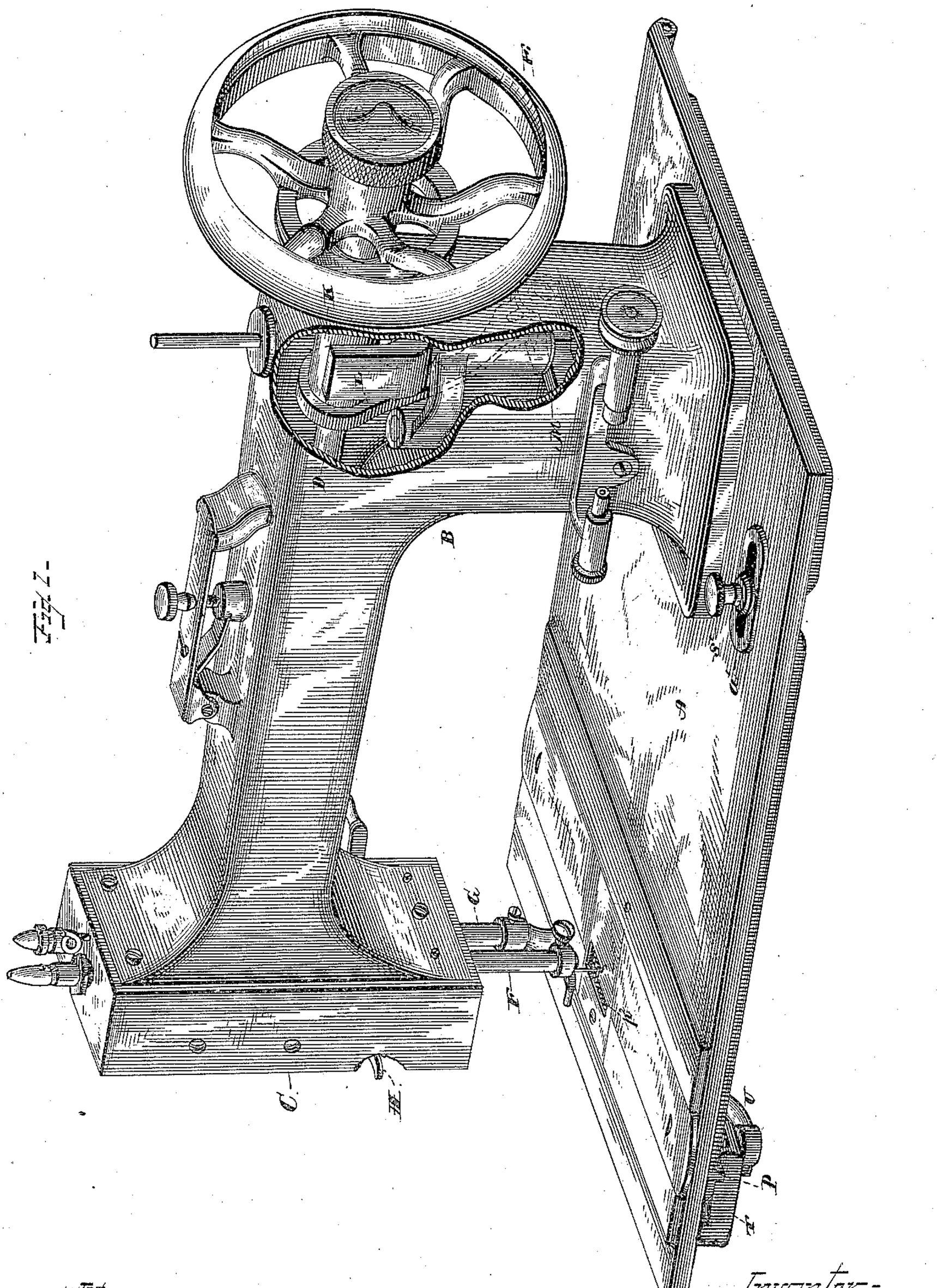
(No Model.) 5 Sheets—Sheet 1.

R. H. ST. JOHN.

FEED MECHANISM FOR SEWING MACHINES.

No. 343,929. Patented June 15, 1886.



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N. PETERS. Photo-Lithographer. Washington, D. C.

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FEED MECHANISM FOR SEWING MACHINES.

No. 343,929. Patented June 15, 1886.

