(No Model.)

4 Sheets—Sheet 1.

F. W. MERRICK.

EYELETING MACHINE.

No. 422,351. Patented Feb. 25, 1890.

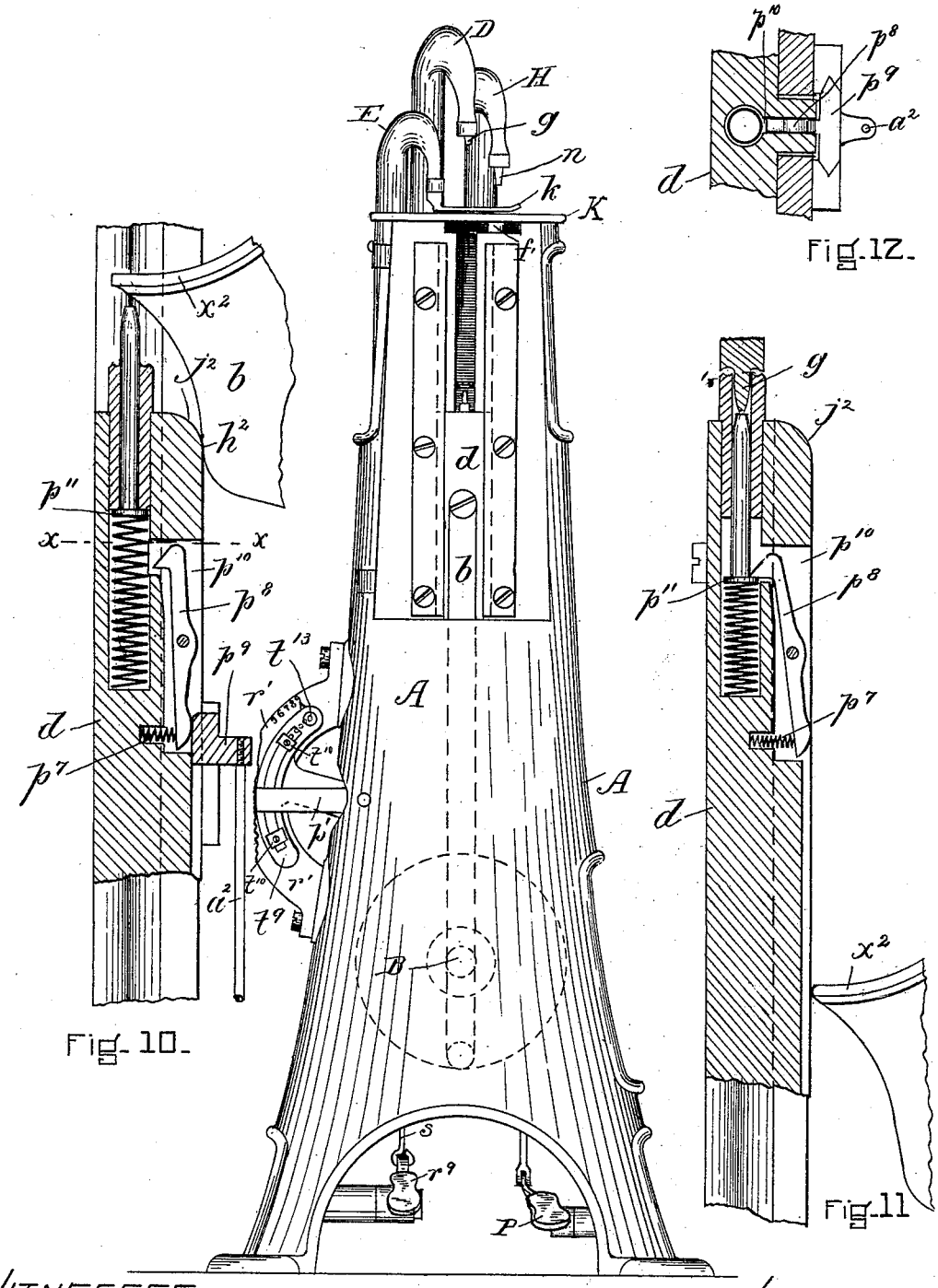

Fig. 1

Fig. 12.

Fig. 10.

Fig. 11.

WITNESSES.

