(No Model.)

W. P. VALENTINE.

SEWING MACHINE.

No. 328,089. Patented Oct. 13, 1885.

Fig. 1

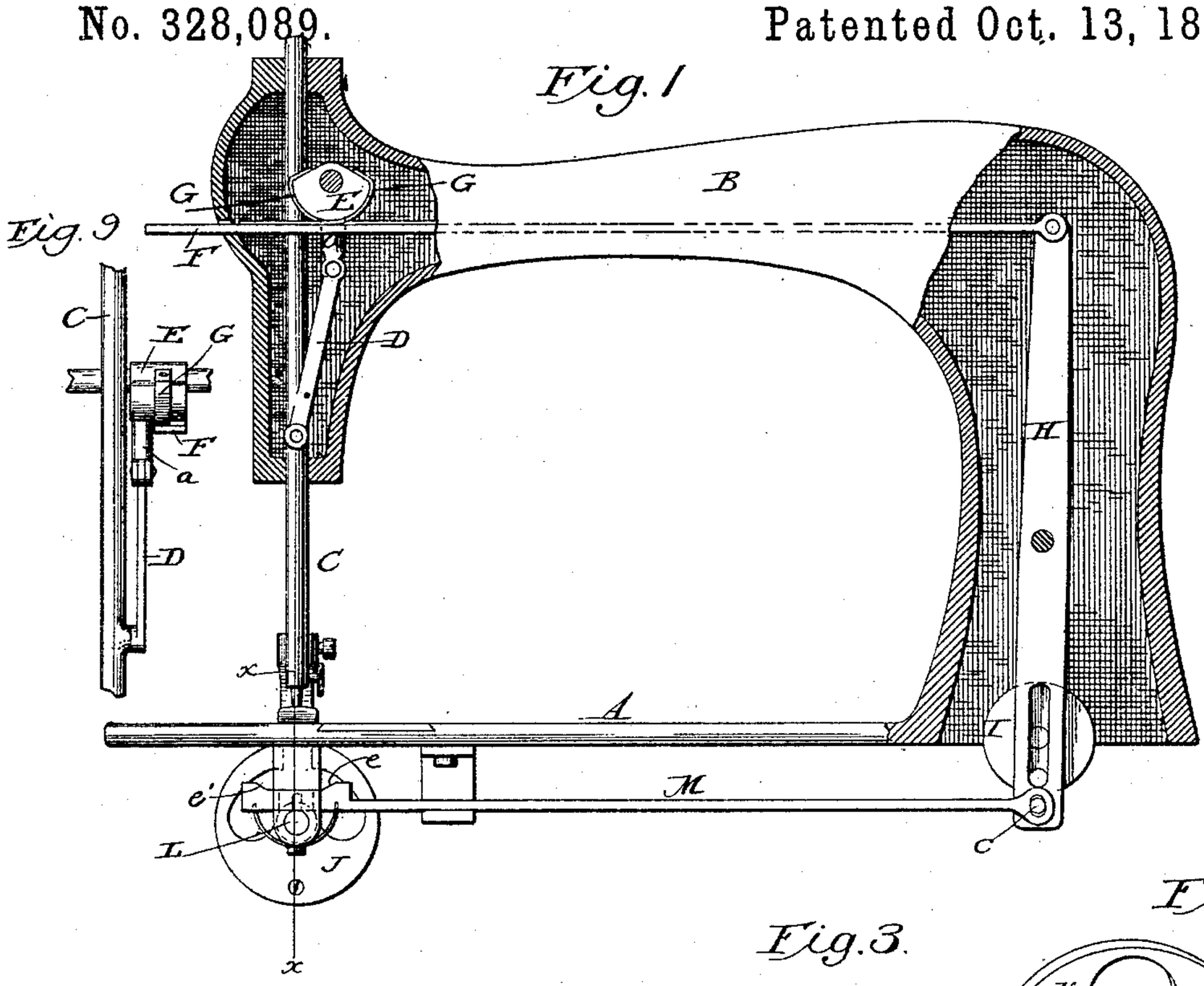


Fig. 4

Fig. 3.