Fig. 2.

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FEED MECHANISM FOR SEWING MACHINES.

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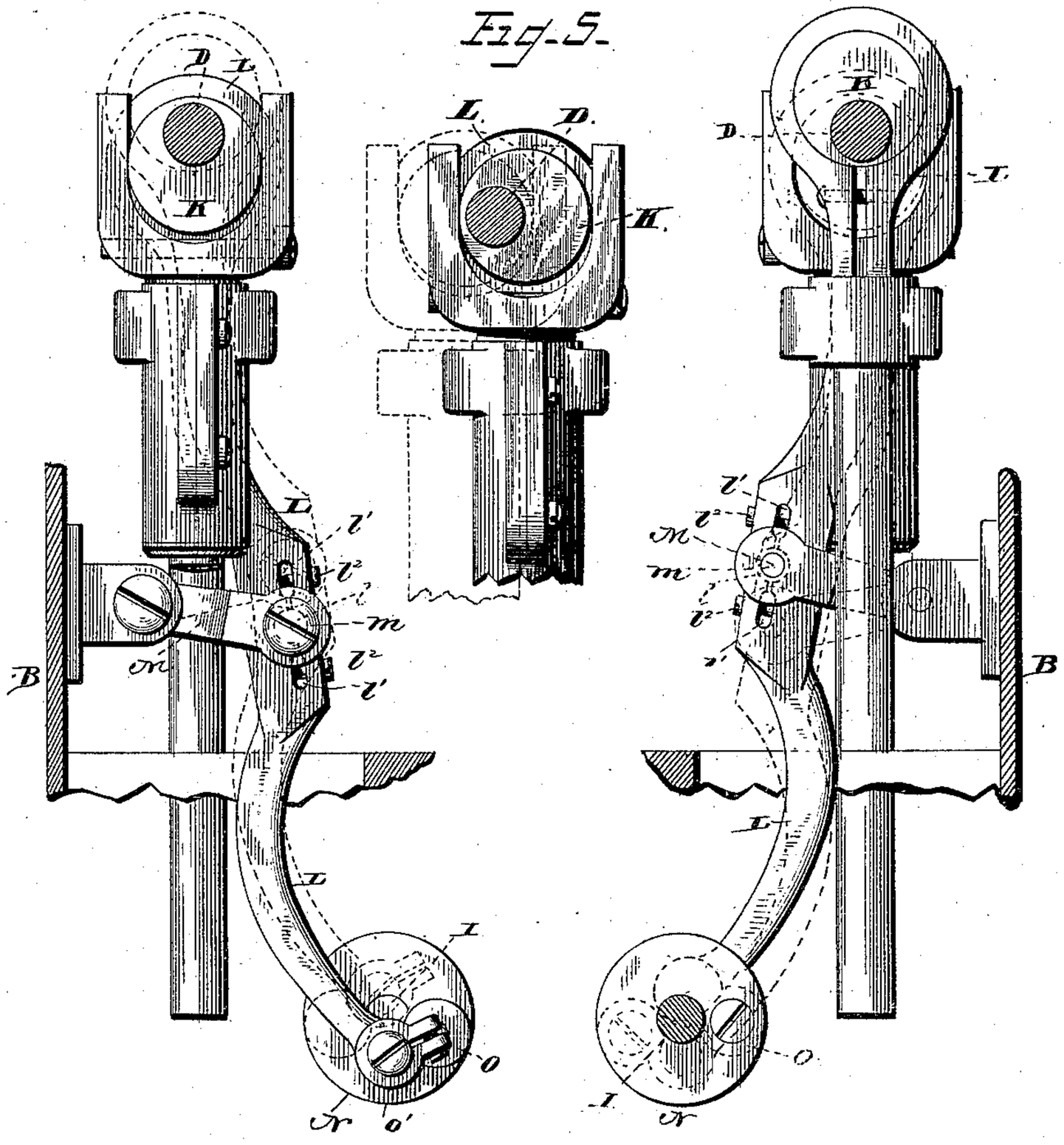
Fig. 3.

Fig. 4.

Fig. 5.



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FEED MECHANISM FOR SEWING MACHINES.

No. 343,929. Patented June 15, 1886.

Fig. 6.