Robert Wallace,
C. E. Rotter

INVENTOR.

Frank W. Merrick,
by Wm. A. Macleod
his Atty

(No Model.) 4 Sheets—Sheet 2.

F. W. MERRICK.

EYELETING MACHINE.

No. 422,351. Patented Feb. 25, 1890.

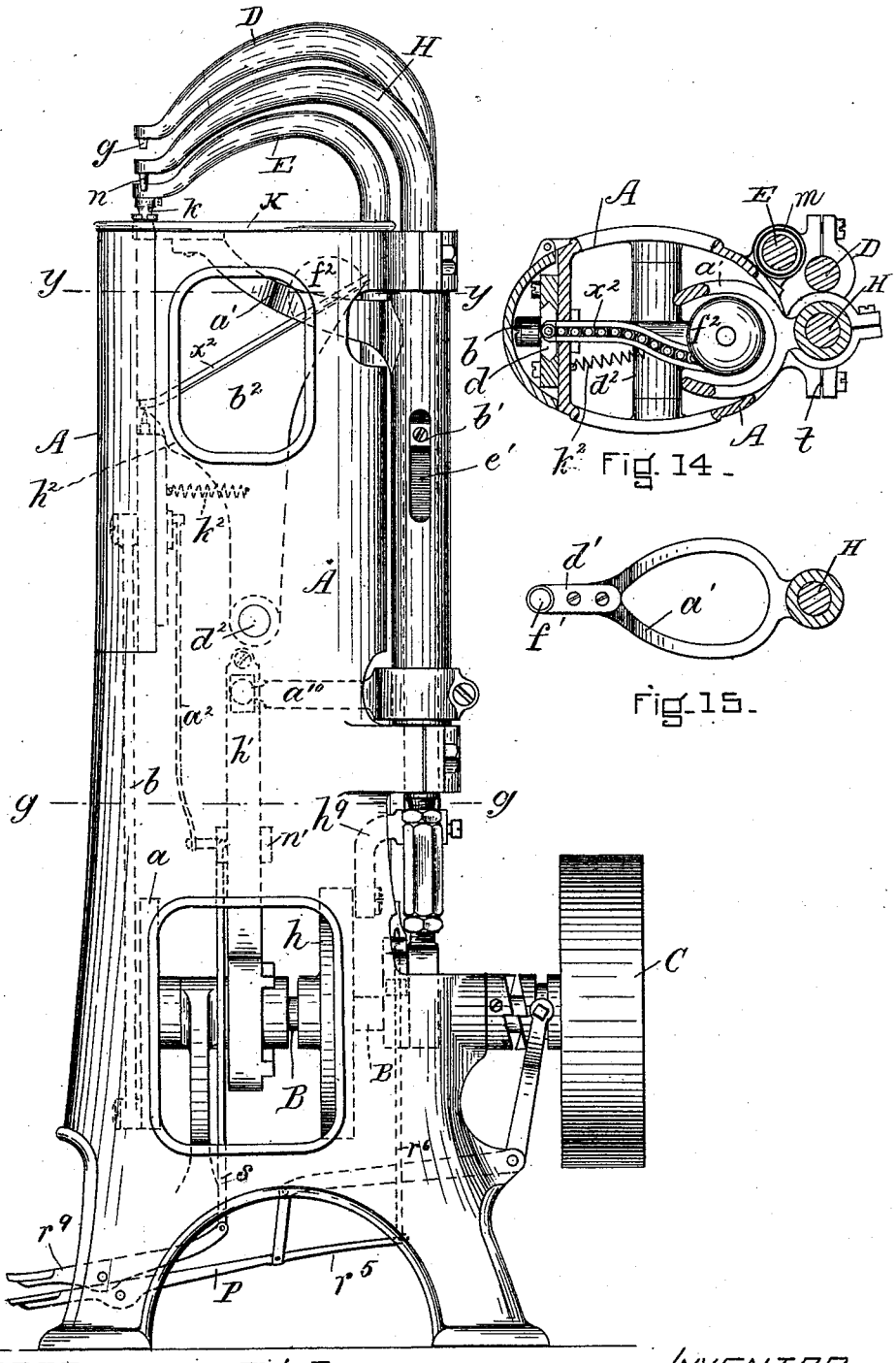

Fig. 2.

