(No. Model.)

5 Sheets—Sheet 1.

L. D. HAWKINS.

EYELETING MACHINE.

No. 325,077. Patented Aug. 25, 1885.

Fig. 2.

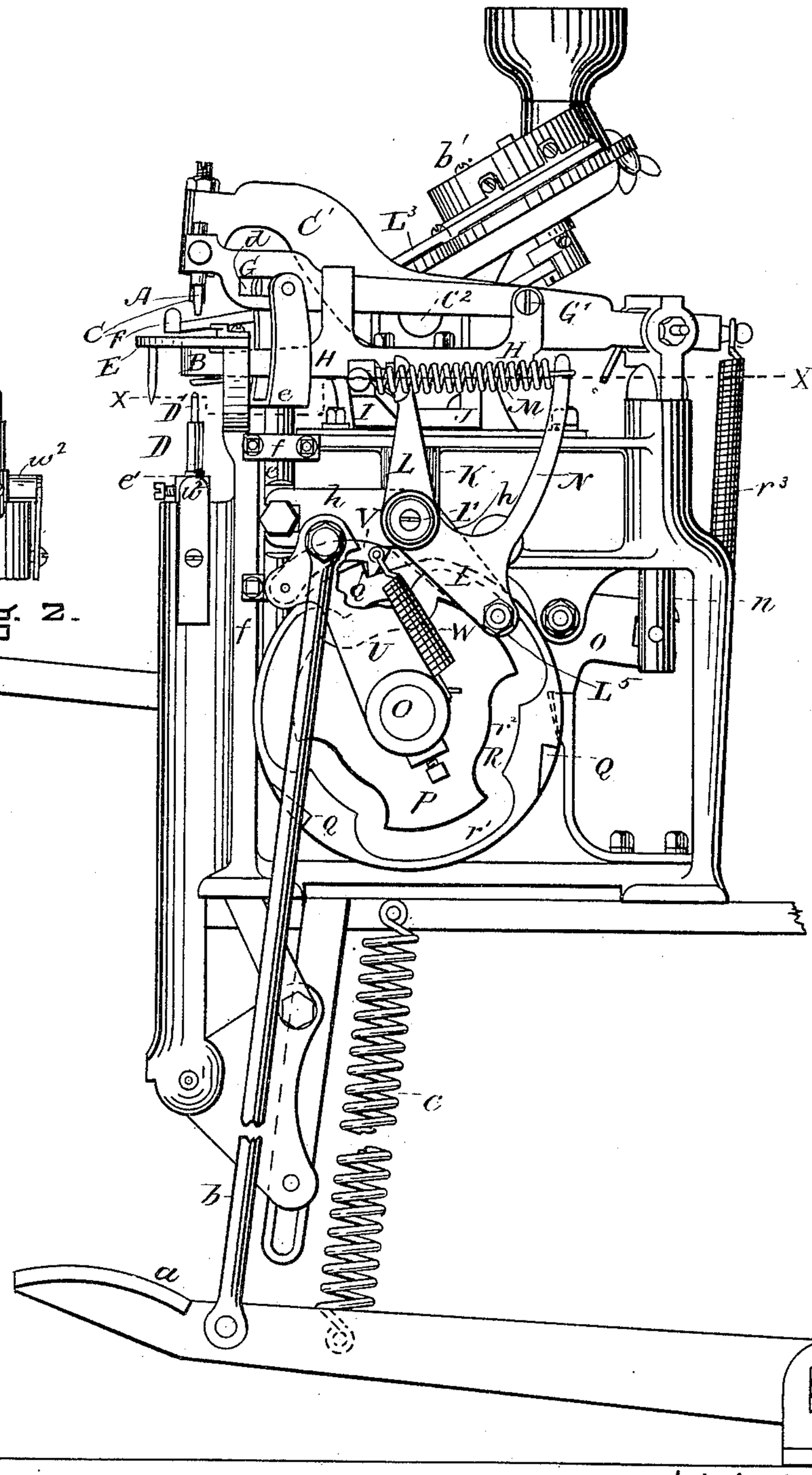

Fig. 1

WITNESSES

