3 Sheets—Sheet 1.

J. P. WOOD.

Combined Eyelet Punch and Setting Machine.

No. 228,156. **Patented May 25, 1880.**

Fig. 1.

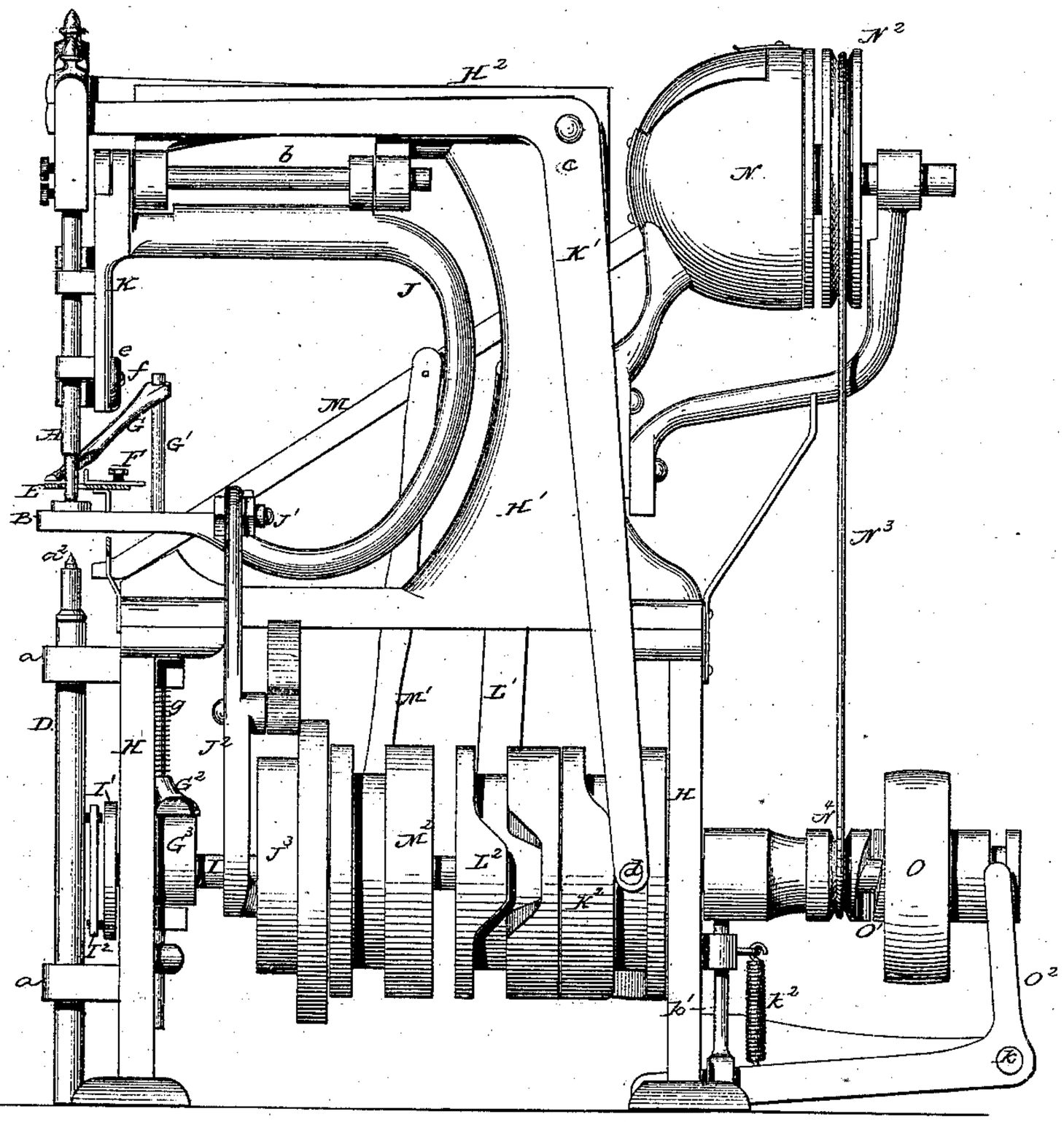

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Fig. 2.