Fig. 14.

Fig. 15.

WITNESSES.

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(No Model.) 4 Sheets—Sheet 3.

F. W. MERRICK.

EYELETING MACHINE.

No. 422,351. Patented Feb. 25, 1890.

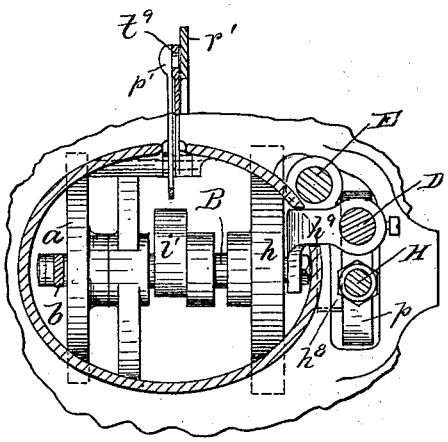

Fig. 13.

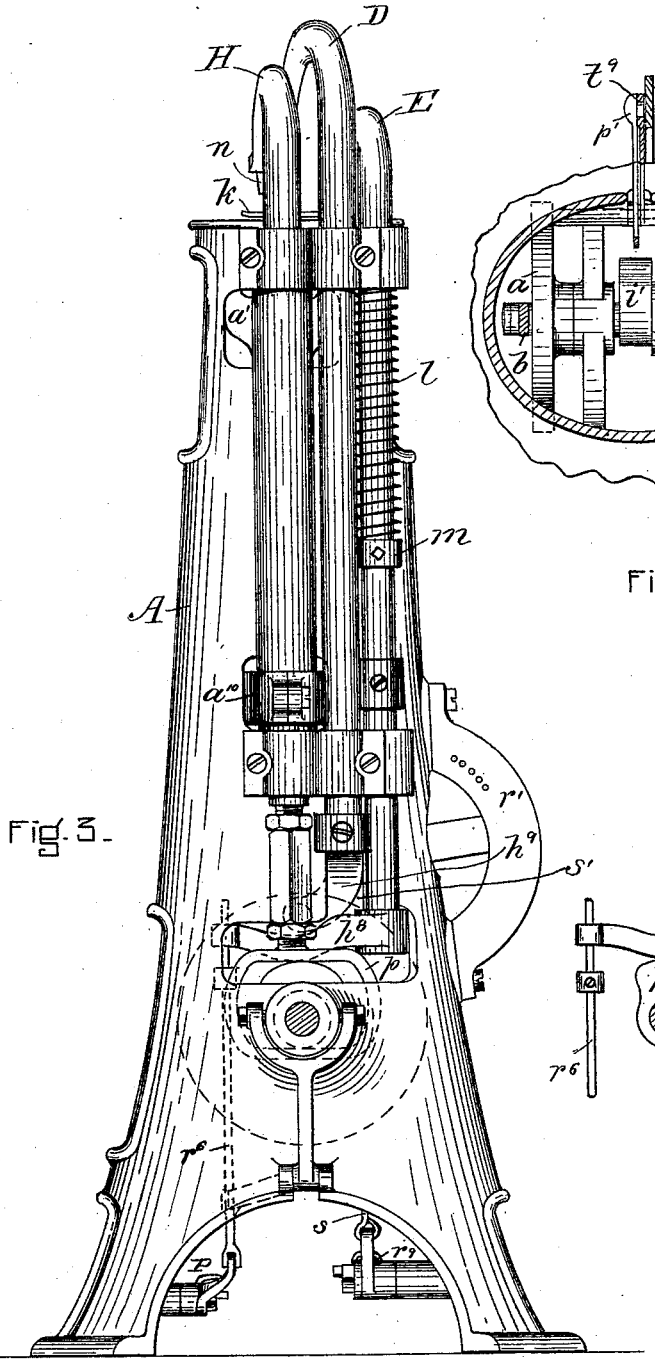

Fig. 3.

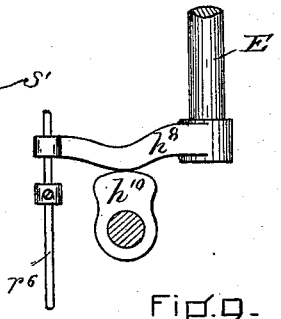

Fig. 9.