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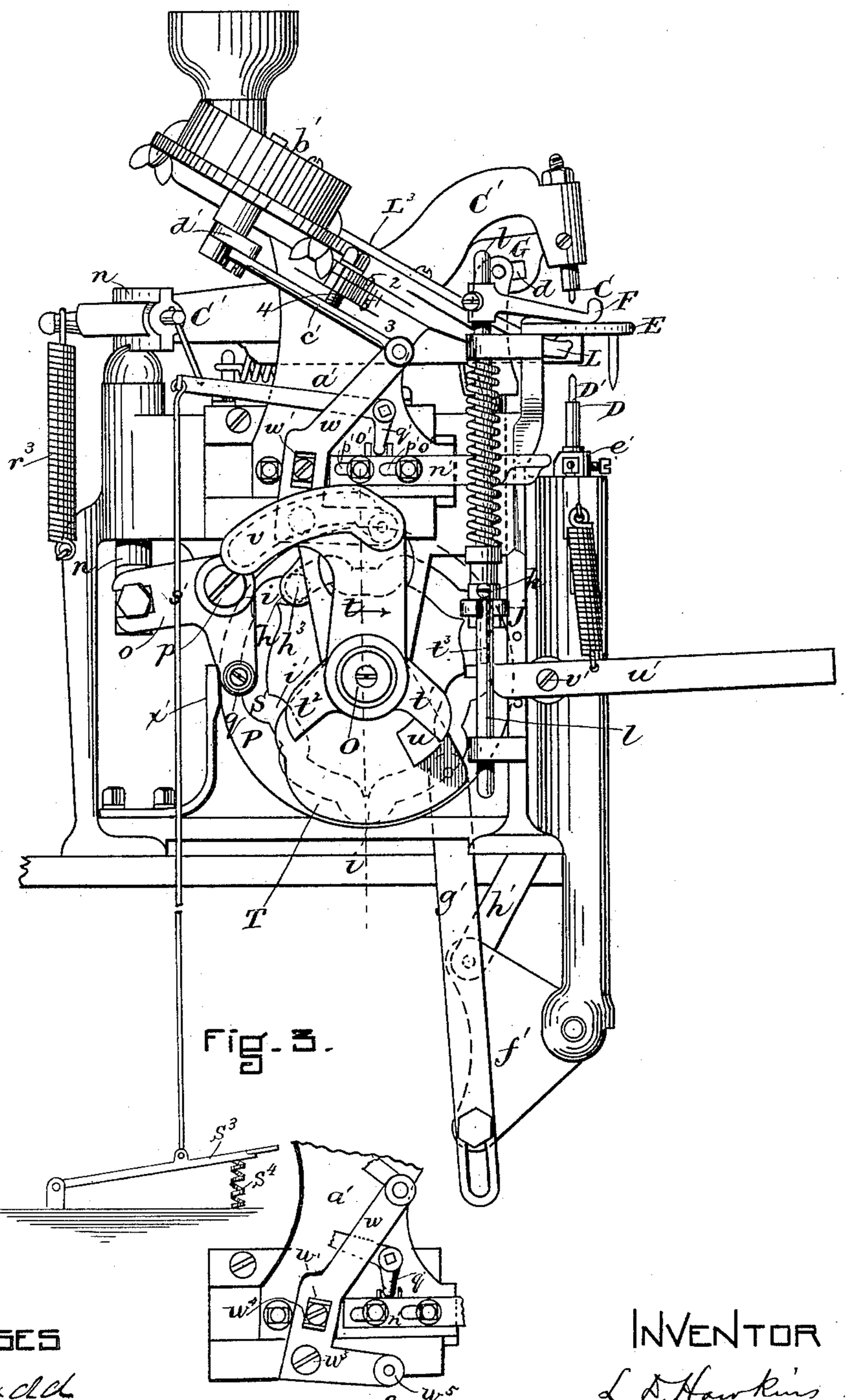

Fig. 3.

Fig. 3a.

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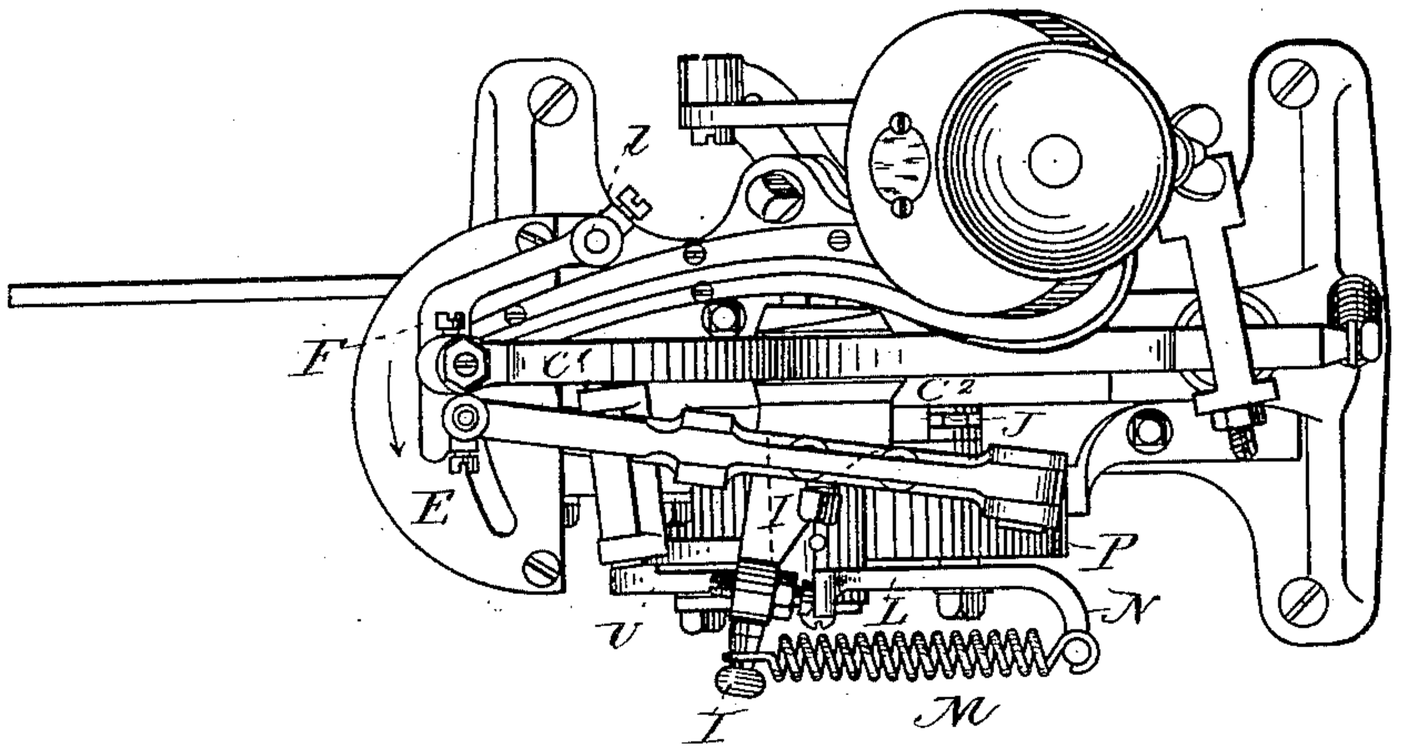