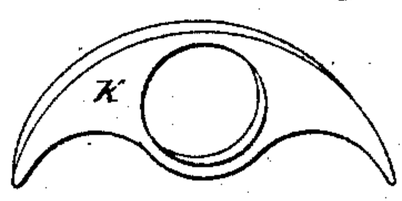
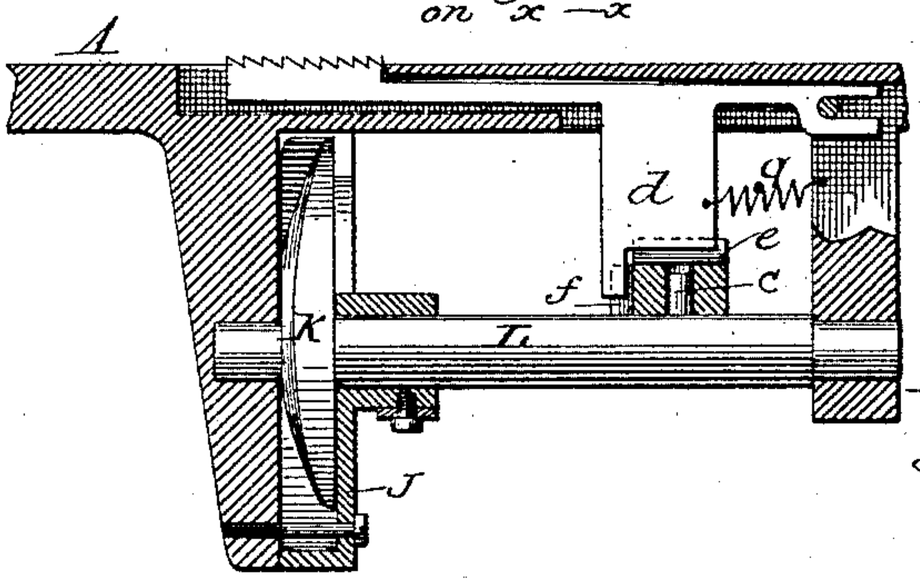


Fig. 2
on x—x



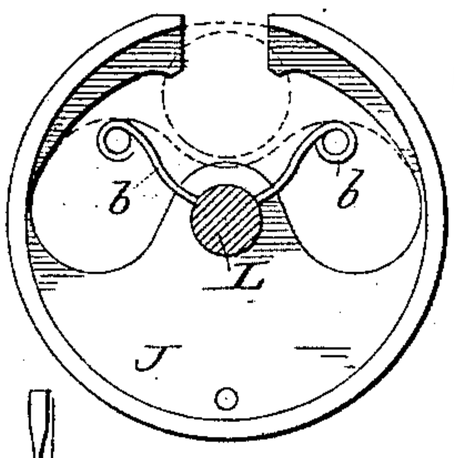


Fig. 5

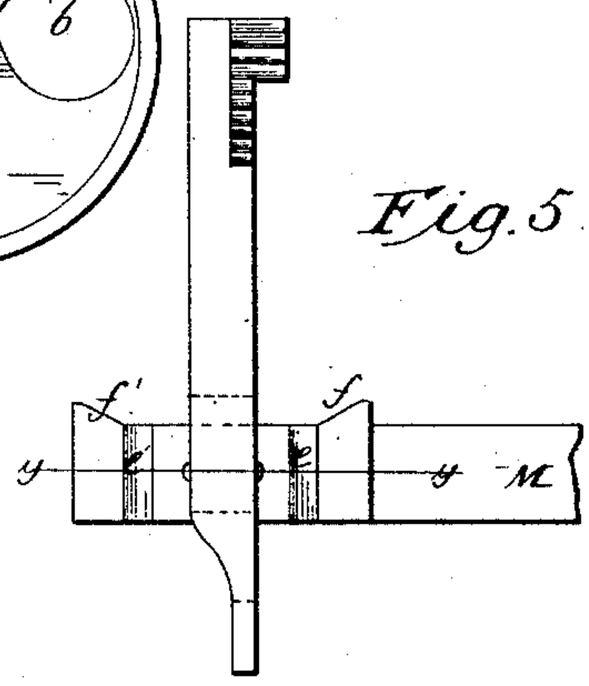


Fig. 8

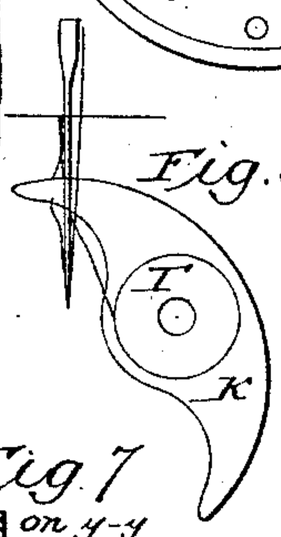


Fig. 6

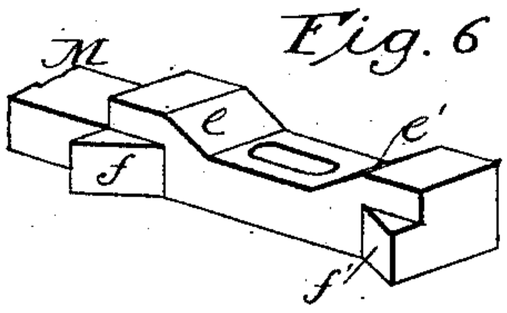
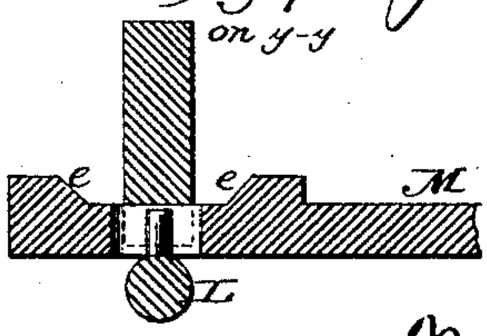