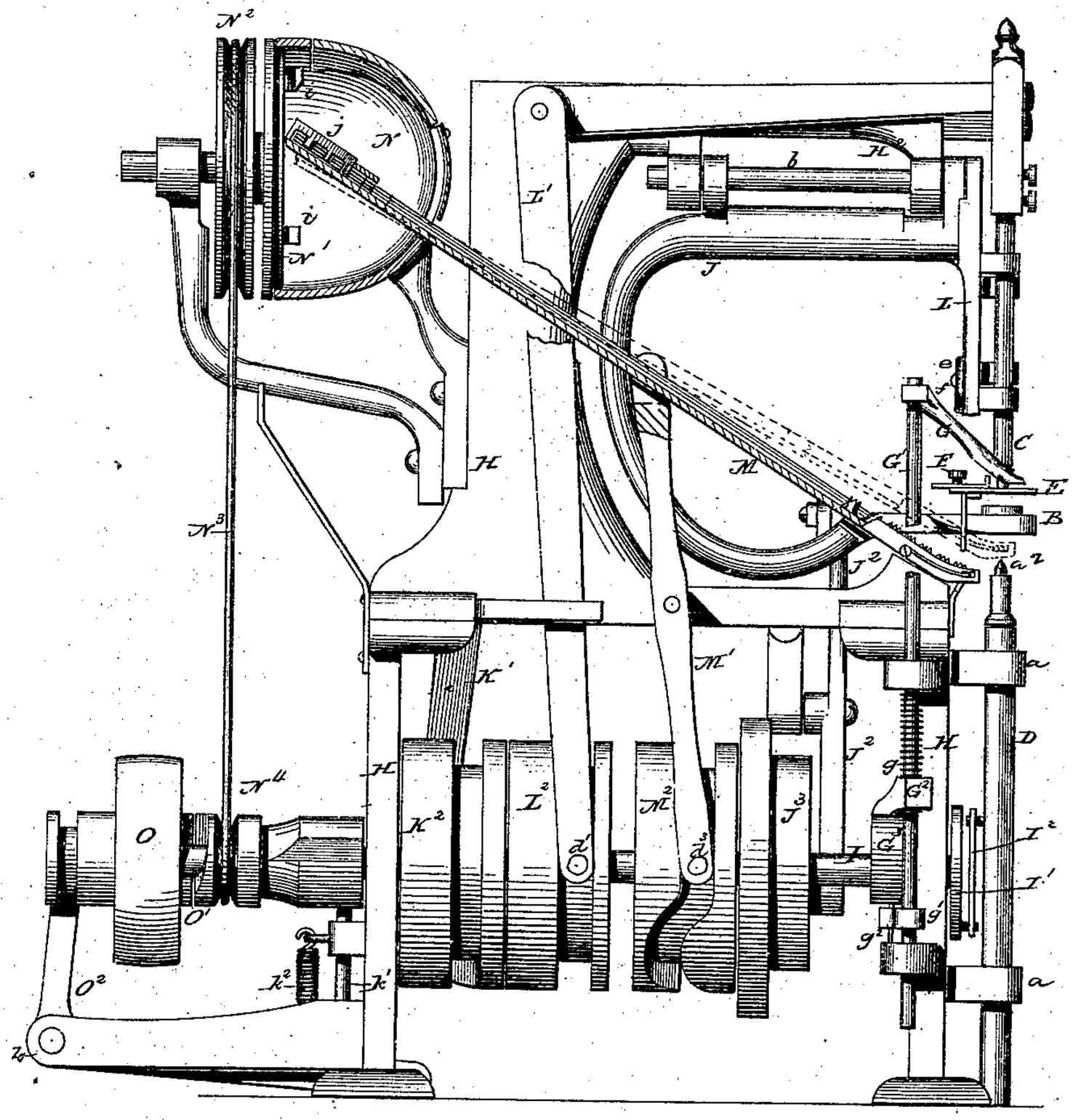
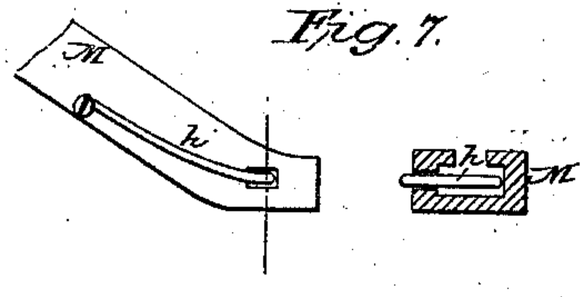