Fig. 4.

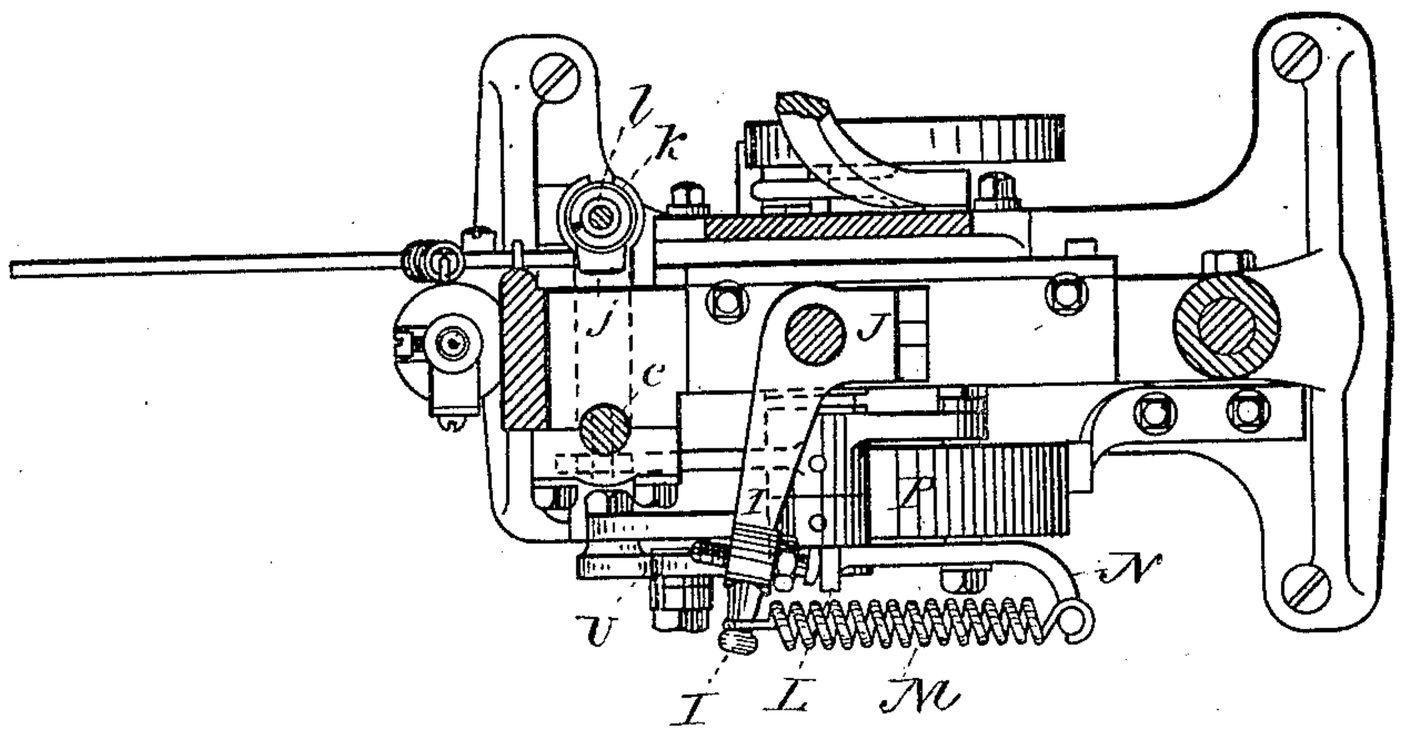

Fig. 5.

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EYELETING MACHINE.

No. 325,077. Patented Aug. 25, 1885.

Fig. 6.