Fig. 7
on y-y



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM P. VALENTINE, OF PAINESVILLE, OHIO, ASSIGNOR OF THREE-FOURTHS TO E. G. WETHERBEE, M. J. WILSON, AND W. C. REED.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 328,089, dated October 13, 1885.

Application filed July 25, 1884. Serial No. 138,777. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. VALENTINE, of Painesville, in the county of Lake and State of Ohio, have invented certain Improvements in Sewing-Machines, of which the following is a specification.

The aim of this invention is to produce a simple and noiseless machine employing a double-pointed shuttle adapted to complete and release a stitch at each motion of the shuttle, whereby it is enabled to operate at high speeds.

The invention consists in various combinations and features, which will be hereinafter described and claimed.

Referring to the accompanying drawings, Figure 1 represents an elevation of my machine, various portions of the frame-work being broken away to expose operative parts to view. Fig. 2 is a vertical section on the line *x x*, Fig. 1, through the feed and shuttle mechanism. Fig. 3 is an inside face view of the shuttle-race and shuttle-driver. Fig. 4 is a perspective view of the shuttle. Fig. 5 is a top plan view of the feed-bar and the bar by which it is actuated. Fig. 6 is a perspective view of the feed-actuating bar. Fig. 7 is a cross-section through the feed mechanism on the line *y y*, Fig. 5. Fig. 8 is a diagram illustrating the manner in which the needle-thread is released by the shuttle. Fig. 9 is an elevation of the needle-bar and its operating devices.

In constructing my machine I provide a horizontal bed or base plate, A, of any suitable form, and secure firmly thereon an uprising overhanging arm, B, to sustain the needle-bar and its adjuncts, as in machines of the ordinary form. In the overhanging end of this arm I mount a vertically-reciprocating needle-bar, C, and connect the same by means of a pitman, D, to a crank-arm, *a*, formed on a semicircular block, E, which is arranged to oscillate on a horizontal pivot in the top of the standard, so that the oscillatory motion of the block will produce a vertical reciprocation of the needle.

Horizontally in the upper part of the standard I mount a reciprocating bar, F, which extends beneath the rotary block E, and is connected thereto by two flexible straps, G, secured to the block and passed thereunder in opposite directions, and secured at their extremities to the bar, as plainly shown in Fig. 1, so that the reciprocation of the bar F will produce the rotary or oscillatory motion of the head. The head and its crank are caused to make a half-revolution, or thereabout, whereby the crank and pitman are caused to move the needle downward and upward during the movement of the bar F to the right, and repeat the action during the movement of the bar F to the left, each movement of the bar to and fro serving, in other words, to cause two strokes of the needle. This movement is not separately claimed herein, being made the subject of an application filed on the 23d day of April, 1884, No. 128,962; renewed November 9, 1884, No. 149,187.

At its rear end I pivot the bar F to the top of an upright lever, H, which is pivoted midway of its length, or thereabout, in the standard. The lower end of this lever H is slotted to receive a crank or wrist-pin formed on a rotary wheel, I, through which power is primarily communicated to the machine. This pulley I may be adapted to receive a driving-belt, or its shaft provided with a pulley to receive such belt; or it may receive motion in any other suitable manner.

Referring next to the shuttle mechanism, I secure beneath the bed-plate, directly below the needle-bar, a shuttle guide or race, J, consisting of a disk having a circular flange, against the inside of which the shuttle K is arranged to travel to and fro in a circular path. The shuttle-race is provided with a slot in the top, to permit of the needle descending therein in position to present the thread to the two ends of the shuttle alternately. The shuttle is made of the form plainly represented in Fig. 4, the outer edge being circular, the two ends pointed, and the inner edge concave between the ends and the central portion, which is widened or enlarged to permit the introduction of the circular bobbin T, which is seated in a cavity therein. This shuttle, being placed within the race or guide and bearing at its outer edge against the inner surface of the guide, is retained in position and given a rotary reciprocation by

means of two arms, *b*, extending from opposite sides of a rock-shaft, L, acting against the inner concave edges of the shuttle. The shaft L is mounted in bearings on the under side of the bed and operated by means of a horizontal reciprocating bar, M, which is provided in one end with a slot to receive a stud, *c*, formed on the side of the rock-shaft. As the bar is moved to and fro the stud, encountering the opposite ends of the slot, causes the shaft to be turned first in one direction and then in the other. The slot is made of such length as to allow a certain amount of lost motion between the bar M and the shaft—or, in other words, to permit the shaft and shuttle-driving devices to remain at rest during a portion of the movement of the bar—for a purpose which will hereinafter appear. The bar is jointed to and receives motion from the lower end of the upright lever H, through which the needle is actuated, as before explained.

