works in the grooves *i j*, (see Figs. 1 and 3,) and above the table B there projects from said bar I′ an arm or stand, *d*, which carries the feeder-point *f*, and between the upper side of which arm and the upper end of carriage *b* is arranged a spring, *e*, in such a manner as to exert a constant tendency to slide the bar I′ downward in its bearings in the carriage *b b′*, and keep the wheel K′ hard down onto the plate M′. As the carriage *b b′* is moved along on the plate D as before mentioned the wheel K′ travels along on the plate M′ until it comes against the stop and lifter N. When wheel K′ strikes N, it ascends the stop N, carrying up, of course, with it the bar I′ and all its attachments against the pressure of spring *e*, and rides on top of it, until the motion of carriage *b b′* is reversed. When the lifter N lifts the wheel K′, the spring catch or bolt *g* o^5 (see Fig. 3) is forced in and flies out again over or on top of the rib or bar *h*, on which it rides, holding up the bar I′, during the reverse or return motion of carriage *b b′*. As soon as the bolt o^5 arrives at the other end of rib or bar *h* and passes by it the spring *e* forces the

bar I′ down until the wheel K′ comes against the plate M′. The grooves *i* and *j* extend a short distance beyond the end of rib *h* and communicate, so as to allow the bolt o^5 to pass down without being forced inward.

It will be understood that as the carriage *b b′* reciprocates the feeder-point *f* moves along in contact with table B, until the wheel K′ strikes N. Then the feeder-point *f* is lifted some distance above the table B, and returns in this elevated position to the point from whence it started, then drops down ready to make another forward or feeding stroke; and it will also be understood that the point *f* continues feeding until lifted by the action of lifter N on wheel K′; and hence by shifting the position of N (by moving the plate M′, to which it is fast) the length of feed may be varied at pleasure, the object of which will be presently explained.

c is a cam-lever, pivoted to bar I above the carriage *b*, and which when turned lifts and holds up the bar I′, so as to keep the feeder *f* away from the table, very much after the fashion of the lifter on the presser-foot bar of a sewing-machine.

C is a plate arranged immediately over the table B, and of about the same size. This plate C rests on the table B, but has a longitudinal recess or rabbet running entirely across it centrally on its under side (see 3, Fig. 3, and dotted lines, Fig. 2) in such manner as that when the plate C is placed on the table B as shown a channel will be formed where the two come together. This channel is about equal in width to the width of the strip of paper or other material to be worked or run through it, and sufficiently high to admit of the thickness of the material and the eyelets therein inserted. The plate C has also two rectangular holes cut through it—one larger than the other—one for the feeder-point *f* to travel along in, the other and wider one to see the material passing through and to facilitate the operator in stopping and drawing back the strip of material should the eyeleting mechanism miss or fail to insert an eyelet.

G is a small table extending out from A′, level with it and the table B, and on which are formed or arranged the female printing or embossing die D^5 and the female punching-net die a^5. In the top plate of the opposite box A′ is cut out the female stamping or cutting-out die D^4, (see Fig. 2,) into which works the die P′. (See Fig. 1.) The tags or pieces cut out by these last-mentioned dies fall through onto an inclined plate, L^3, and pass out on it through an opening in the front side of A′. (See Fig. 1.)

On one end of the shaft O is fastened a ratchet-wheel, N′, which in its rotation operates upon a projection on the handle M of a hammer, L, in such manner as to periodically move the hammer L backward or away from the chute Q, (see Fig. 1,) while a spring, S, attached at one end to the handle M, and at the other end to the stud S^3 (on which said handle turns) exerts a continual pressure tending to force the hammer L toward and against the chute *e*. The result of this combination of devices is a constant knocking or hammering against the chute Q by the hammer L, which insures the passage of the eyelets down through said chute. If the column of eyelets supplied to the chute Q were allowed to feed down only by their gravity, without any shaking, they would sometimes stick, and the eyeleting mechanism would not be punctually supplied.

