(No Model.) 4 Sheets—Sheet 1.

A. GARRETT & G. WEBSTER.

PUNCHING AND EYELETING MACHINE.

No. 413,752. Patented Oct. 29, 1889.

Fig. 1.

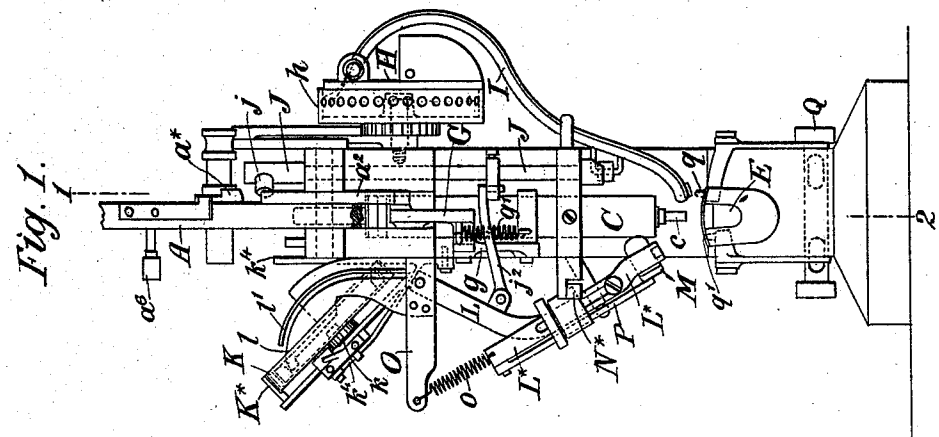

Fig. 2.

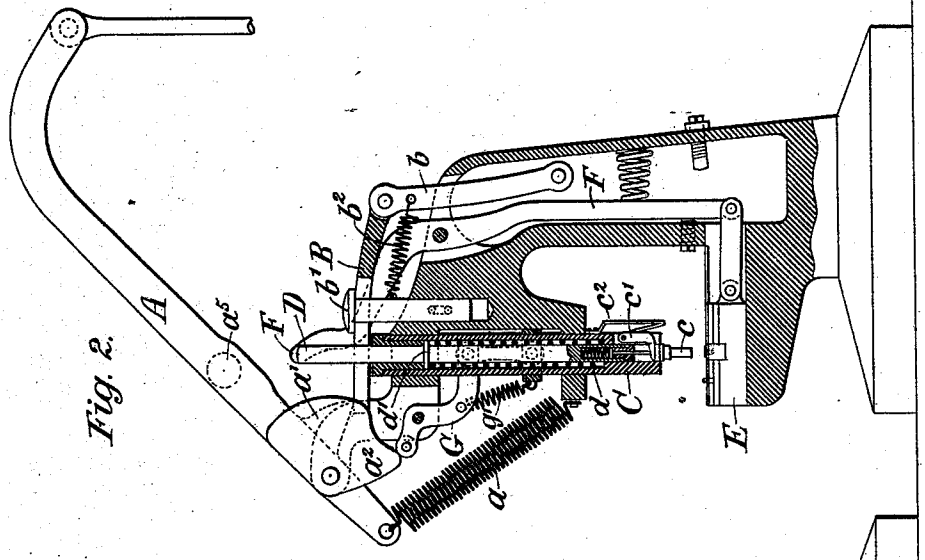

Fig. 3.