Fig. 7.



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Combined Eyelet Punch and Setting Machine.

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Fig. 3.

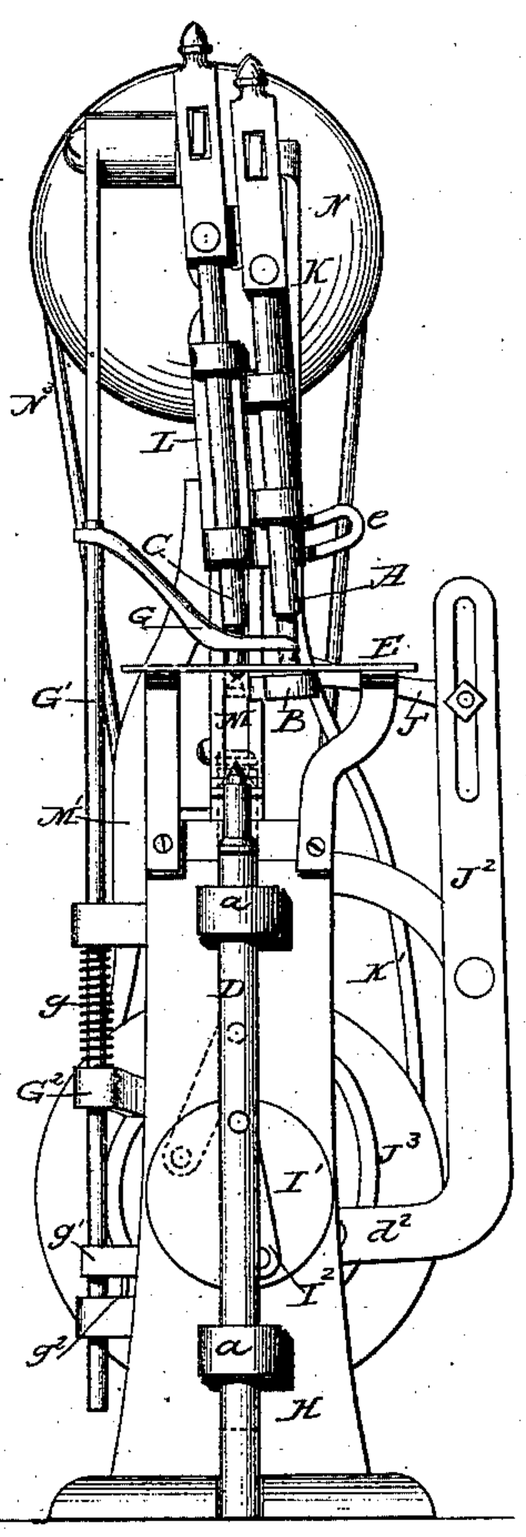


Fig. 4.