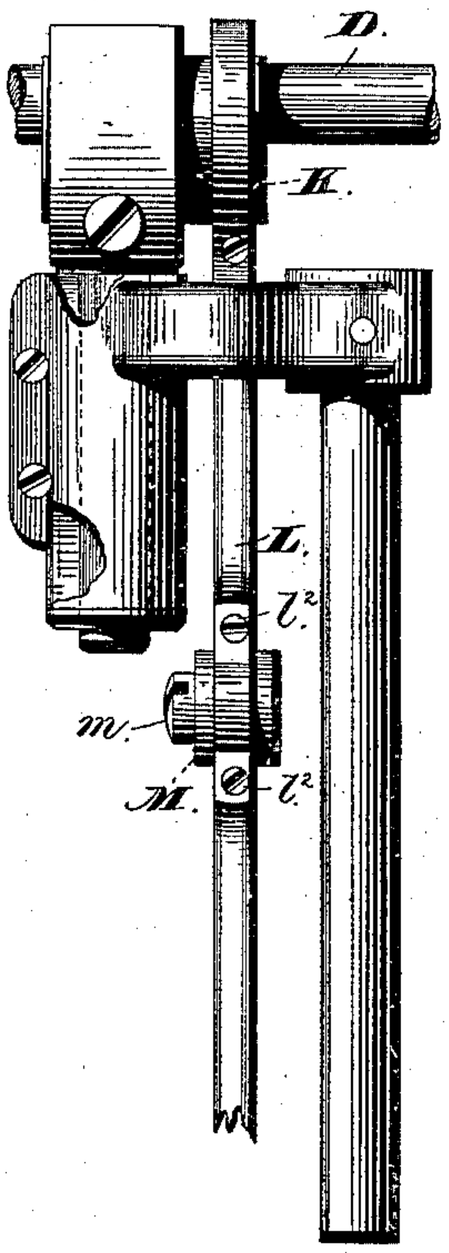


Fig. 7.

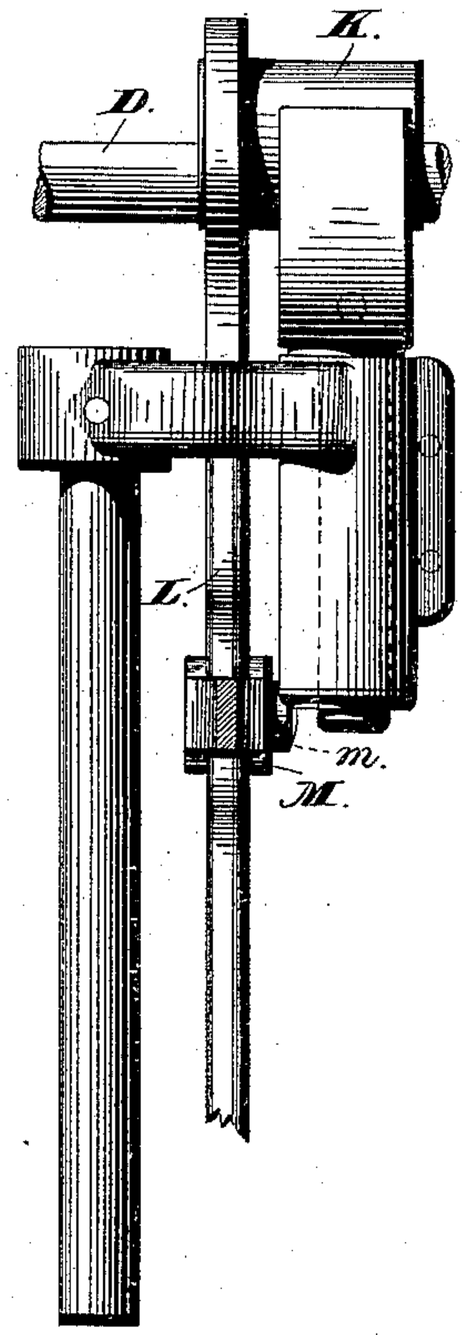


Fig. 8.