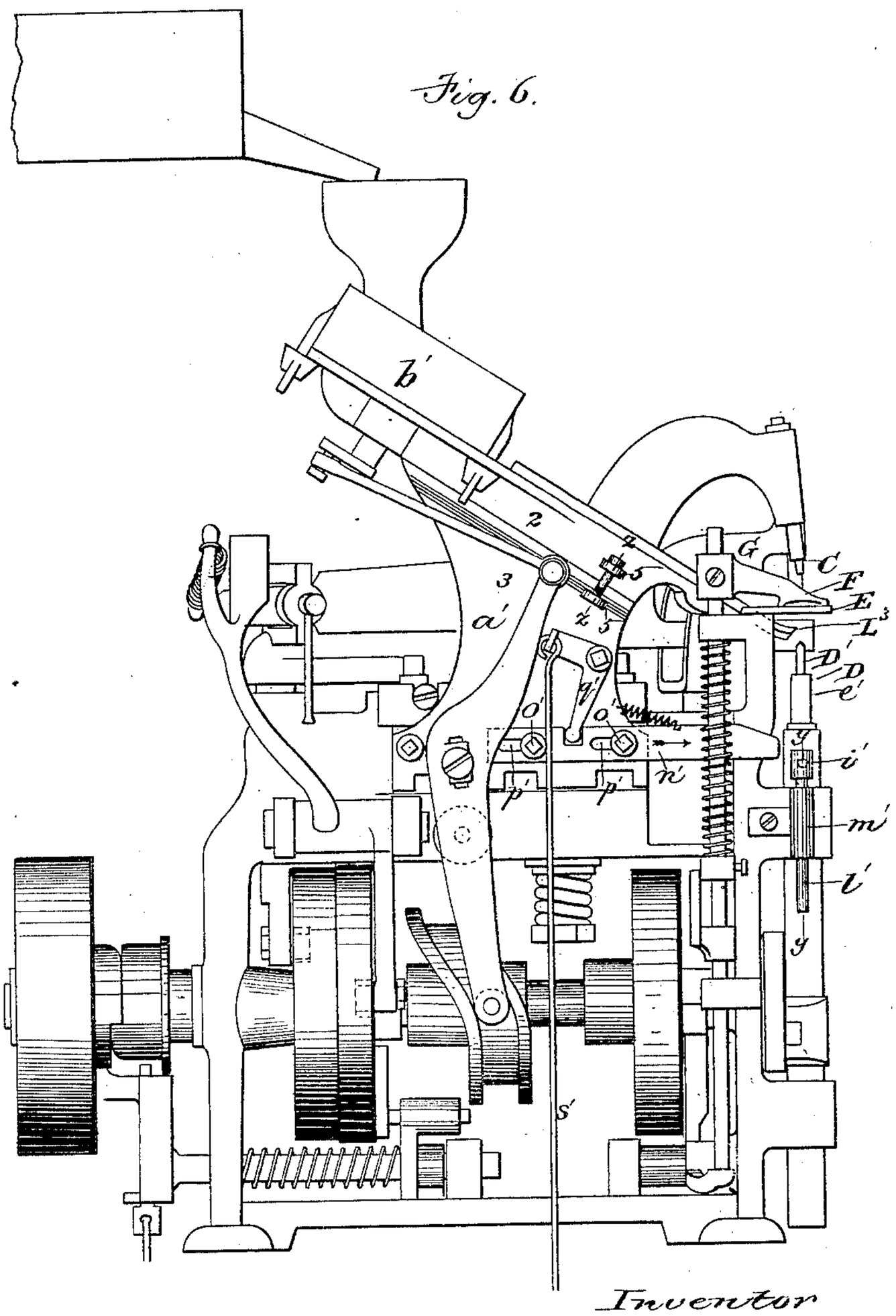


Fig. 8.

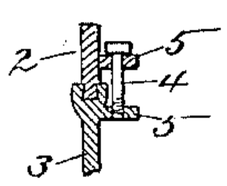
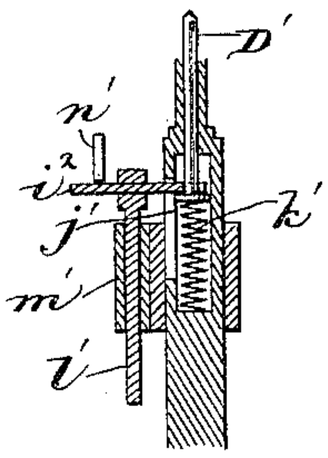


Fig. 7.



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(No Model.) 5 Sheets—Sheet 5.

L. D. HAWKINS.

EYELETING MACHINE.

No. 325,077. Patented Aug. 25, 1885.