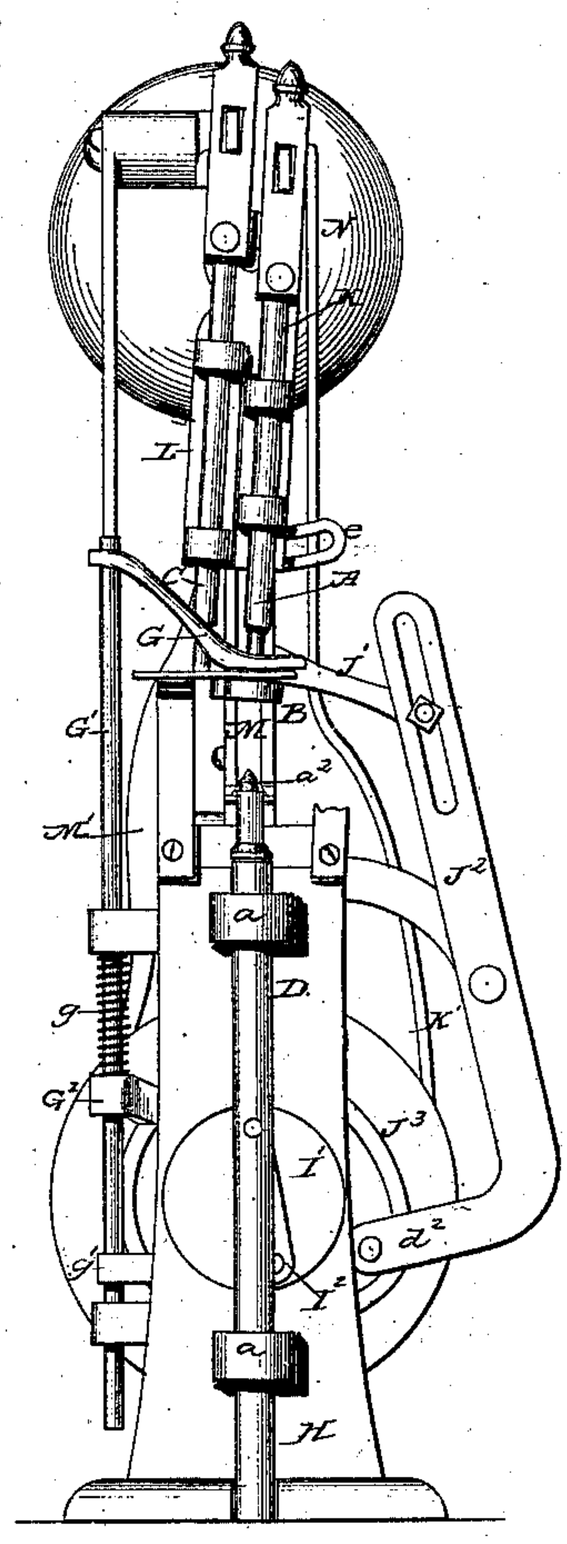


Fig. 5.

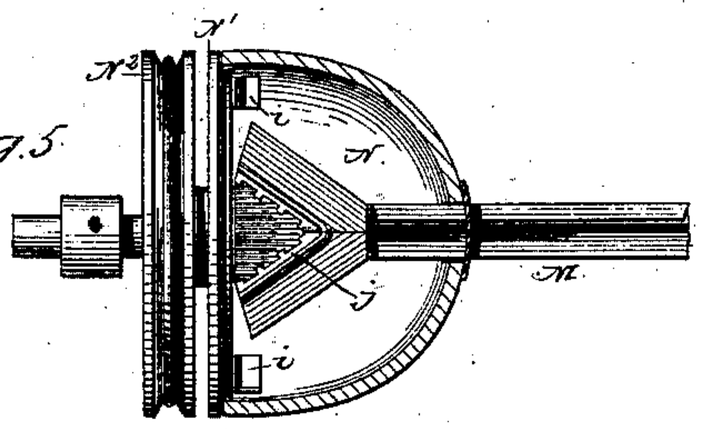
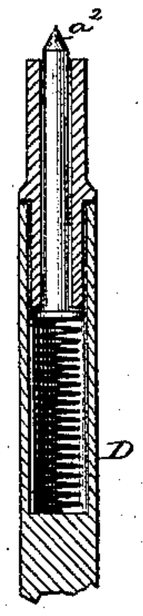


Fig. 6.



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UNITED STATES PATENT OFFICE.

JULIEN P. WOOD, OF MARLBOROUGH, MASSACHUSETTS.