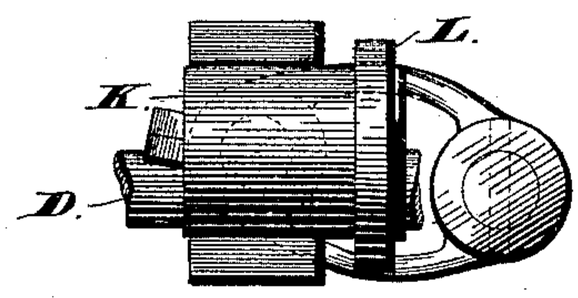
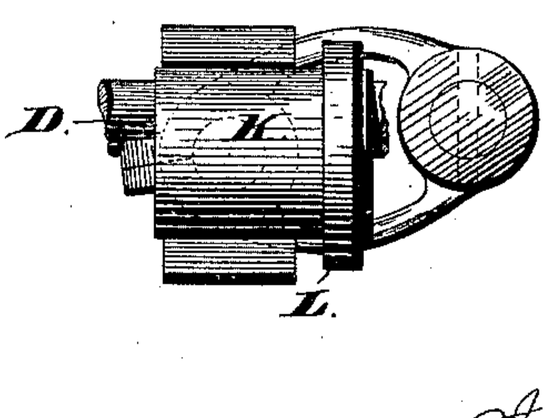


Fig. 9.



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FEED MECHANISM FOR SEWING MACHINES.

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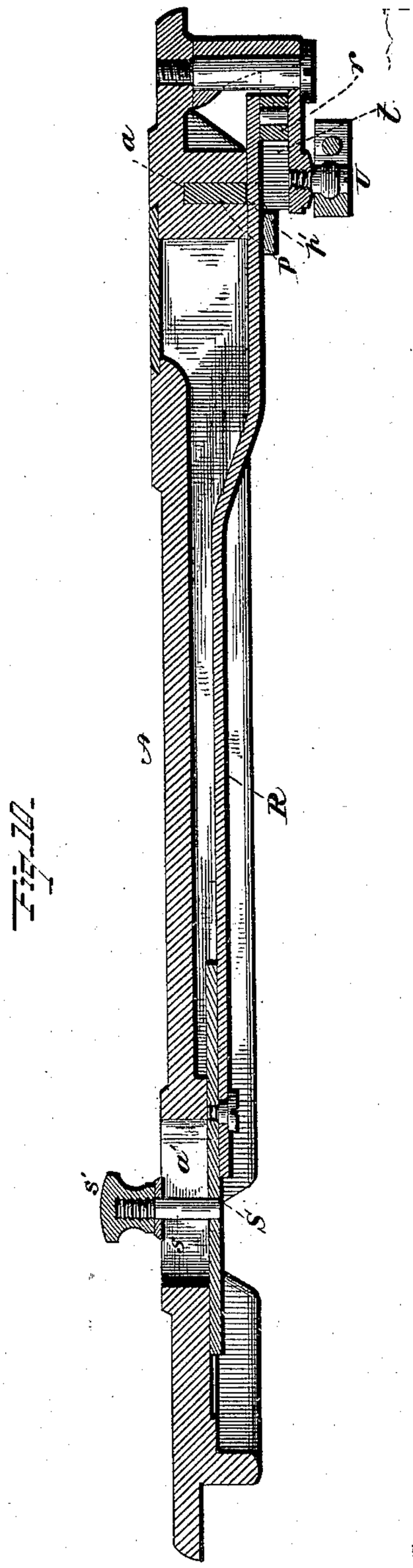

Fig. 10.

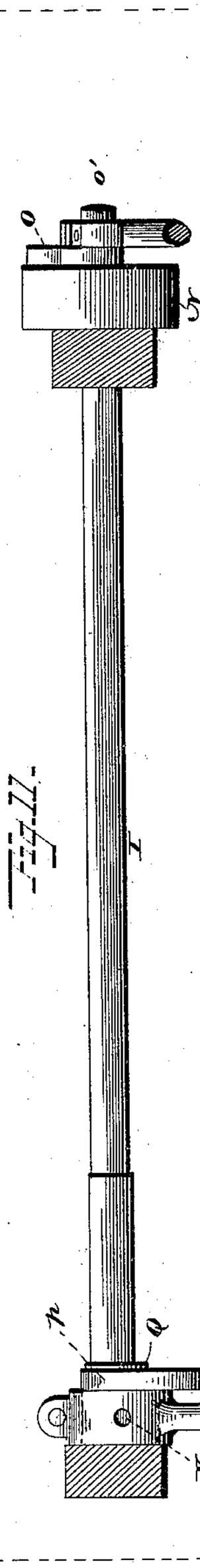

Fig. 11.