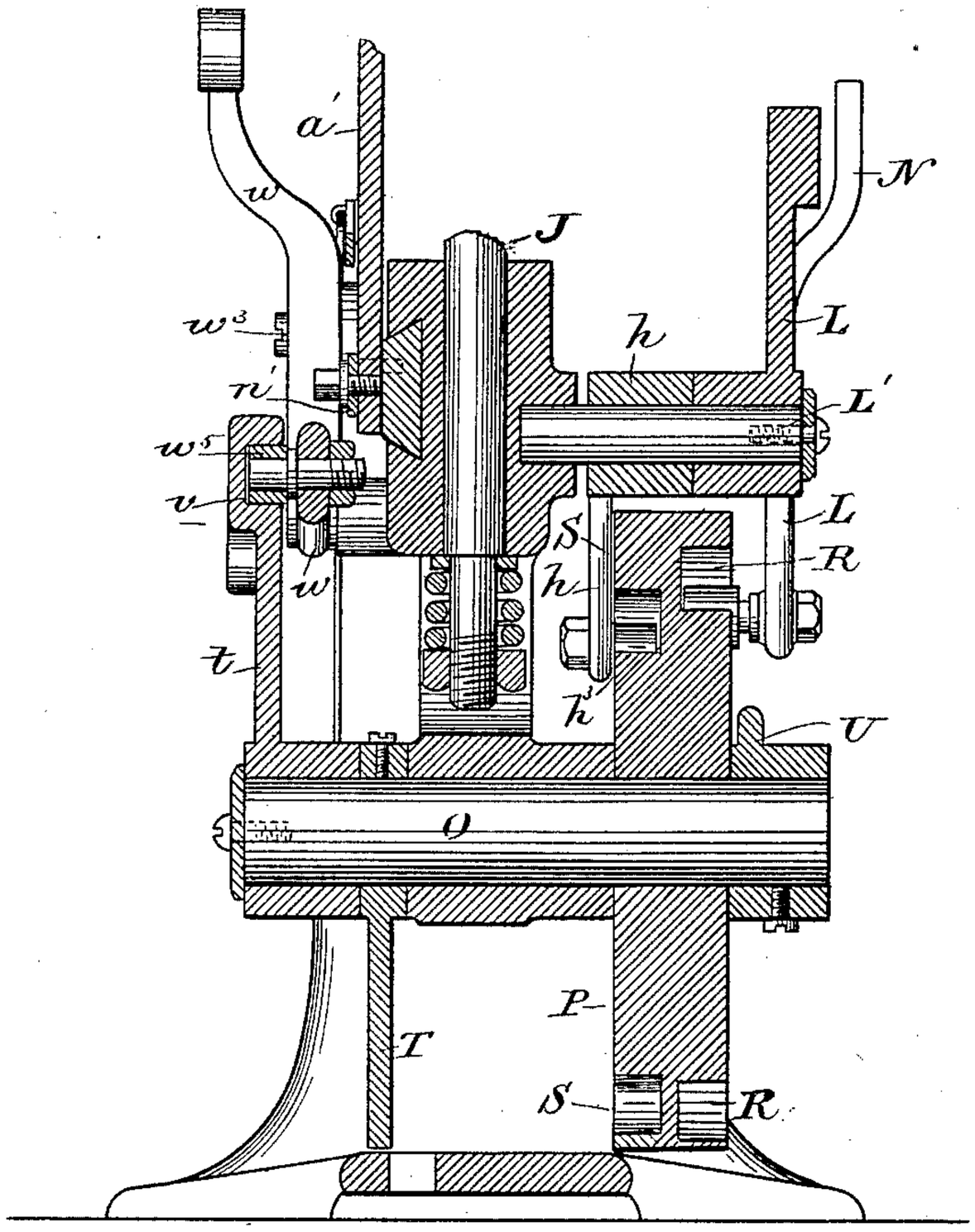

Fig. 9.

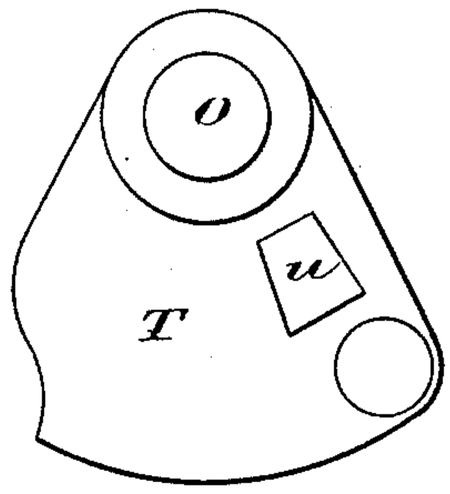

Fig. 10.

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UNITED STATES PATENT OFFICE.

LORENZO D. HAWKINS, OF STONEHAM, MASSACHUSETTS, ASSIGNOR TO THE COMBINATION POWER PUNCH EYELETING MACHINE COMPANY.

EYELETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 325,077, dated August 25, 1885.

Application filed August 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, LORENZO D. HAWKINS, of Stoneham, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Eyeleting-Machines, of which the following is a specification.

This invention relates to the so-called "combination eyeleting-machine" which performs the several operations of punching the eyelet-holes, inserting and upsetting the eyelet in each hole, and feeding the work, the feeding being accomplished by a lateral movement of the top set or anvil while the finger of said anvil is inserted in the last hole formed by the punch.

The present invention has for its object, first, to provide a machine of this class with devices whereby the different movements of the operating parts can be effected by means of a treadle operated by the foot of the attendant; secondly, to enable the attendant without stopping the machine to make the eyelet lifting and inserting device inoperative, so that any desired number of holes can be punched without being supplied with eyelets; and, thirdly, to provide means for detachably connecting the eyelet-box and the roadway leading therefrom to the frame of the machine, so that different forms of eyelets or other devices may be applied by the same machine, a different box and roadway being employed for each form or variety; and, fourthly, to provide improved means for raising the presser-foot.