COMBINED EYELET PUNCH AND SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 228,156, dated May 25, 1880.

Application filed November 12, 1879.

To all whom it may concern:

Be it known that I, JULIEN P. WOOD, of Marlborough, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Combined Eyelet Punch and Setting Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, a side elevation from the opposite side, with the eyelet-feeding devices in section. Figs. 3 and 4 are end elevations, showing different positions of the punching and setting tools; Fig. 5, a detail of the eyelet-feeder, with its case or reservoir in horizontal section; Fig. 6, a sectional detail of the lower setting-tool; Fig. 7, details showing the arrangement of the spring for retaining the eyelets on the chute.

My invention relates to a novel construction of machines of that class in which the eyelet-hole is punched and the eyelet set in one and the same operation; and it consists of a peculiar construction and arrangement of parts, in which the punch first descends upon a bed-plate and cuts the hole, and then, without rising, passes laterally over a subjacent setting-tool to feed the material. Said material is then clamped by a presser-foot, while the punch and bed separate and retreat laterally. An upper setting-tool having the same lateral motion with the punch is then brought over the hole, after which the subjacent setting-tool rises, catches an eyelet from a feed trough or chute, and then closes into the hole with the upper setting-tool, to expand and set the eyelet.

My invention also consists in the means for imparting the several movements to the several parts, and in the construction of mechanism for feeding the eyelets to the setting devices, as hereinafter fully described, and pointed out in the claims.

In order to make the description more clear, I will first describe the immediate action of the punching and setting devices, and then the several trains of mechanism for imparting motion thereto.

In the drawings, (see Figs. 3 and 4,) A represents the punch; B, its bed; C, the upper setting-tool; D, the lower setting-tool, and E the horizontal work-plate.

The punch A and upper setting-tool, C, have a vertical reciprocating movement in guides, and are carried by a horizontally-hinged and laterally-swinging frame, as hereinafter described. The punch-bed B is connected to and swings with said frame below the work-plate, while the lower setting-tool, D, is arranged to reciprocate vertically in immovable bearings *a a* in the frame-work. This setting-tool has at its upper end the usual pointed and spring-seated center piece, a^2, (see Fig. 6,) and the position of the same is just midway between range of movement of the upper setting-tool and punch, so that the latter may, by the lateral swing of their carrying-frame, be brought alternately into vertical line with said lower setting-tool.

F is a gage-plate placed upon the work-plate in rear of the punching and setting devices, to regulate the distance which the line of holes shall have from the edge of the work; and G is the presser-foot, arranged in front of the punching and setting devices, to hold the work by clamping it against the work-plate.

Now these parts being connected with their actuating devices, and being timed for the proper order of operation, their action is as follows:

The punch A first descends on the work in the position shown in Fig. 3, and by pressing against the material between the punch and bed B cuts a hole in said material, while the round blank passes up into the hollow punch. Then, without rising, the punch and bed swing laterally through a slot in the work-plate to the position shown in Fig. 4, over the center piece, a^2, of the subjacent setting-tool D, feeding the work with it. The presser-foot then clamps the work, and the punch rises and retreats with its bed back to the position in Fig. 3. The subjacent setting-tool then rises, and after taking an eyelet from the eyelet-feeder, as shown in Fig. 2, enters the hole in the work and co-operates with the descending upper tool, C, to expand and set the eyelet, as shown in dotted lines in Fig. 3.

Now, I am aware that it is not new to punch the hole and set the eyelet in the same operation, and that in doing this the punch and

upper setting-tool have been made together adjustable back and forth over the subjacent setting-tool. In such case, however, the punch immediately rose after cutting the hole, and the feeding was effected by the upper setting-tool, which was drawn back, entered through the hole, and then swung over the lower setting-tool. Now, as the operating end of the setting-tool is always of less diameter than the punch, there is an amount of lost motion in the feed with this arrangement. While, therefore, I do not claim the punch and upper setting-tool made laterally adjustable together in connection with the lower setting-tool, I do claim the punch and its bed made laterally adjustable into range of alignment with the lower setting-tool without rising or separating from each other, for by thus making the punch and its bed together adjustable toward the lower setting-tool the feed is effected by the punch itself, and as the latter fits tightly the hole which it makes, there is no lost motion, and the hole is always brought into true position for the setting devices.