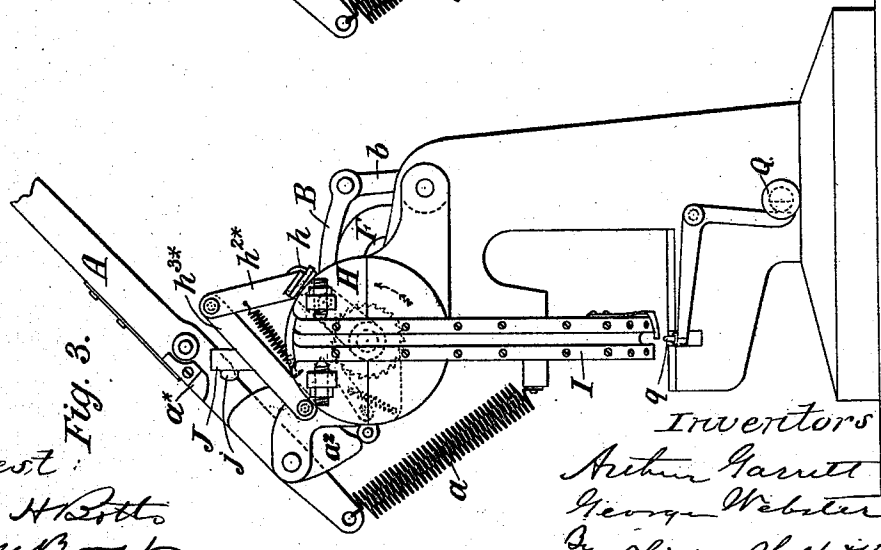

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Fig. 10.

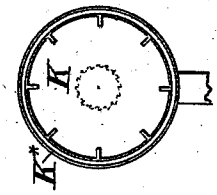

Fig. 9.

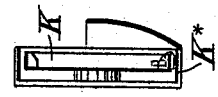

Fig. 6.

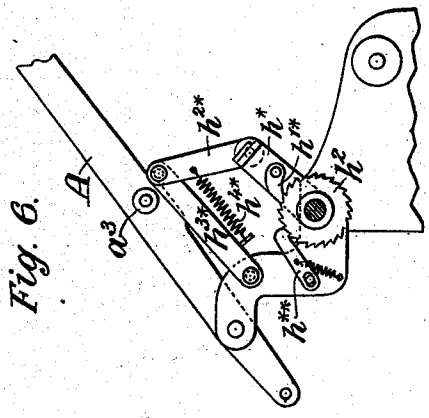

Fig. 7.

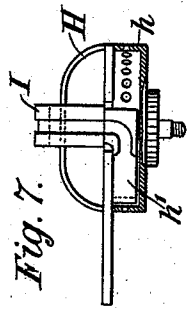

Fig. 8.

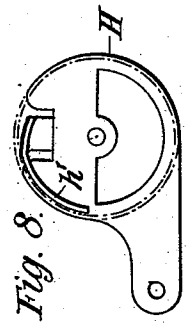

Fig. 4.

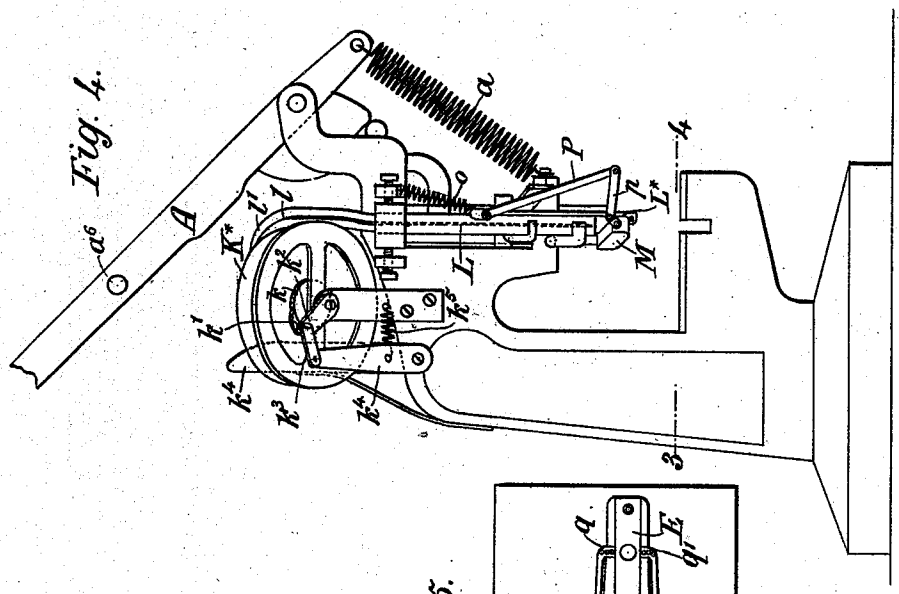

Fig. 5.