To these ends the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved foot-power eyeleting-machine. Fig. 2 represents a front elevation of a portion thereof. Fig. 3 represents an elevation of the opposite side. Fig. 3ª represents a portion of Fig. 3. Fig. 4 represents a top view. Fig. 5 represents a section on line *x x*, Fig. 1, looking downwardly. Fig. 6 represents a side elevation of an eyeleting-machine having my improved devices for making the eyelet-lifter inoperative. Fig. 7 represents a section on line *y y*, Fig. 6. Fig. 8 represents a section on line *z z*, Fig. 6. Fig. 9 is a vertical section of the machine, taken in the plane of shaft O, looking to the rear of the machine, parts being omitted for clearness of illustration. Fig. 10 is a detached view of cam T.

The same letters of reference indicate the same parts in all the figures.

The eyeleting-machine shown in Figs. 1, 3, 4, and 5 is of the usual construction, excepting as hereinafter specified, and has the rising and falling punch A and its co-operating bed B, the vertically-movable top set, C, and the co-operating vertically-movable bottom set, D, the work-supporting bed E, and the work-holding presser-foot F, said parts being arranged in the usual manner in machines of this class—that is to say, the punch is attached to a lever, G, which is pivoted at G′ to a frame, H, supporting the punch-bed B. The top set is attached to a lever, C′, which is pivoted at C^2 to ears formed on a base or support, J, to which the frame H is attached. To the base J is rigidly attached a lever, I, which projects horizontally from the machine. Said base J is pivoted in a fixed socket, K, on the frame of the machine, so as to oscillate horizontally and carry with it the punch A, its bed B, and the top set, C. The presser-foot F is held down upon the work by a suitable spring, and is raised intermittently to permit the work to be fed, and the bottom set, D, is reciprocated vertically, so as to pick an eyelet from the raceway L^3 with its finger D′, insert said eyelet in a hole in the material, and cooperate with the top set in upsetting the eyelet. The time of the several operations is also the same as usual in this class of machines, viz: The punch first descends, perforates the work, and then rises. The punch and top set move horizontally in unison until the feeding-finger of the top set is over the hole made by the punch. The top set descends and its finger enters the hole. The anvil and punch move horizontally in the opposite direction to the first movement until the top set is brought over the bottom set, the punch remaining raised above the work. The bottom set is raised, taking an eyelet from the raceway, inserting it in the hole in the material, and compressing it against the top set. The raceway is moved forward before the bottom set rises

and backward after the eyelet is taken by the finger D′, as usual. This operation is repeated indefinitely, the punch descending to perforate the work immediately after each eyelet is inserted and upset, and the presser-foot rising to release the work while it is being fed, and falling to clamp the work during the other parts of the operation.

The horizontal movements of the punch and top set are produced by a lever, L, pivoted at L′ to the frame of the machine, and pressed positively, by means hereinafter described, against the outer end of the lever I to move the same in one direction, and by a spring, M, which is connected to the lever I and to an arm, N, on the lever L, said spring pulling the lever I in the opposite direction when it is released by the lever L.

Heretofore in machines of this class the several movements above described have been effected by means of a series of cams on a shaft which is belted to a driving-shaft, and intermediate levers or devices for imparting motion from the cams to the operating parts, as shown, for example, in Letters Patent granted to me February 13, 1883, No. 272,382.

In carrying out the first part of my invention I dispense with said power-operated shaft and employ a transverse arbor or rock-shaft, O, journaled in a suitable bearing or hanger. P represents a disk adapted to rotate independently on said rock-shaft O, and provided in its perimeter with a series of teeth or notches, Q, and in its opposite sides with cam-grooves R S. T represents a cam rigidly attached to said rock-shaft. U represents an arm also rigidly attached to said rock-shaft, and provided with a pivoted dog, V, which is pressed by a spring, W, against the perimeter of the disk P, and caused thereby to engage each notch or tooth Q in succession. *a* represents a treadle adapted to be depressed by the foot of the operator, and connected by a rod, *b*, with said arm U. When the treadle is depressed, it pulls the arm U downwardly, and thus turns the rock-shaft and its cam T, and at the same time partially rotates the disk P by means of the dog V. *c* represents a spring adapted to raise the treadle *a* after each depression thereof, and thus through the rod *b* raise the arm U and turn the rock-shaft O and its cam T in a direction opposite to that in which they were turned by the downward movement of the treadle. The rock-shaft is thus rocked or oscillated by each depression and release of the treadle, and the disk P is rotated one step forward by each depression of the treadle, the dog V being caused to engage one of the teeth Q each time the arm U is raised by the spring *c*. The punch-carrying lever G is slotted at *d* to receive a cross-bar on the forked vertically-movable rod *e*, which is adapted to slide in guides *f f* on the frame of the machine. Said rod is reciprocated vertically and caused to raise and lower the punch-carrying end of the lever G by means of a lever, *h*, pivoted at L′ to the frame of the machine, slotted at one end to receive a block which is pivoted to the rod *e*, and provided at its opposite end with a roller, h^3, projecting into the cam-groove S on the inner side of the disk P. The cam-groove S is formed with a series of abrupt outward curves, *i*, adapted to give the lever *h* a quick oscillating movement in the direction required to depress the rod *e*, and thus bring the punch down upon its bed, and immediately afterward a quick movement in the opposite direction to raise the punch above the work. To the lower end of the rod *e* is attached a horizontal arm, *j*, which projects across to the presser-foot standard *l*, as shown in Fig. 5, and supports a collar, *k*, on said standard, the arm *j* being slotted to receive the standard *l*. The cam-groove S has a series of inward curves, *i′*, alternating with the outward curves *i*, and adapted to raise the rod *e* and the presser-foot (through the described connection between the arm *e* and the presser-foot standard) and hold the same raised while the work is being fed by the lateral movement of the top set, and to lower said parts and permit the presser-foot to bear on the work after the feed movement is completed.