w is a removable slide or plate covering the slot and bar which carry the eyelets from the chute to the eyelet-inserting mechanism, which is most clearly seen at Fig. 4. A single eyelet at a time is fed or carried forward from the supply-column in chute *g* by the reciprocating bar o^3 and placed on top of the hollow die *i′*, as shown in red, Fig. 4, the material to be eyeleted lying on top of the plate *w* and upper surface of A′, which is flush with *w*. The punch *l* descends through the material, through the hole p^4 in plate *w*, through the eyelet, and down into the hollow die *i′*, being actuated by the carriage F, attached to plate G^2. At the same time a pin, s^4, in the moving carriage F, and working in a slot in the lever J^2, vibrates the said lever J^2 on its pivot m^4, and this lever J^2, having a cam-like portion, m^6, which comes against the lower end of hollow die *i′*, moves said die upward in its bearings in the hub c^3, and the shoulder of upper die, *k*, coming down at the same time the eyelet is passed between it and top of die *i′*, and is upset or clinched in the material. The cam-surface m^6 is so made that it does not begin to lift the die *i′* until after the punch *l* has descended into *i′*, and the motions of these two dies are so timed as that they shall meet and upset the eyelet just in the plane in which the material lies. The die *i′* is forced down again into its normal position as the cam m^6 releases it by means of a spring, *x*. While the operation just described of the two dies is going on the descent of carriage G^2 also causes, through the medium of a strap, m^2, passing over pulley I^2, and fastened at one end to the said carriage and at the other to the bar o^3, the bar o^3 to move back from the eyeleting-dies until its forward end passes the mouth of the chute Q, when another eyelet passes down into the groove in which slide o^3 travels. As carriage G^2 ascends the spiral spring s^3 pulls the bar o^3 forward again and causes another eyelet to be fed onto the top of die *i′*.

This eyelet-inserting mechanism is the same in construction and operation as that in the eyeleting-machine patented to Luson De Forest on the 13th day of January, 1863, and I would refer to that patent for a more full description of it, since no part of my present invention lies in any peculiarity of the eyeleting mechanism of my machine, except a little improvement, which I will now explain. It consists in the arrangement around the

punch *l* of a bar or plate, *q*, which is connected by vertical bars *n n* (see Fig. 1) to a top cross-piece, *p*, and springs *r*, and a stop, *m*, the whole so arranged that when the head H, with the punch *l* and die *k*, descends the bar or presser-foot *q* will come down onto the material and remain pressing on the material, while the punch and die continue to descend and insert, in connection with the lower die, i^4, an eyelet and return far enough to have released the punch *l* from the eyelet inserted in the material. It will be seen that by this device the lifting of the material by the eyelet clinging to the punch *l*, which would derange the material or sometimes tear it, is effectually prevented, which is a great desideratum in an eyeleting mechanism for inserting eyelets in any fragile material.

The stop-screw *m* may be turned or set to regulate the relative position of the plate *q* with punch *l*, and consequently the time at which during the ascent of the upper die the material will be relieved from pressure by the foot *q*.

The chute Q is supplied with eyelets from a hopper and shaking table, such as is fully shown and described in Letters Patent granted to me on the 13th day of January, 1863. Since I propose to use this kind, and it forms no part of my present invention, I have not shown it in the drawings, and refer for a description of it to my said Letters Patent just above mentioned.

On the upper surface of the table G is arranged a bar or plate, R, in the under side of which is cut a recess, so that a channel is formed between the lower side of R and the top of G, in which the slip or strip of paper travels, as illustrated by the red lines in Fig. 2 and the blue lines in Fig. 1.

After having described the several parts and their operations a brief explanation of the general and connected operations of the whole machine will be sufficient to render my invention perfectly clear to those skilled in the arts.