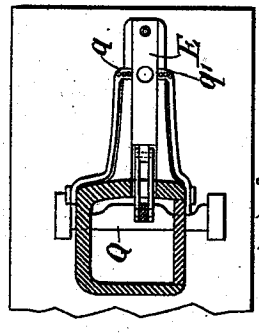

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Fig. 15.

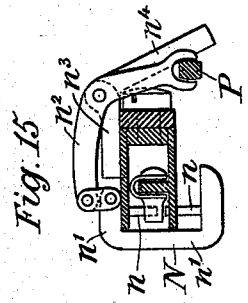
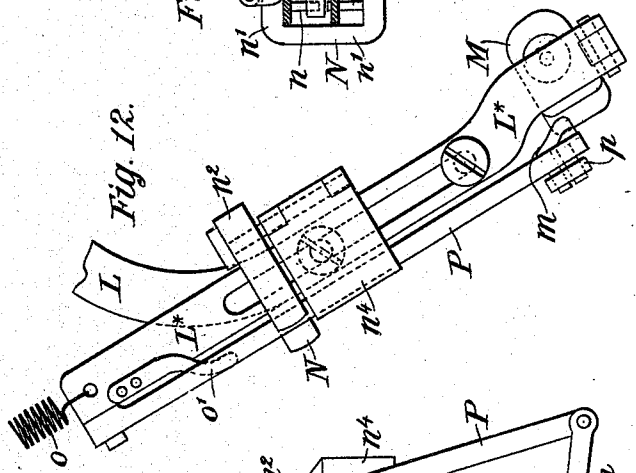


Fig. 12.



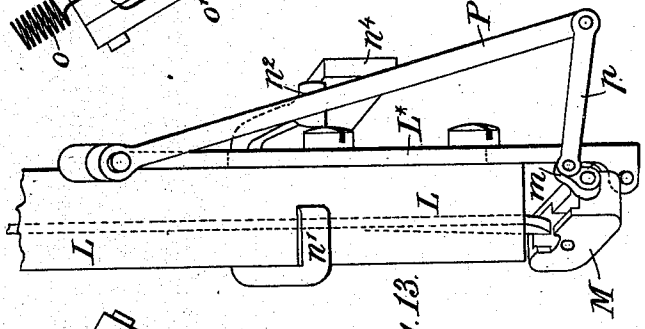
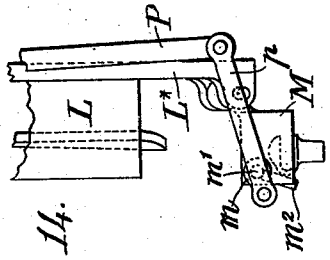


Fig. 13.

Fig. 14.



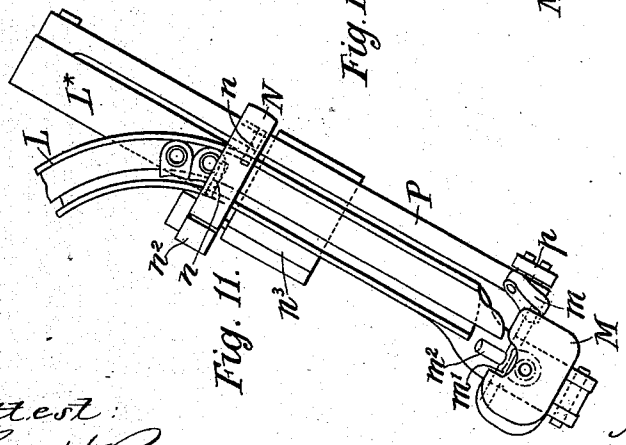


Fig. 11.