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(No Model.) 4 Sheets—Sheet 4.

F. W. MERRICK.

EYELETING MACHINE.

No. 422,351. Patented Feb. 25, 1890.

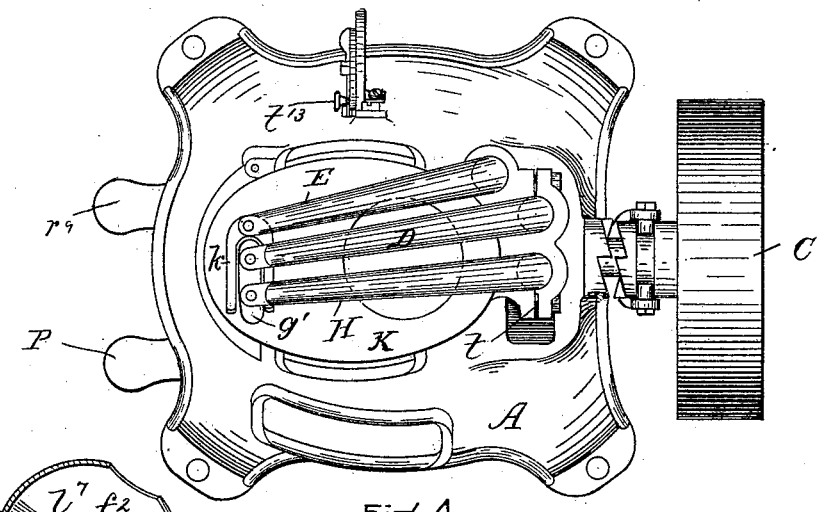

Fig. 4.

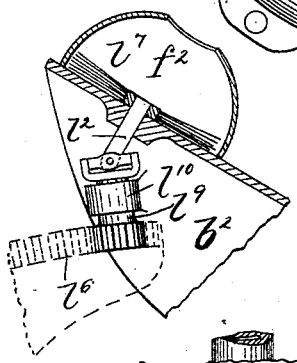

Fig. 8.

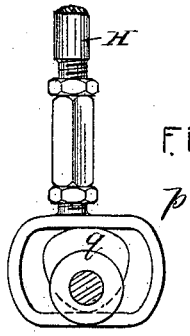

Fig. 6.

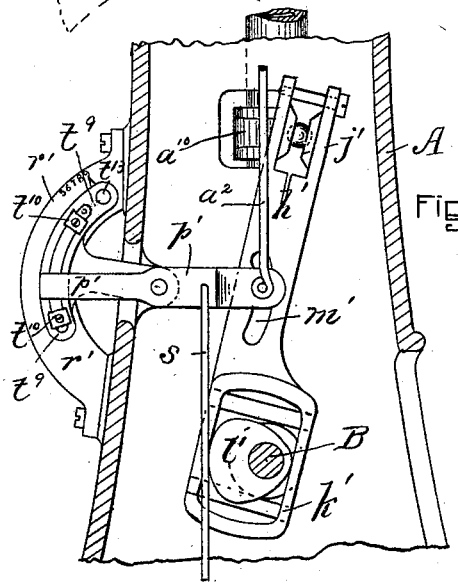

Fig. 7.

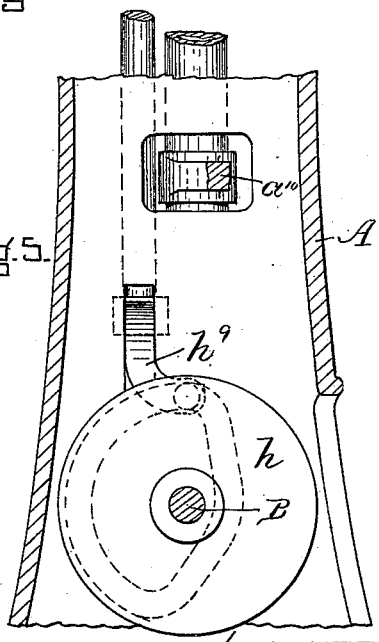

Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

FRANK W. MERRICK, OF SOMERVILLE, ASSIGNOR TO THE MERRICK MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS.

EYELETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 422,351, dated February 25, 1890.

Application filed May 15, 1889. Serial No. 310,820. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. MERRICK, of Somerville, county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Eyeleting-Machines, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof, in which—

Figure 1 is a front, Fig. 2 a side, and Fig. 3 a rear, elevation. Fig. 4 is a top view. Fig. 5 is a detail showing the cam which operates the upper set. Fig. 6 is a detail of the yoke and cam which operate the punch. Fig. 7 is a detail of the arm and its operating yoke and cam which actuate the die, as also the punch, laterally to feed the stock forward, and showing, also, the mechanism by which the length of the feed may be regulated or changed. Fig. 8 is a section of the eyelet-box, and showing the eyelet-agitating device. Fig. 9 is a detail of the cam which operates the presser-foot. Figs. 10 and 11 are vertical sections of the under-set bar, showing the method of holding down the spindle during the downward movement of the bar. Fig. 12 is a section on line $x\ x$, Fig. 10. Fig. 13 is a section on line $g\ g$, Fig. 2. Fig. 14 is a section on line $y\ y$, Fig. 2. Fig. 15 is a plan view of the arm which carries the die.

The object of my invention is the construction of an automatic eyeleting-machine which may have a large table unobstructed by the eyelet-hopper, raceway or other parts, a positive punch-feed which cannot fail to feed even the thinnest material and which may be speedily adjusted without stopping the machine, if necessary, so as to vary the length of the feed, and a hopper and its raceway arranged beneath the table of the machine and so mounted as to be readily swung back when it is desirable to use the machine for punching holes only without setting eyelets in them; and my invention consists in the construction and arrangement of the parts of the machine, whereby the hopper and its raceway may be placed underneath a table, thus permitting a large and unobstructed table for the reception of the work.

My invention further consists in the construction and arrangement of the punch-feed so that not only the punch has a lateral feed movement, but also the die with which the punch co-operates, thus insuring a positive feed without danger of missing even the thinnest or lightest kind of material.

My invention further consists in the mechanism for imparting to said punch and die the lateral feed movement, as also for adjusting the length of the feed speedily and easily, so that, if desired, the operator may with ease and with little or no loss of speed vary the distance between one eyelet and another.

My invention further consists in the method of mounting and operating the eyelet-hopper and raceway so as to permit of its being moved backward at each upward movement of the under set, and, further, in the mechanism by which the eyelet-spindle may be locked down and prevented from taking an eyelet when it is desired to punch holes only without setting eyelets therein, all as hereinafter described.

I have shown my invention in the accompanying drawings and embodied in the best form now known to me, and I will describe the same, using like letters of reference to indicate like parts.

A represents the frame or standard of the machine, and may be varied in form, as desired. In a bench-machine a frame adapted to be placed on a bench would be used.

B is the main shaft, which is journaled in the standard and is fitted with a belt-pulley C, and from which all the operating parts of the machine are directly actuated. The front end of the main shaft is provided with a crank-wheel a, which is provided with a crank-pin carrying a pivoted link b, the other end of said link being pivoted to a stud on the under-set bar d. The bar d is mounted in a vertical raceway in the front of the standard, (see Fig. 1,) so that as the crank-wheel a revolves the under set is reciprocated vertically.

g is the upper set, which is mounted in a bar D, curved at its upper end, the shank of which is set in suitable bearings on the rear of the standard to permit of vertical movement. (See Fig. 3.) The said shank or straight portion of the bar D is provided at its lower end with a curved piece h^9, which projects through a vertical slot s' in the standard A, (see Fig. 3,) and carries at its

lower end a cam-truck, which travels in the cam h on the main shaft. By this arrangement the upper set g is given a vertical movement, and is prevented from lateral movement by the said vertical guide-slot in the standard, through which the piece h projects. The presser-foot k is also mounted, as shown, on a similar goose-neck-shaped bar E, the shank of which is also mounted in a similar bearing on the standard A and beside the shank of the goose-neck D. (See Fig. 3.)