In the machine which I have built and put into successful operation, and which is like the one herein described in every essential feature, I employ for the manufacture of the tags paper cut into a narrow strip, of a width equal to the width of the tag, and wound in a coil on a reel. The coil or reel of paper is placed at a convenient distance from the machine to supply it in a suitable position, and the end of the strip is passed through the channel or passage formed between the bar R and table G, thence along on top of the plate *w*, and along through the channel or passage formed, as already explained, between table B and plate C. When the machine is started, the chute Q being kept supplied with eyelets, the stands or arms H, H′, and I all reciprocate vertically and simultaneously. As they descend the embossing-die K comes down onto the paper and embosses it, the perforating-punch *a* at the same time piercing it and forming an eye for the tag, the feeder-point *f* feeding the paper along at each stroke a distance equal to the length of the tag to be made. The eyes punched out by *a* come successively under the die *k* and punch *l*, and have an eyelet inserted in each one of them, and as the strip is fed along thus embossed, eyed, and eyeleted the cutting-off die P′ at each descent cuts off from the end of this strip a tag or piece of a given design eyeleted and ornamented. This mode of operation on the strip of paper is more clearly illustrated at Fig. 5, which represents a plan of the strip as it passes through the machine and has these different operations performed on it. In this figure, P^4 is the paper strip; 1, the eye punched out by punch *a;* 3, the ornamentation; 2, the eyelets. At T^4 the dotted lines show the tag completed by cutting off by the die P′.

In starting the machine, after punching the first eye, the strip may be slid along by hand until this first eye is brought under the feeder-point *f*, when the machine may have power turned on, and will continue automatically, the pressure of the feeding-point on and its impression into the paper being sufficient to insure its operation; but should the material from which the tags are being made be so thin or of such nature that the feed-point would be apt to injure it, instead of pulling the strip along, then the strip may be set by a hand a few times until the eyeleted holes or eyes reach up to the location of the feeder, so it will drop into the eyeleted eye, and then the machine may be set in motion by power.

The object of having the parts performing the different operations located as shown is to admit of varying the feed and dividing the distance between the eyeleting mechanism and the cutting-off dies into a greater or less number of equal parts to make tags of different lengths.

It will be seen that when the machine is intended to make a different-sized tag the die K, with its stand I, must be adjusted nearer to or farther from the eyeleting-punch *l;* and to correspond with this adjustment I propose to make the table G, in which is formed the female for die K, removable, so that another and different one may be substituted for it. The dies P′, and its female, should also be made removable for the substitution of different-sized dies.

Having fully described my automatic machine for making tags, and wishing it to be understood that I propose to use various kinds and sized strips of material by varying the guiding channels, and to produce various sizes and designs of tags or labels by changing the feed-motion and varying the dies, and to produce tags either with or without the eyelets in, and not wishing to be limited in the application of my invention to the precise mode of carrying it out, which I have shown and successfully practiced, what I claim as of my invention, and desire to secure by Letters Patent, is—

1. An automatic feeding mechanism, in combination with an eyeleting mechanism, whereby eyelets may be set at given intervals, substantially as set forth.

2. The combination of an eyeleting mechanism, a feeding mechanism, and a stamping or cutting-out device or mechanism, whereby the material may be eyeleted and cut apart into pieces of given size with the eyelet in a given position in each.

3. An eyeleting or eye-forming mechanism, in combination with a stamping or cutting-out device or mechanism, whereby the eye-forming operation and cutting out are both performed in an organized machine without moving the material or handling it more than once.

4. The punch a a^5, operating previously to the insertion of the eyelet, in combination with the eyeleting mechanism and cutting-off dies D^4 P', to perform the successive operations of punching out, setting the eyelet, and cutting apart the material, substantially as set forth.

5. The employment of the presser-foot q, or its equivalent, in combination with the eyeleting mechanism, as and for the purpose substantially as described.

6. The employment of the hammer L, or its equivalent, in connection with the eyeleting mechanism, to insure the flow of eyelets through the supply passage or chute q, substantially as set forth.

In testimony whereof I have hereunto set my hand and seal this 24th day of August, 1863.

THOMAS B. DE FOREST. [L. S.]

In presence of—

J. W. NARAMORE,

WM. E. DOWNS.