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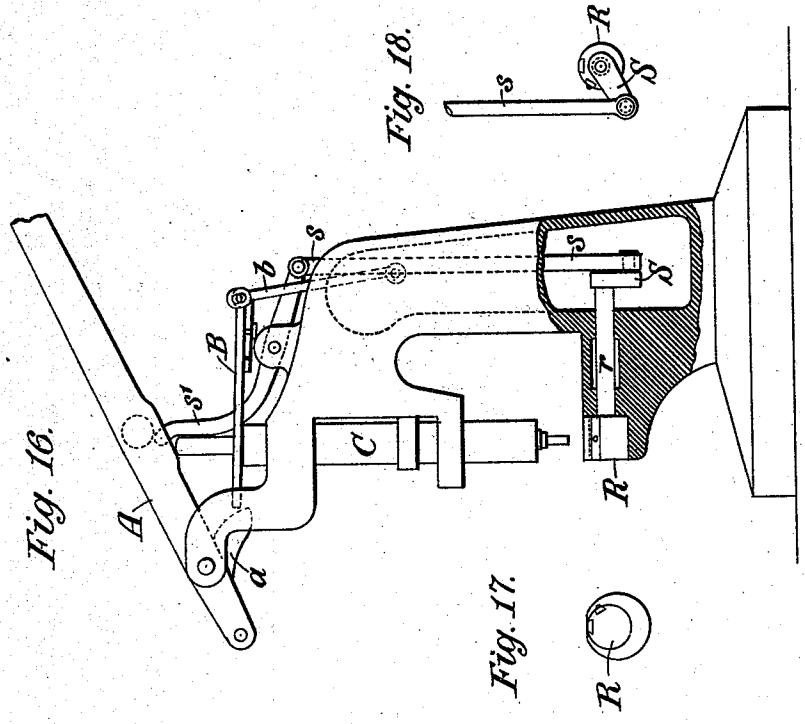

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UNITED STATES PATENT OFFICE.

ARTHUR GARRETT, OF TOWCESTER, AND GEORGE WEBSTER, OF ASTCOTE, COUNTY OF NORTHAMPTON, ASSIGNORS TO JOHN PHIPPS, OF NORTHAMPTON, ENGLAND.

PUNCHING AND EYELETING MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,752, dated October 29, 1889.

Application filed January 22, 1889. Serial No. 297,179. (No model.) Patented in England June 14, 1887, No. 8,518.

To all whom it may concern:

Be it known that we, ARTHUR GARRETT, watch-maker, of High Street, Towcester, and GEORGE WEBSTER, shoe-maker, of Astcote, both in the county of Northampton, England, have invented certain new and useful Improvements in Punching and Eyeleting Machines, of which the following is a specification, and for which we have received a patent in England dated June 14, 1887, No. 8,518.

This invention has for its object to improve the construction and efficiency of eyeleting-machines to be used chiefly in the manufacture of boots and shoes.

Hitherto attempts have been made to effect eyeleting in different ways. For instance, the eyelet has been caused to punch its own hole, a very unsatisfactory arrangement. Separate punching and eyeleting machines also have been placed side by side and operated by separate treadles. With this arrangement, however, any mistake of the operator in putting his foot on the wrong treadle is likely to bring down the punch when the eyelet only is required, or vice versa, and possibly punch a hole through the vamp, or spoil the boot by a misplaced eyelet.

According to the present invention the punch and the eyeleting device, and also the hooking arrangement, when hooks are required in lieu of eyelets, are operated by a single lever worked by a treadle, which lever also actuates the feed of the eyelets or hooks one by one when required.

The machine consists, essentially, of a punching-cylinder, an eyelet or hook delivery or feed, and a crumping-rod for fixing the eyelet or hook in the hole punched. The mechanisms for feeding and delivering the eyelets and the hooks are substantially alike, and each of them may properly be termed an "eyelet feeding and delivery mechanism," because the hooks are in effect eyelets having attachments of peculiar form and are the equivalent of eyelets. Where eyelet feeding and delivery mechanism is herein referred to in a general way it is to be understood that such terms are intended to include either of the forms of mechanism shown.