The several trains of mechanism for operating the different parts will now be described.

H H′ H² is the main frame of the machine, which first rises in the shape of standards H H, in which is journaled in bearings the main horizontal drive-shaft I, carrying the operating-cams. The upper portions of these frame-standards H H are connected, and at one end rise in the shape of standard H′, from which there extends a horizontal arm, H², like that of a sewing-machine. Just below this arm H² there is suspended upon a horizontal hinge or joint the **C**-shaped frame J, the said frame being connected to said arm so as to swing like a pendulum by means of lugs and the hinge-rod *b*.

To the upper and outer end of the swinging frame J is attached the head K, in which the punch slides vertically, and also the head L, in which the upper setting-tool slides vertically.

The punch is loosely connected at its upper end with the horizontal arm of an elbow-lever, K′, Fig. 1, which lever is jointed at its corner *c* to the upper portion of the frame-work, while its lower arm is offset and provided with a friction-roller, *d*, which enters a cam-groove in boss K² on the main shaft I, which gives the necessary reciprocating movement to the punch.

The upper setting-tool is similarly connected with the horizontal arm of an elbow-lever, L′, Fig. 2, whose lower end carries a roller, *d′*, that enters a cam-groove in the boss L² on the main shaft, and which imparts the necessary reciprocating movement to the upper setting-tool.

In order that the distance between the eyelets may be varied, the head carrying the punch and the head carrying the upper setting-tool are made independent and jointed at the top on the hinge-rod, and may be set at the bottom any distance to or from each other by means of the slotted arm *e* and set-screw *f*, to increase or diminish the distance between the punch and setting-tool, and consequently between the eyelets after they are set.

For giving the swing to the frame J necessary to shift laterally the punch, its bed, and the setting-tool, I connect the lower part of this frame J with the upper end of lever J² by means of a connecting-rod, J′, and the lower end of said lever I provide with a friction-roller, *d²*, which travels in a cam-groove in the side of the boss J³ on the main shaft I.

As the adjustment of the punch to or from the upper setting-tool requires a change in the lateral throw of the frame J in order to make the said parts register with the subjacent setting-tool, I increase or diminish the throw of said frame J to compensate for the same by adjusting the end of pitman J′ higher up or lower down in a slot in the end of lever J².

For operating the presser-foot I attach to it a vertical rod, G′, passing through guide-lugs on the main frame, which rod is held normally down by a spiral spring, *g*, and is provided with a rigid right-angular arm, G², which is lifted at the proper time to raise the presser-foot by the cam G³, arranged on the main shaft I.

To prevent the axial movement of the rod G′, which would throw the presser-foot away from its place of duty, I fix to the rod G′ a second arm, *g′*, perforated to receive and slide over a short vertical guide-rod, *g²*.

To give reciprocating movement to the lower setting-tool a disk, I′, is fixed to the main shaft I outside of the main frame, and a wrist-pin and pitman, I², serve to connect the lower setting-tool and convert the rotary into reciprocating motion.

To feed the eyelets to the setting devices I employ an inclined chute, M, having an undercut groove to receive the eyelet flange down. This chute is designed to be always filled with eyelets taken from a reservoir, N, which line of eyelets are retained against dropping out by a bent spring, *h*, Figs. 2 and 7, which is fastened to the outside of the chute, and whose end passes through a hole in the side of the chute to catch and hold the eyelets.

The end of the chute is alternately projected to a position where the lower setting-tool can pass through and seize an eyelet, as shown in dotted lines, Fig. 2, and is then removed from this position, so as to be out of the way of the further advance or rise of said tool. This shifting of the chute is effected by a vertical lever, M′, fulcrumed upon the main frame and provided below with a friction-roller, *d³*, which enters a cam-groove in the boss M².