Referring next to the mechanism for advancing the cloth or other fabric, I make use of a toothed feed-bar rising through the bed and receiving the ordinary four-motion movement. This bar is sustained at one end by means of a stud or projection, *d*, formed on its under side and extended downward to bear on the upper surface of the shuttle-driving bar M. The bar is provided, as shown in Figs. 5 and 7, with two surfaces, *e* and *e'*, separated a considerable distance, and inclining upward in opposite directions, so that as the bar is moved to and fro these surfaces will be carried alternately beneath the feed-bar, each causing it to rise, so that its teeth will be elevated above the table and caused to act upon the fabric.

For the purpose of moving the feed-bar endwise to advance the cloth while it is in its elevated position, the bar M is provided on its edge with two inclines, *f* and *f'*, which act alternately as the bar is moved to and fro against the stud *d* of the feed-bar. These inclines serve to move the bar in a forward direction only, its motion in the opposite direction being effected by means of a spiral spring, *g*, applied as in the drawings, or a spring otherwise arranged for the purpose.

It will be perceived that the feed-bar is elevated and advanced by the movement of the bar M in each direction, this being necessary for the reason that the needle makes one stroke during the movement of the said bar to the right, and another stroke during its movement to the left.

It will be observed that the periphery of my shuttle embraces an arc of about one hundred and twenty degrees only, and that, consequently, it need make but about one-third of a revolution in order to pass through the loop of the needle-thread.

It will also be perceived that the shuttle lies wholly on one side of the driving-shaft, and that when it has passed slightly more than half its length through the loop its rear side releases the needle-thread, as represented in Fig. 8, permitting the thread to be drawn rapidly upward while the shuttle is completing its movement.

The needle commences its ascent as soon as the central expanded portion of the shuttle has passed it. In this manner the drawing up of the thread is commenced and partially performed before the shuttle has completed its motion, thus economizing time and adapting the machine to be driven at high speed.

My machine will be provided with an intermittent tension device or a take-up device of any ordinary or appropriate construction to act upon the needle-thread, and assist in securing the operation hereinbefore described.

Having thus described my invention, what I claim is—

1. The lever H and its actuating-crank, in combination with the reciprocating bar F, the needle-bar, the pitman, the oscillating segment, and the straps connecting the segment and reciprocating bar, as shown.

2. In combination with the needle-bar and the reciprocating bar F, connected thereto by intermediate devices, substantially as described, the lever H, the slotted reciprocating bar M, and the shuttle-driving shaft provided with a pin acted upon by said bar.

3. In combination with the curved shuttle-race, the double-ended shuttle, the rock-shaft provided with the shuttle-driving arms and the stud, and the reciprocating bar slotted to engage the stud and permit a lost motion between the parts.

4. In combination with the centrally-pivoted driving-lever H, the reciprocating bar F, and the needle-bar connected to said bar by intermediate devices, substantially as described, the bar M, provided with the inclines, the feed-bar actuated by said inclines, and the rotary shuttle-driving shaft, also actuated directly by the bar M, as shown.

5. In combination with the oscillating shuttle having the concave inner edges, as described, the needle and the needle-operating mechanism, adapted, as described, to start the needle upward before the shuttle has completed its movement, whereby the drawing up of the thread is partly performed during the movement of the shuttle.

6. In combination with the feed-bar and the retracting-spring, the reciprocating slide M, provided with the two oppositely-inclined surfaces to lift the bar, and the two oppositely-inclined surfaces to advance the bar endwise, said parts being constructed and arranged as described and shown, whereby a forward and backward movement of the slide is caused to produce two advances of the feed-bar.

7. In combination with the needle-bar, the rotary head connected to the bar by a crank and pitman, the bar F, reciprocating at right angles to the needle-bar, the connecting-straps, lever H, bar M, provided with the four inclines, the feed-bar, the rock-shaft connected with the bar M, as shown, and pro-

vided with shuttle-driving arms, and the double-ended shuttle.

8. In combination with the rotary shuttle-driving shaft, and the feed-bar parallel therewith, the bar M, acting at right angles thereto, said bar being provided with the inclined surfaces to actuate the feed-bar, and being connected by a slot and pin with the shaft, as described and shown, whereby it is caused to impart motion directly to the shaft and the feed-bar.

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Witnesses:
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W. H. SHIPLEY.