In the accompanying drawings, Figure 1 is a front elevation of a machine embodying our invention, and including both the eyeleting and hooking mechanism. Fig. 2 is a sectional elevation on line 1 2 of Fig. 1. Fig. 3 is a side elevation showing the eyelet-delivering mechanism. Fig. 4 is a side elevation showing the hook-delivering mechanism. Fig. 5 is a horizontal section on the line 3 4 of Fig. 4, showing the anvil or punching or riveting blocks. Figs. 6, 7, and 8 are details relating to the eyelet-feed. Figs. 9 and 10 are sectional and face views of the hook-hopper and feed-box detached and in a vertical position. Figs. 11, 12, 13, and 14 show on an enlarged scale the lower part of the hook-delivery contrivance in two positions. Fig. 15 shows, also enlarged, the hook-delivery slide in cross-section, and the arrangement for insuring the delivery of the hooks one at a time. Figs. 16, 17, and 18 show in side elevation and detail a modification in connection with the punching and riveting blocks.

A is a hand or treadle lever pivoted to the framing of the machine and provided with a spring *a*, for holding it normally in the raised position of Fig. 2. On the under side of this lever A is a projection *a'*, which overlies the end of a forked slide B, jointed to the pivoted link *b*. Beneath this slide B is the head of the punching-cylinder C, which slides vertically in the machine-framing.

At the lower end of the cylinder C is the punch *c*, carried by the L-shaped piece of metal *c'*, which is pivoted in a slot in the cylinder. The punch *c* is held in a vertical position by the spring c^2 (shown best in Fig. 2) until pushed aside in the manner to be hereinafter described.

Within the cylinder C is a rod D, called herein the "crumping-rod." The upper end of this crumping-rod stands some distance above the upper end of the cylinder C, and is held in that position by the coiled spring *d*, lying between the collar *d'* on the rod D and a projection within the cylinder. The lower end of the rod D is provided with a spring point or needle, for the purpose hereinafter mentioned.

The lower part of the frame-casting contains the punching and eyeleting blocks which form the anvil or resistance whereon the punching of the hole and the riveting at

effected. This anvil consists of a movable block E, having on its face an elastic plate, of brass or other suitable material, to take the blow of the punch, and also a nipple for turning up and riveting the back of the eyelet. Each of these is brought successively into position immediately beneath the punching-cylinder, which also contains the crumping-rod, by the pivoted lever F, suitably provided with a set-screw to limit its rocking movement. The sliding movement of the cylinder C is controlled by a lever G, pivoted to the framing, and to a link g, pivoted to a collar on the cylinder. The head of the lever G is provided with a bowl for taking a bearing against a cam a^2, fast on the lever A. A tension-spring g' connects the lever G and the collar to which the link g is pivoted and tends to draw the cylinder C in an upward direction.

b' is a stop for preventing the slide B rising too high, and b^2 is a tension-spring for keeping the slide forward when the machine is out of action. The depression of the lever A causes the projection a' to bear upon and depress the slide B, which in turn depresses the cylinder C, carrying the punch. The punch is thus driven through the work laid upon the anvil. At this point the delivery of the eyelet or hook, as the case may be, takes place.