The lower end of the shank E is provided with an arm h^8, which rests on the cam h^{10}, set on the main shaft, (see Figs. 3 and 9,) and by this means the bar E and presser-foot are raised at each revolution of the shaft to permit the feeding forward of the stock. A spiral spring l encircles the bar E, the upper end of said spring resting against the guide-way or bearing and the lower end against a collar m on the bar. (See Fig. 3.) The spring l acts to keep the bar E pressed down against the cam h^{10}, and thus as the cam revolves the presser-foot is given a vertical movement.

The punch is shown at n, and is also mounted in a goose-neck-shaped bar H, which is likewise set in a suitable bearing on the frame, so as to permit of its vertical movement. The shank of the bar H is attached by means of a stud and right-and-left-hand adjusting-screw (see Figs. 3 and 6) to a yoke p, which receives a shield-shaped eccentric q, by means of which the punch is reciprocated vertically, with two periods of rest during each reciprocation—that is, at each revolution of the shaft. By this means the punch is brought down to cut a hole in the stock, and remains down while it is being moved laterally to feed the stock, after which it goes up and remains up while it is moved laterally back to the point from which it moves down again to punch the next hole. The bearings in which the bar H slides are shown at t, Fig. 4, as split and provided with clamping-screws, by which any wear of the bearing may be taken up, if desired. The bar H carries the arm a', the rear end of which is provided with a sleeve through which the bar passes. A block b' on the bar H is received in a vertical slot c' in the sleeve of the arm a'. By this arrangement the bar H may have a vertical movement relatively to the arm a', while the two will move laterally together.

The forward end of the arm a' carries a die-block d', adjustable thereon by means of screws, (see Fig. 15,) which carries a die f', which may be of wood, metal, or other suitable material. The die f' projects upward through a slot g', Fig. 4, in the table and co-operates with the punch n to punch a hole in the stock for the reception of an eyelet or similar article.

The slot g' in the table permits the lateral movement of the die f' in co-operation with the punch to feed the stock, and as the feed movement occurs when the punch and die are in contact and after the punch has passed through the stock it will be clear that the feed is positive and that very thin and light stock will be fed with the same certainty as thick stock.

As will be obvious, the length of the feed will govern the spacing of the eyelets, or, rather, the spacing of the punch-holes in which either eyelets or hooks are set. The mechanism for controlling the length of the feed is one of the essential features of my invention, and consists, essentially, of a lever having a movable fulcrum, whereby, by shifting the fulcrum, the feed movement may be varied.

I will now describe the particular mechanism shown in the accompanying drawings by which the feed movement is governed in a machine like the one shown employing a punch-feed. For the purpose of giving the punch and die a lateral feed movement, I provide a lever h', (see Fig. 7,) the upper end of which is pivoted to a projection a^{10} on the sleeve of the arm a', (see Fig. 2,) by means of a sliding block. (Shown at j', Fig. 7.) The other end of this lever is provided with a yoke k', which receives a shield-shaped eccentric l' on the main shaft. The central portion of the lever h' is provided with a curved slot m', which receives a stud n' on the end of the lever p', the other end of said lever p' being extended in front of a graded segment or curved projection r', secured on the standard of the machine. To this lever a rod s is secured, the lower end of the rod being pivoted to a treadle r^9, so that the operator, by movement of his foot on the treadle, may raise or lower the lever p', thus raising or lowering the stud n' in the slot m', and thus changing the fulcrum of the lever h' and varying the throw of said lever. Since this lever h' moves the arm a' and the bar H laterally it will be clear that the lateral or feed movement of the die f' and punch n will be varied by a variation of the throw of the lever h', and that consequently the length of the feed may be adjusted or varied as desired. For the purpose of setting the lever p' so as to fix the throw of the lever h' at a given amount, or of gaging the throw of the lever p', I provide a slotted curved piece t^9, which is pivoted by an arm to the standard on the pivot of the lever p' and projects in front of the segment r'. The piece t^9 is secured to the segment r' by means of a headed pin t^{13}, which projects into holes in the segment r'. (See Fig. 1.) On the curved piece t^9 are adjustably secured an upper and a lower block t^{10}, which limit the movement of the lever p' so that two different and definite lengths of feed may be obtained, and two different spacings may be obtained for eyelets and lacing stud-holes, as required on the flap of a shoe.