The lateral movements of the punch and top set are effected by means of the lever L, pivoted to the frame of the machine, as above described, beside the lever *h*, and bearing at one end against the lever I, which projects from the base J, the cam-groove R in the outer side of the disk P, which receives a roller on the lower end of the lever L, and the spring M, secured at one end to the lever I, and at its opposite end to the arm N, attached to the lever L. The outer portions, *r′*, of the cam-groove R move the lever L to the position indicated in Fig. 1, thus causing it to move the lever I and swing the top set over the bottom set after the punch has perforated the work. So soon as the punch rises from the work, an inner portion, r^2, of the cam R moves the lever L away from the lever I. The spring M at the same time acts on the lever I, causing it to follow the lever L, and thus swings the top set and punch in the direction indicated by the arrow in Fig. 4, the top set being thus brought over the hole formed in the work by the last action of the punch.

The descent of the top set to cause its finger to enter said hole is caused by a vertically-movable rod, *n*, adapted to slide in a socket in the rear portion of the frame of the machine, and having a horizontal slot in its upper end, through which the rear end of the lever C′ projects, a bell-crank lever, *o*, pivoted at *p* to the frame of the machine and engaged at one end with the rod *n*, and the cam T, rigidly attached to the rock-shaft O and oscillated thereby, said cam being thus forced intermittently against a roller, *q*, on the lever *o*, and caused to turn said lever on its pivot and raise the rod *n* and the rear end of the lever C′, thus

depressing the forward end of said lever and the top set carried thereby. The top set is held thus depressed while it is being moved laterally by the lever L until it comes over the bottom set, and the latter rises and inserts and upsets an eyelet in the hole through which the feeding-finger of the top set projects. When the cam T recedes from the lever *o*, a spring, r^3, attached at one end to the frame of the machine and at the other end to the lever C′, quickly depresses the rear end of said lever and raises the top set, the latter remaining raised until it is moved back by the action of the spring M to the position over the next hole formed by the punch.

An arm or lever, *t*, is journaled on the rock-shaft O so as to be capable of moving independently thereof. Said arm is provided with wings t' t^2, between which plays a projection, *u*, on the cam T. When the cam T is turned toward the lever *o*, its projection *u* strikes the wing t^2 of the lever *t*, and turns said lever on its pivot in the direction indicated by the arrow in Fig. 3. When the cam T is turned in the opposite direction, its projection *u* strikes the wing t' of the lever *t* and tilts said lever in a direction opposite to that indicated by the arrow. A cam-groove, *v*, in the outer end of the lever *t* receives a roller, w^5, on the lever *w*, and is thus caused to oscillate the lever *w*, which reciprocates the slide *a*′, supporting the eyelet-box *b*′ and roadway L^3, and oscillates the agitator in the eyelet-box, said lever *w* being pivoted at w^3 (see Fig. 3^a) to the frame of the machine, and provided with a slot, *w*′, which receives a block pivoted to the slide *a*′, and with a rod, *c*′, which connects its upper end with the crank *d*′ of the agitator. The movements imparted to the lever *w* cause it to move the roadway outwardly over the eyelet-lifter before the latter rises, so that the lifter will enter the lower eyelet in the roadway, and then withdraw from the roadway before the bottom set reaches it; also to operate the agitator, so as to insure a sufficient delivery of eyelets from the box to the roadway. The bottom set is mounted on a rod, *e*′, adapted to reciprocate vertically in a socket formed on the frame. A bell-crank lever, *f*′, is pivoted to the lower end of said socket, and is connected by a rod, *g*′, with the cam T, and by a rod, *h*′, with the bottom-set-carrying rod *e*′. The bottom set is thus raised and lowered by the oscillation of the cam T and rock-shaft O.

The rock-shaft O, the treadle and spring which oscillate the same, and the intermediate devices whereby the punch, top set, bottom set, and presser-foot are operated, enable the operator to accomplish by foot-power the same results as are accomplished by the power-driven shaft and accompanying mechanism described in my above-named patent.