We will first describe the eyelet-delivery. The eyelets, which are of ordinary form, are contained in a feed-box H, mounted upon the side of the machine. (See Fig. 1.) This feed-box consists of a vertically-rotating drum h, a stationary hopper, and plate, which together close its front. The drum h is perforated with radial holes. Into these holes the necks of the eyelets fall, and as the drum rotates are carried round therewith onto a supporting-plate h' (see Figs. 7 and 8) within the drum, which leads to the delivery-slide I. The rotation of the drum H is in the direction of the arrow, Fig. 3, and is effected by means of the ratchet-wheel arrangement shown in Fig. 6.

h^2 is the ratchet-wheel, mounted concentrically with the drum, on the back plate thereof. Pivoted on the drum-spindle is an arm h^*, carrying a pawl h'^*, engaging with the teeth of the ratchet-wheel. To the arm h^* is pivoted a link h^{2*}, to which again is pivoted the link h^{3*}, which itself is pivoted to the framing. On the lever A is a bowl a^3, which descends upon the link h^{3*} and causes that and the link h^{2*} to spread and move the arm h^* and pawl h'^* round over the teeth of the ratchet-wheel. When the lever A is raised, the elasticity of the coiled spring h^{4*} causes the links h^{2*} and h^{3*} to approach, whereby the arm h^* is raised and an intermittent rotary movement communicated to the drum. A spring retaining-pawl h^{**} is loosely pivoted to the framing to check backward movement of the drum, a slight reversal being, however, permitted by the play of the pawl upon its pivot, to insure a clearance of the eyelets should there be a tendency to block in the feed-box. The delivery-slide I is pivoted to the front plate of the eyelet-drum, near the exit-plate, and is suitably curved to bring its lower end near the work to be eyeleted. The eyelet-slide consists of a back plate and flanges for overlying the eyelet-heads as they slide down, neck outward. The eyeleting-slide is brought into position by the vertical rod J, which is capable of partial rotation on its axis, and which at its lower end is connected to the slide I by means of a crank-arm provided with a slot in which a loop (connected with the slide) works. There is also an outside loop fixed to the casting to prevent too great an outward movement of the feeder-tube. The rotation of the rod J is effected by a bowl j on the side thereof, near the upper end, coming into contact with a spring finger or latch a^* on the lever A. The depression of the lever A causes, through the projection a' and slide B, the depression of the punching-cylinder C. The blow having been struck by the punch and a hole made in the work, the projection a' slips from off the slide B and allows the under side of the still descending lever A to come into contact with the head of the crumping-rod D. At the same moment the cam a^2, which, from its formation, has allowed the cylinder C to descend, begins to raise the latter by means of the lever G, and in this it has the assistance of the spring g'. The descent of the crumping-rod D, forced down by the lever A, causes its end to protrude from the bottom of the retiring cylinder C, pushing aside the pivoted punch c. The finger a^* now causes the rotation of the rod J, and thereby advances the end of the eyelet-slide beneath the descending crumping-rod. The pin in the end of the crumping-rod enters the first eyelet in the slide and withdraws it therefrom past the spring retaining-plate wherewith the slide is furnished. The continued descent of the crumping-rod carries the eyelet into the hole prepared for it, while the slide is permitted to retire, the finger a^* having passed the bowl j on the rod J. After the punching, and before the delivery of an eyelet into the hole punched, the anvil receives, through the bowl a^5 and pivoted lever F, a movement which brings the nipple into position beneath the crumping-rod, in lieu of the plate which received the blow of the punch. The lever A is now thrust completely down, and the riveting of the eyelet within the punched hole is completed.

When it is desired to insert hooks in the work instead of eyelets—as, for instance, in the upper portion of lace-boots for facilitating lacing—the eyelet-delivery is disconnected from the rod J and the contrivance shown on the left side of the machine, Fig. 1, and in detail in Figs. 9, 10, 11, 12, 13, 14, and 15 is employed. The hook-feed box K is somewhat different from the eyelet-feed box, and is mounted obliquely to the machine upon a