When the operator by means of the treadle-rod s holds the lever p' against the lower block, a short feed will result, such as is required in setting the eyelets to receive the lace in the lower part of a shoe-flap, while by shifting the lever p' till it bears against the

upper block t^{10} a longer feed will result, such as is desired in punching the holes to receive the lacing-hooks in the upper part of the shoe-flap. In this way the space between the eyelets or punch-holes may be varied instantly and the holes distributed evenly without stopping the machine. By moving the piece t^9, which may be speedily and accurately done by means of the pin t^{13} and graded scale on the segment r', the path of movement of the lever p', and consequently a given variation of the length of feed, may be provided for, so that when the pin t^{13} is set opposite the figure 5 of the scale on the segment r' the feed is of the right length for a shoe-flap of a given size—say No. 5—while, when the pin is shifted opposite 8 on the scale, the feed is slightly increased to suit the flap of a No. 8 shoe, allowing the same number of eyelets and studs therefor. As will be clear, the lever having a movable fulcrum permits the accomplishment of two results—viz., first, on a shoe-flap of a given size a part of the holes punched may have one spacing, while the remaining holes may have another spacing, and, second, on a shoe-flap of a larger size the same number of holes bearing the same relative positions to each other and to said flap as the holes in the smaller flap bear to it may be properly spaced and spread out as required on said larger flap by a simple and speedy adjustment of the fulcrum of said lever.

As it frequently happens that when the feed is lengthened it is desirable, as in shoe-flaps, to punch holes only for the reception of lacing-studs and not to set eyelets in the holes, I have provided a rod a^2, which is fast at one end to the rear of the lever p' and at the other to a sliding block p^9, which moves in ways on the standard. (See Figs. 10 and 12.) A slot p^{10} in the rear face of said set-bar contains a pivoted latch p^8, the lower end of which is pressed outwardly by means of a spring p^7 throwing the upper hooked end inwardly against the spindle of the under set which takes the eyelets from the raceway. When the under-set bar has moved upwardly to set an eyelet, the spindle is forced downwardly against its spring, as shown in Fig. 11, and the hook of the latch p^8 snaps over the base or seat p^{11} of the spindle, holding the spindle down in its socket. The spindle remains in this position until the set-bar nears the end of its downward movement, when the free end of the pivoted latch slides under the block p^9 and frees the latch from the spindle, thus allowing the spindle to rise in time to take an eyelet on its upward movement. By this arrangement the spindle is held within its socket while it is passing down past the end of the eyelet-raceway x^2, and so is kept out of contact therewith. If now the block p^9 be slid down, so as not to come in contact with the latch p^8 at any part of its movement, the spindle will be held down in its socket continually and the machine may be operated without taking the eyelet—that is, it may be used for punching holes without setting eyelets in them. Since the block p^9 is connected by the rod a^2 with the lever p' when the lever p' is moved downwardly by its treadle, the feed mechanism is not only shifted, as above described, so as to space the holes differently, but the spindle of the under set is at the same time locked down and prevented from taking the eyelets, and thus the operation of the machine in setting eyelets in the lower part of a shoe-flap and cutting holes in the upper part with different spacing is continuous.

The eyelet-hopper f^2 and raceway x^2 are mounted on an arm b^2, which is pivoted at d^2 to a stud on the standard A, so that it may swing toward and from the front of the machine. The arm b^2 flares at the top or upper end, as shown at Fig. 2, so as to present a proper support for the hopper and raceway, and the arm is so constructed that when it is swung forward or down the lower end of the raceway will be in position to deliver an eyelet to the lower set as the set moves upward past it, and as soon as the set has taken an eyelet a cam projection h^2 on the front of the arm b^2 comes in contact with a cam projection or web j^2 (see Fig. 10) on the rear of the set-bar, so that the further upward movement of the set-bar throws the arm b^2 and the raceway and hopper back out of the way.

A spring k^2, fast at one end to the standard and at the other end to the arm b^2, acts to pull the arm down or forward again as soon as the set has descended, and thus to bring the raceway into position to deliver the succeeding eyelet to the under set. The raceway is of the usual form, and is substantially in cross-section a T-shaped or open slot, (see Fig. 14,) while the hopper also may be of any well-known form, the precise form of hopper used not being essential to my invention.