In carrying out the second part of my invention, I provide means whereby the operator, without stopping the machine, may prevent the removal of an eyelet from the roadway when the bottom set, D, is raised, and thus cause one or more holes in the work to be left vacant for the reception of a lacing-hook or other device which the machine is not capable of supplying. To this end I provide a horizontal arm extending through a slot, *j*′, in the rod *e*′, and having a forked inner end, which embraces the lower end of the lifter D′ above the flange of the lifter, which rests on the supporting-spring *k*′. The arm i^2 passes through the perforated head of a vertical guide-rod, *l*′, which slides in a socketed bracket, *m*′, attached to the frame.

n′ represents a plate secured by screws *o*′ *o*′ to the roadway-supporting standard *a*′, the screws *o*′ *o*′ passing through slots *p*′ *p*′ in the plate *n*′, whereby said plate is enabled to slide longitudinally.

q′ represents a bell-crank lever pivoted to the standard *a*′, engaged at the end of one of its arms with a recess in the plate *n*′, and connected at the end of its other arm by a rod, *s*′, with a treadle, s^3, as shown in Fig. 3. Said treadle is suitably arranged so that when depressed by the operator's foot it will depress the rod *s*′ and turn the lever *q*′ on its pivot, so that said lever will throw the plate *n*′ forward in the direction indicated by the arrow in Fig. 1 and cause the end of said plate to project over the outer end of the arm. When the plate *n*′ is thus moved forward, it arrests the lifter D′ and prevents the latter from rising with the rod *e*′, and therefore from entering the roadway and taking an eyelet therefrom.

The operations of punching and feeding the work are not interrupted by the arresting of the lifter; hence any desired number of holes can be punched without being eyeleted. When the operator releases the treadle s^3, whereby the rod *s*′ was depressed, a suitable spring, s^4, forces said rod upwardly, and thereby returns the lever *q*′ and plate *n*′ to their normal position shown in Fig. 6, the arm i^2 being thus released, so that it, with the lifter, can rise and fall with the rod *e*′ and bottom set, D.

This improvement is a marked advantage to the machine in eyeleting boot or shoe uppers which are to have lacing-studs inserted in one or more of the holes and ordinary eyelets in the others. Heretofore in doing this class of work the operator has been obliged, after setting the eyelets, to either remove the work from the machine and punch the other holes with a hand-tool, or to stop the machine and push back the row of eyelets in the raceway, so that the lifter will not meet an eyelet in its ascent, and then punch the other holes with the punch of the machine while the eyelets are held back. The superior convenience of the machine as improved by me will be readily seen.

This improvement may be applied to a power-machine, as shown in Fig. 6, as well as to the foot-power machine above described.

The slide or standard *a*′, supporting the eyelet-box *b*′ and roadway, is preferably made in

two sections, 2 3, the upper section, 2, having a tongue fitting in a groove in the lower section, so that the upper section, with the eyelet-box and roadway, can be removed from the machine. The sections 2 3 are detachably secured together by a screw, 4, inserted in coinciding holes formed in ears 5 5 on the sections 2 3. I am thus enabled to supply the machine with a box and roadway adapted to supply tubular-shanked lacing-hooks or other devices instead of ordinary eyelets.

The collar *k* of the presser-foot-supporting rod *l* is provided with a downwardly-projecting finger, t^3, (shown in dotted lines in Fig. 3,) which bears on a lever, *u'*, pivoted at *v'* to the frame, and projecting outwardly from the machine. When the outer end of the lever *u'* is depressed, the presser-foot rod *l* and the presser-foot are raised thereby and the work on the bed is released.

w^2 represents a spring-brake which bears against the rod *e'* of the bottom set and prevents said rod from moving loosely. *x'* represents a similar brake bearing on the periphery of the disk P.

I claim—

1. In an eyeleting-machine, the combination, with the punching, feeding, eyelet inserting and upsetting, and work-holding devices, of a treadle adapted to be operated by foot-power, a rock-shaft, intermediate devices, substantially as described, whereby the rock-shaft is oscillated by the movements of the treadle, and mechanism whereby said punching, feeding, eyelet inserting and upsetting, and work-holding devices are successively operated by the oscillations of the rock-shaft, as set forth.

2. In an eyeleting-machine, the combination, with the punching, feeding, eyelet inserting and upsetting, and work-holding devices, of the rock-shaft provided with the cam T, the disk P, having cam-grooves journaled on said shaft, mechanism, substantially as described, whereby said shaft is oscillated and the cam-groove l disk is intermittently rotated, and intermediate mechanism, substantially as described, through which said rock-shaft, its cam, and the cam-grooved disk act to operate said punching, feeding, eyelet inserting and upsetting, and work-holding devices, as set forth.

3. In an eyeleting-machine, the combination, with the work punching and feeding mechanism and eyelet-supply-trough, of an eyelet-transfer finger and a transfer-finger stop, all arranged to co-operate substantially as described.

4. In an eyeleting-machine, the combination, with an eyelet-lifter, of a treadle mechanism and connections therefrom to the lifter, substantially as described, whereby said lifter may be arrested, as set forth.

5. In an eyeleting-machine, the combination, with the eyelet-lifter provided with a lateral arm, i^2, of the sliding plate *n'* and means, substantially as described, for engaging said plate with the arm, as set forth.

6. In combination with the eyelet-box, the slide or standard *a'*, made in two sections, 2 3, the sections being tongued and grooved together and detachably secured by a set-screw, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 30th day of July, 1883.

LORENZO D. HAWKINS.

Witnesses:

C. F. BROWN,

A. L. WHITE.