stud-axle carried by a bracket on the framing. The feed-box K, which is open-fronted and circular, receives rotary motion in the manner best shown in Fig. 4. A ratchet-wheel k is fixed on the back plate of the box, with which wheel engages the pawl k'. The pawl k' is carried by the radial arm k^2 and the link k^3, which latter is pivoted to the forked lever k^4, to which back and forward movement is given by the bowl a^6 upon the lever A and by the spring k^5. The depression of the lever A causes the backward movement of the longer arm of the lever k^4, and through the arm k^2 and link k^3 draws the pawl k' over the teeth of the ratchet-wheel. The release of the lever k^4 allows the spring to advance it, and with it all parts connected thereto, including the pawl which drives the ratchet-wheel. The circular feed-box is contained within a box or hopper K*, open at back to permit the action of the rotating mechanism, and being of such a diameter as to allow the heads of the hooks to lie between it and the feed-box. The latter is provided internally with radial projections at its circumference, (see Fig. 10,) by which the hooks as they catch upon the edge of the feed-box are carried upward. As the hooks reach the highest point they are received onto the edge of a plate l, down which they slide by their own weight into the hook-delivery slide or carrier L, a guard l' being provided for preventing the hooks from falling off the plate l. The lower portion of this carrier L is fully illustrated at Figs. 11, 12, 13, 14, and 15 of the drawings. The carrier L is pivoted to brackets on the framing, and is connected to the rod J through the link j^2. The carrier contains a channel for the hooks and a plate or rib in line with plate l, above mentioned, and is provided with an attachment L*, sliding in guides upon the carrier. The attachment L* terminates in a bridge M. The carrier is also provided with a contrivance N, for retaining the hooks and allowing them to pass one by one. The sliding portion L* is drawn in an upward direction by the spring o, secured to the bracket O, carried by the casting.

The bridge M, above mentioned, consists of back and front plates, with room for the hook-head to lie between them, and is pivoted to the sliding portion L*. Its normal position is such that the front plate immediately underlies the rib within the hook-carrier. To the upper part of the sliding portion L* is pivoted the rod P, (see Fig. 13,) to the end of which is pivoted one end of the link p. The other end of this link p is pivoted to the crank-arm m fast upon the shaft m', within the bridge M. The shaft m' extends lengthwise of the bridge, and about midway of its length, opposite a notch or recess in the bridge, (see Fig. 11,) is fixed the pin m^2. The hooks delivered into the hook-carrier from the feed-box are stayed in their downward course by the retaining device N, which is actuated to permit the passage of a single hook by a stop N* on the framing when the carrier is advanced by the rotation of the rod J after the punching operation. The retaining device N (see Fig. 15) consists of a pair of pins n, placed at different levels and projecting into the channel of the carrier, near one side of the rib above mentioned. The pins n are carried by a U-piece n', jointed to the bell-crank lever n^2, pivoted to the plate n^3. Fixed to the carrier, upon the same pivot-pin, is the plate n^4, which lies outside the rod P and serves to take the pressure of the stop N* and transmit it to the said rod. The bell-crank lever n^2 is forked (see Fig. 15) to embrace the rod P, so that the movement of the latter rocks the former, and thereby gives a reciprocating movement to the pins n. The hooks as they slide down within their carrier are intercepted by the upper of the two pins n; but on the rocking of the lever n^2 the first hook is dropped by the upper pin onto the second, and from thence to the bridge M. We will now suppose the hole for the reception of the hook to have been punched. The descending lever causes the rotation of the rod J in the same manner as described with reference to the eyelet mechanism; but in the present case the hook-carrier L is connected by the link j^2 to the rod J, and is therefore by its rotation advanced to the descending crumping-rod. This advance causes the plate n^4 to strike the stop N*, by which it is compressed against and swings the rod P into the position shown at Fig. 14. It will be noticed from this view that the bridge M has now assumed a horizontal instead of a vertical position beneath the hook-carrier, and that the hook is held neck downward upon the lower plate of the said bridge, and is retained within the notch therein by the pin m^2. In this position the crumping-rod D descends upon the bridge and the central spring-point within it (the length of which is regulated by a suitable set-screw) strikes and holds the bridge in a central position, while the crumping-rod presses down the same and drives and rivets the hook into position in the work. After the riveting the lever A is allowed to rise and the crumping-rod to retire, as before, and the spring o returns the sliding portion L* to its normal position, while a flat spring o' causes the pendent rod P, now released from the pressure of the plate n^4 and stop N*, to return the bridge into a vertical position ready for the next hook.