In this connection I would say that I do not claim, broadly, shifting the eyelet-chute, as this has been done before; nor do I claim the application of a spring to the lower end of same to retain the eyelets, as heretofore gen-

erally used. However, with the spring entirely on the outside, the pressure of the setting-tool in seizing an eyelet has had a tendency to throw the spring out of place and allow the eyelets to fall out. By causing the end of spring to protrude through a hole in the side of the chute the spring cannot be dislocated, but is simply moved back and forth.

For feeding the eyelets to the chute (see Figs. 2 and 5) a hemispherical reservoir is provided, with a revolving circular head, N′, connected to a pulley, N^2, which is revolved by a belt, N^3, and pulley N^4 on the main shaft. To the inner face of the head N′ is attached a set of cups, *i*, which elevate the eyelets from the bottom and deliver them to the upper end of the chute, which emerges from the opposite side of the reservoir. The upper end of the chute, where it catches the eyelets delivered from the cups, is expanded into a tapering mouth, (see Fig. 7,) in which is arranged a triangular gate, *j*, consisting of a plate having teeth reaching nearly to the bottom of the tapering mouth, which teeth cause the eyelets always to enter the chute flange down and in proper position to be caught and inserted by the setting-tool.

It is sometimes necessary to insert only one or two eyelets instead of a series, and it is therefore necessary that the machine should be under complete control.

In imparting motion to the drive-shaft, then, I connect the loose drive-pulley O to the main shaft by a clutch-coupling, O′, and this pulley I connect by a swivel and fork with the upper end of the elbow-lever O^2, fulcrumed at *k*. The horizontal arm of the lever is provided with an upwardly-projecting stop-arm, *k′*, which is constantly drawn up toward the main shaft by a spring, k^2. Upon the hub of the shaft, just above the stop-arm *k′*, is formed a depression, and whenever in the rotation of the shaft this depression is over the stop-arm the spring k^2 forces the stop-arm into said depression, and by deflecting the elbow-lever throws the pulley outward and disengages the clutch. Whenever, therefore, the machine is required to continue in action the lever O^2 is held down by a suitable treadle, and when the foot is removed from the treadle the action of the machine ceases, but does not cease until the operation of setting the eyelet upon which it may be at work is finished.

Having thus described my invention, what I claim as new is—

1. A combined eyelet punch and setting machine, consisting of a punch, with its bed, made together adjustable into range of alignment with the lower setting-tool before separation, in combination with the upper setting-tool, and with a subjacent setting-tool, and means for holding the work, substantially as and for the purpose described.

2. The combination, with the upper setting-tool and punch, of their independent guide-heads connected upon a common center and made adjustable at their lower ends to increase or diminish the distance between the eyelets when set, as described.

3. The combination, with an eyelet-setting device, of a punch and its bed connected to the same frame, and made laterally adjustable together into range of alignment with the lower setting-tool to effect the feed, as set forth.

4. The swinging frame J, suspended upon a horizontal axis from the main frame and combined with and carrying laterally-adjustable eyeleting devices, as set forth.

5. The combination, with the swinging frame J, carrying laterally-adjustable eyeleting devices, of the connecting-rod J′, lever J^2, and cam J^3, for actuating the frame, as set forth.

6. The combination, with the lower setting-tool, of the inclined chute M, the vertical lever M′, and the cam M^2, substantially as and for the purpose described.

7. The combination, with the chute M, of the retaining-spring *h*, arranged upon the outer side of the chute and having its bent end protruding through a hole in the side of the chute across the passage of the eyelets, substantially as and for the purpose set forth.

8. The reservoir N, having a revolving head, N′, provided with cups, in combination with the chute, as and for the purpose described.

9. In an eyelet-machine, the combination, with the eyelet punch and setting tools, their actuating parts, the main drive-shaft, and a loose drive-pulley, connected with said shaft through a clutch, of a shifting-lever for said pulley acted upon by said drive-shaft, and a spring to disconnect the clutch and stop the machine, as set forth.

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Witnesses:
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