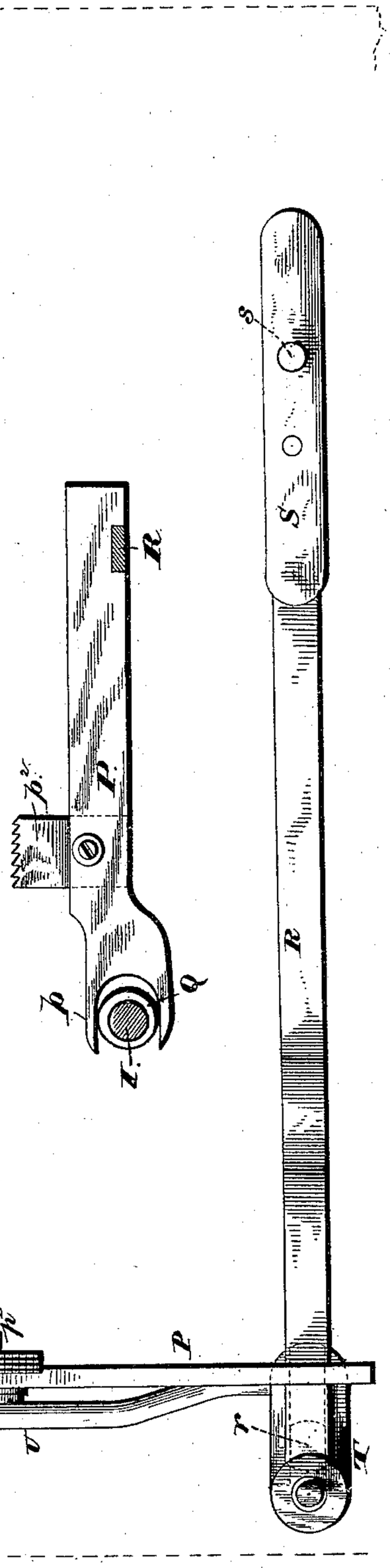

Fig. 12.

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UNITED STATES PATENT OFFICE.

ROSWELL H. ST. JOHN, OF TOLEDO, OHIO, ASSIGNOR TO THE UNION MANUFACTURING COMPANY, OF SAME PLACE.

FEED MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 343,929, dated June 15, 1886.

Application filed October 16, 1884. Serial No. 145,667. (No model.)

To all whom it may concern:

Be it known that I, ROSWELL H. ST. JOHN, of Toledo, in the county of Lucas, and in the State of Ohio, have invented certain new and useful Improvements in Feed Mechanisms of Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my machine from the rear side, a portion of the stationary arm being removed to show the mechanism contained therein for operating the feed-bar. Fig. 2 is a plan view of the bottom of said machine. Fig. 3 is an elevation from the rear end of the machine of the feed-bar-operating mechanism located at such point. Fig. 4 is a like view, from the front end of said machine, of the said mechanism thus located. Fig. 5 is a rear elevation of the upper portion of the same, the full lines indicating the extreme lateral position in one direction of the eccentric moved parts and the dotted lines the opposite lateral position of said parts. Figs. 6 and 7 are elevations of said mechanism from opposite sides. Figs. 8 and 9 are plan views of the same from the upper end, and show, respectively, the positions of parts seen in Figs. 6 and 7. Fig. 10 is a sectional view, looking toward the front, upon line *x x* of Fig. 2. Fig. 11 is a plan view from above of such feed-bar-operating mechanism as is located below the base-plate, and Fig. 12 is a front elevation of the feed-bar.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide improvements in sewing-machines, relating especially to the means and mechanism for driving the shuttle lever or arm and the means for driving or actuating the feed-bar; and to this end my invention consists in the construction, arrangement, and combination of parts, as hereinafter specified.

In the annexed drawings, A represents the base-plate, B the stationary arm, and C the head of my machine, which parts have the usual form and construction. Within the horizontal portion of said arm B, which arm is hollow throughout its entire length, is journaled a driving-shaft, D, that upon its rear projecting end is provided with a driving-wheel, E, and at its front end is connected with and caused to actuate a needle-bar, F, which, with a presser-bar, G, and take-up H, are contained within said head C.