For the purpose of agitating the eyelets in the hopper, I have provided a shaft l^2, which may be used, if desired, and which is provided at one end with a brush l^7 inside the hopper. (See Fig. 8.) The other end of said shaft l^2 is connected by a universal joint with a shaft l^9, journaled in a lug l^{10} on the arm b^2. The lower end of the shaft l^9 carries a pinion which meshes with a rack l^6, secured to a bracket on the standard, and which at each forward and backward movement of the arm b^2 operates to revolve the brush l^7, and thus agitate the eyelets.

As the vertical throw of the under set may be made as long as desired by increasing the throw of the crank-wheel a, a considerable space may be allowed between the lower end of the raceway where the eyelet is delivered to the under set and the point just above the table where the eyelet is placed in the work. Sufficient room is therefore gained to place the hopper and raceway wholly under the work-table K, and still have sufficient pitch to the raceway to insure the fall or delivery of the eyelets down the same from the hopper.

By this arrangement a large and unobstructed work-table is obtained which greatly facilitates the use of the machine and enables it to be used in setting eyelets in large work in which, so far as known to me, eyelets could only hitherto be set by foot-power or by a slow hand process.

The treadle P (see Fig. 2) is connected with a shipper mechanism of well-known construction, so that the operator may stop and start the machine by pressure of his foot. A projection r^5 from this treadle is pivoted to the lower end of a vertical rod r^6, the upper end of which rod is secured to the arm h^8 on the presser-foot bar E. (See Fig. 9.) By this mechanism the operator is enabled to lift the presser-foot by depressing the heel of his foot which is on the treadle P, while by depressing the toe of said foot the shipper-lever is shifted and the machine started. To permit of this latter movement, the upper end of the vertical rod r^6 is so secured to the arm h^8 that it may slide vertically therein.

The arm a', which supports the die f', is of the yoke shape, in cross-section, (shown in Fig. 15,) in order to accommodate the eyelet hopper and raceway and to permit the latter to be placed centrally in the machine.

What I claim is—

1. The combination, in an eyeleting-machine, with the vertically-moving under set and its bar, of an eyelet hopper and raceway mounted on a movable support or arm, said support being provided with a cam projection which co-operates with a similar projection on the under-set bar, whereby as the under set moves upward the eyelet hopper and raceway are moved backward, for the purposes and substantially as shown and described.

2. In an eyeleting-machine, the combination, with an under set having a spring-mounted spindle, of a latch co-operating with said spindle carried on the under-set bar, and a sliding block arranged to bear on said latch to release the spindle at a certain point in the movement of the under-set bar, and means for operating said sliding block, substantially as shown and deseribed.

3. In an eyeleting-machine, the combination, with a set having a spring-mounted spindle, of a latch arranged to co-operate with said spindle to lock the spindle within its socket, a sliding block arranged, when in its operative position, to bear on the latch to free it from the spindle, and treadle-operating mechanism for said block, substantially as shown and described.

4. In an eyeleting-machine having a laterally-moving punch and die, the combination, with an operating-lever for imparting to said punch and die their lateral movement, of a movable support to which said operating-lever is fulcrumed, two stops, and a movable part by which said stops are carried, whereby said stops are adapted to be simultaneously moved to change the position of the movement of said support, substantially as shown and described.

5. In an eyeleting-machine having a pivoted arm carrying the eyelet hopper and raceway, the combination therewith of a stationary rack, a shaft, and pinion co-operating with said rack, said shaft being journaled on the said arm, which carries the hopper and raceway, and being connected with a brush or equivalent device in the hopper, whereby the movement of the hopper-supporting arm will agitate the eyelets, substantially as shown and described.

6. In an eyeleting-machine, the combination, with an upper set and presser-foot above the table or work-support of said machine, of a vertically-moving under set and a movable eyelet hopper and raceway arranged beneath said table or work-support and thus entirely out of the way of the operator.

7. In an eyeleting-machine, the combination, with the upper set and presser-foot above the table or work-support of said machine, of a vertically-moving under set, an eyelet hopper and raceway arranged beneath said table or work-support, a pivoted arm by which said hopper and raceway are carried, and mechanism, substantially as described, for moving said pivoted arm to change the positions of said hopper and raceway.

FRANK W. MERRICK.

Witnesses:
WM. A. MACLEOD,
ROBERT WALLACE.