If it be desired to make use of the eyeleting or hooking mechanism without repeating the punching blow, the lever A is not permitted to rise sufficiently to bring the projection a' above the punching-slide, and thus eyelet after eyelet or hook after hook can be inserted in any kind of prepared work while the punch remains inoperative.

Mention must now be made of the guides q q', provided with points, either of which can at pleasure be raised above the level of the anvil for securing the work in position

by passing one of the pins through the last-made hole. The guides are in the form of bell-crank levers, with the upper or horizontal arms bent inward at their forward ends (see Figs. 1 and 3) and lying in recesses cut for them in the framing on either side of the block or anvil. These arms are pierced to receive the guide-pins, (see Fig. 5,) which may be set at any desired distance from the center to suit the work in hand. The tails of these bell-crank levers q q' lie in contact with a bolt Q, sliding transversely in the framing. This bolt is provided with cam-faces, so that if slid from right to left, or vice versa, one or other of the guide-pins is raised or lowered, as required, according to the direction of working.

It now remains to describe a modification in connection with the anvil which is shown in Figs. 16, 17, and 18 of the drawings. In this modification instead of the punching-plate and riveting-nipple being provided with a sliding movement, their position is changed in a rotary direction, which gives an economy in space in some cases advantageous. R is the cylindrical punching-block fast on the end of a horizontal shaft r. S is a crank-arm, and s is a link for communicating motion in a rotary direction from the pivoted lever s'. The punching-slide is provided with an elastically-pivoted joint to prevent too heavy a thud of the punch on the brass block, and so avoid the breaking of the punch-bits.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, and a shifting anvil for receiving the punch and crumping-rod, substantially as described.

2. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, a shifting anvil for receiving the punch and crumping-rod, and an operating-lever and connections between the same and the punching-cylinder, anvil, and crumping-rod for operating them in proper sequence, substantially as described.

3. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, a shifting anvil for receiving the punch and crumping-rod, and a feeding and delivery mechanism for presenting eyelets, one by one, in proper position beneath the crumping-rod, substantially as described.

4. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, a shifting anvil for receiving the punch and crumping-rod, and a plurality of feeding and delivery mechanisms for presenting eyelets, one by one, in proper position beneath the crumping-rod, substantially as described.

5. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, a shifting anvil for receiving the punch and crumping-rod, a feeding mechanism having a swinging pendent chute or carrier for presenting eylets, one by one, in proper position beneath the crumping-rod, a partially-rotating crank-rod connected to said chute to swing the same, an operating-lever, and connections between said lever and the punching-cylinder, anvil, crank-rod, and crumping-rod for operating them in proper sequence, substantially as described.

6. A combined punching and eyeleting machine consisting, essentially, of a reciprocating punching-cylinder carrying a laterally-movable punch, a crumping-rod reciprocating in said cylinder in line with said punch, a shifting anvil for receiving the punch and crumping-rod, a plurality of feeding mechanisms having swinging pendent chutes or carriers for presenting eyelets, one by one, in proper position beneath the crumping-rod, a partially-rotating crank-rod connected to said chutes to swing the same, an operating-lever, and connections between said lever and the punching-cylinder, anvil, crank-rod, and crumping-rod for operating them in proper sequence, substantially as described.

7. In a combined punching and eyeleting machine, the combination, with the punching and eyeleting mechanism of a work-gage, consisting of a pair of pivoted arms located upon the opposite sides of the anvil of the eyeleting mechanism, and having pins q q', arranged to enter the last-made hole in the material, and the sliding cam-faced bolt Q, acting upon both of said arms to raise one and depress the other, substantially as described.

8. The combination, in a punching and eyeleting machine, of a reciprocating punching-cylinder carrying a pivoted punch, and a reciprocating crumping-rod located within said cylinder in line with said punch and acting, when moved downward, to engage with the punch and move the same laterally out of its path.

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