Journaled within suitable bearings at the lower side of the base-plate A is a shaft, I, which is located in rear of the transverse center of said plate, and is arranged in a line with the driving-shaft D. Said shaft I has such length as to cause its front end to extend nearly to the front end of said base-plate, and its rear end to terminate at or near the horizontal center of the vertical portion of the stationary arm B.

Secured upon the shaft D, within the upper end of the vertical portion of the stationary arm B, is an eccentric, K, upon which is journaled one end of a bar, L, that has the form in side elevation seen in Fig. 3, and at its longitudinal center is provided with an opening, *l*, for the reception of a bearing-pin. From each side of said opening a slot, *l'*, extends for a short distance lengthwise of said bar, and through said bar and each slot immediately adjacent to said opening is passed a screw, l^2, that operates to draw the slotted portions of said bar toward each other, and thus lessen the diameter of said opening in such direction whenever required to compensate for wear. The slotted center of the bar L is connected with a fulcrum-bar, M, by means of a screw, *m*, which passes through the forked outer end of said fulcrum-bar and through the opening *l* of said bar L. The opposite rear end of said fulcrum-bar is pivoted to the front wall of the stationary arm B, leaving its said outer end free to move vertically to conform to the movements of said bar L.

Secured upon the rear end of the shaft I is a disk, N, and upon the rear face of the same, near its edge, is pivoted one end of a short plate or link, O, that is free to move upon or around its pivotal bearing *o*. With the free end of said link is connected the lower end of the bar L by means of the screw *o'*, which, passing through said bar, has its threaded end con-

tained within a corresponding opening in said link, said screw thus arranged operating as a journal-bearing for said bar. If, now, the driving-shaft D is rotated its movements will be communicated to the shaft I through the bar L, and the latter caused to revolve with equal velocity, but in a direction opposite to that of said shaft D. The pivoted fulcrum-bearing for said bar L insures a positive lateral movement in each direction of the lower end of the latter, while the longitudinal movements of the same are made equally positive by the close connection between its upper end and the eccentric K. The link O compensates for any inaccuracies in adjustment or differences in the throw of the ends of said bar L, and causes the movements of the connecting parts to be made with freedom and ease. The feed-bar P has the form, in side elevation, shown in Fig. 12, and is located in suitable position beneath the base-plate A. The front end of said bar fits loosely within a corresponding groove, *a*, that is provided within said base-plate, while its rear end is provided with a fork, *p*, which is caused to embrace a cam, Q, that is secured upon and revolves with the shaft I. Said cam has a grooved face, that closely incloses said fork and insures the lateral as well as the vertical position of the rear end of said feed-bar. The front end of the feed-bar P rests upon one end of a bar, R, which is supported within suitable bearings upon the lower side of the base-plate A, and extends from near the rear end of the same to or beyond said feed-bar. Said bar R is longitudinally adjustable within certain limits and its front end fits loosely into and may be moved longitudinally through a correspondingly-shaped notch, *p'*, which is provided within the lower edge of said feed-bar. Said front end is also capable of a lateral movement equal to the longitudinal movement required for said feed-bar, and, to accommodate the same, its rear end is pivoted upon a plate, S, that slides within a correspondingly-shaped groove in the said base-plate, and is adjusted to and secured in longitudinal position by means of the pivotal screw *s*, which extends upward through a slot, *a'*, in said base-plate and has upon its upper end a nut, *s'*. By loosening said nut, said plate S and bar R may be moved lengthwise, while, by the tightening of said nut, said plate S is securely fastened in place and said bar R only permitted to move upon its pivotal bearing.

Pivoted upon the base-plate A, in front of the bar R, is an arm, T, which is adapted to swing laterally upon its pivotal bearing and is provided within its upper face with a longitudinal groove, *t*, that receives a block, *r*, which is pivoted to the lower side at the end of said bar. Said block is adapted to move freely lengthwise of said groove as said bar is moved longitudinally, and is also adapted to turn freely upon or around its pivotal bearing as the outer end of said arm swings laterally to and fro.

Motion is imparted to the pivoted grooved arm T by means of a rod, U, one end of which is journaled upon an eccentric, V, that is secured to and revolves with the front end of the shaft I, while the opposite end of said rod is pivoted to the lower side, at the outer end of said arm T, by means of a ball-and-socket bearing. As arranged, the rotation of the eccentric V will cause the free rear end of the pivoted arm T to swing horizontally to and fro in substantially the line of the feed-bar P, and such motion, through the pivoted block *r* and bar R, will be communicated to said feed-bar and produce the longitudinal or feed movements of the same. By adjusting the bar R longitudinally its pivotal connection with said vibrating arm will be moved toward or from the axis of the latter, and the degree of motion given to said bar R, and through the same to said feed-bar, will be correspondingly diminished or increased.

By means of the mechanism described, the feed-bar P is first raised until its serrated dog p^2 projects above the needle-plate the distance necessary to enable it to engage with the fabric being operated upon. Said bar is then moved longitudinally the predetermined distance to form a stitch, is then lowered until its said dog is below said needle-plate, and is finally moved longitudinally to its first position, said movements constituting what is known as the "four-motion feed."

The vertical movements of the feed-bar P are produced entirely by the cam Q, and the latter is so shaped as to quickly perform its office and to give to said bar a period of rest between each of its vertical movements, by which means the feed-dog p^2 is enabled to commence and complete its feed motion, while said feed-bar is at rest vertically, and each stitch made by the machine will have precisely the length of each of the others made under the same adjustment of the bar R.

Each movement of the feed mechanism is produced without use of a spring and is positive, and in consequence of such construction no liability exists to derangement or that any of the parts will fail to perform its office.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In combination with a swinging arm positively swung in both directions and a pivoted bar having its free end pivotally connected with the arm, the feed-bar connected with the pivoted bar, so as to be actuated thereby in both directions, the fork on the feed-bar, and the rotary cam engaged by the fork, substantially as and for the purpose set forth.

2. In combination with the cam Q on rotating shaft I, the feed-bar, the fork on the same engaging the cam, the swinging bar connected with the feed-bar so as to move the same longitudinally, a swinging arm pivotally connected with the swinging bar, the connecting-bar U, pivoted at one end to the swinging arm and at the other provided with an eccentric-strap,

and the eccentric on the shaft I, substantially as and for the purpose shown.

3. In combination with the rotary shaft I and the cam Q and eccentric V thereon, the feed-bar P, having the fork engaging cam Q, the pivoted swinging bar R, engaging a notch in the feed-bar, the swinging arm T, pivotal connection between such arm and bar R, and the eccentric-rod U, connected at one end with arm T and at the other provided with an eccentric-strap engaging eccentric V, substantially as and for the purpose described.

4. In combination with shaft I and cam Q and eccentric V, the feed-bar provided with a fork engaging cam Q, the pivoted swinging bar R, engaging notch in the feed-bar, the swinging grooved arm T, the pivoted block on bar R, engaging groove in arm T, and the eccentric rod pivoted to arm T and provided with eccentric-strap embracing eccentric V, substantially as and for the purpose specified.

5. In combination with shaft I and cam Q, and eccentric V thereon, the feed-bar having a fork embracing cam Q, the pivoted swinging bar R, substantially at right angles to the feed-bar and passing through a notch therein, the adjustable block to which the bar R is pivoted, the swinging grooved arm T, the block pivoted to bar R and engaging the groove in arm T, and the eccentric-rod provided with a strap for eccentric V at one end and at the other pivoted to arm T, substantially as and for the purpose shown.

6. In combination with the feed-bar, the longitudinally adjustable swinging bar engaging a portion of the feed-bar, a swinging grooved arm, and means on the swinging adjustable bar for engaging the groove in the arm, substantially as and for the purpose set forth.

7. In combination with the feed-bar, the longitudinally-adjustable swinging bar, substantially at right angles to the feed-bar and engaging a notch therein, the swinging grooved arm, and a block or slide pivotally connected with the swinging bar and engaging the groove in the arm, so as to be adjusted toward or from the pivotal center of the arm as the swinging bar is adjusted longitudinally, substantially as and for the purpose described.

8. In combination with the feed-bar and the longitudinally-adjustable swinging bar engaging a notch in the feed-bar, a swinging arm provided with a groove extending toward the pivotal center of the arm, and a block pivoted on a pin on the swinging bar and engaging the groove, so as to be moved in nearer to or farther from the pivotal center of the arm as the bar is adjusted longitudinally, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of November, A. D. 1883.

ROSWELL H. ST. JOHN.

Witnesses:
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RATHBUN FULLER.