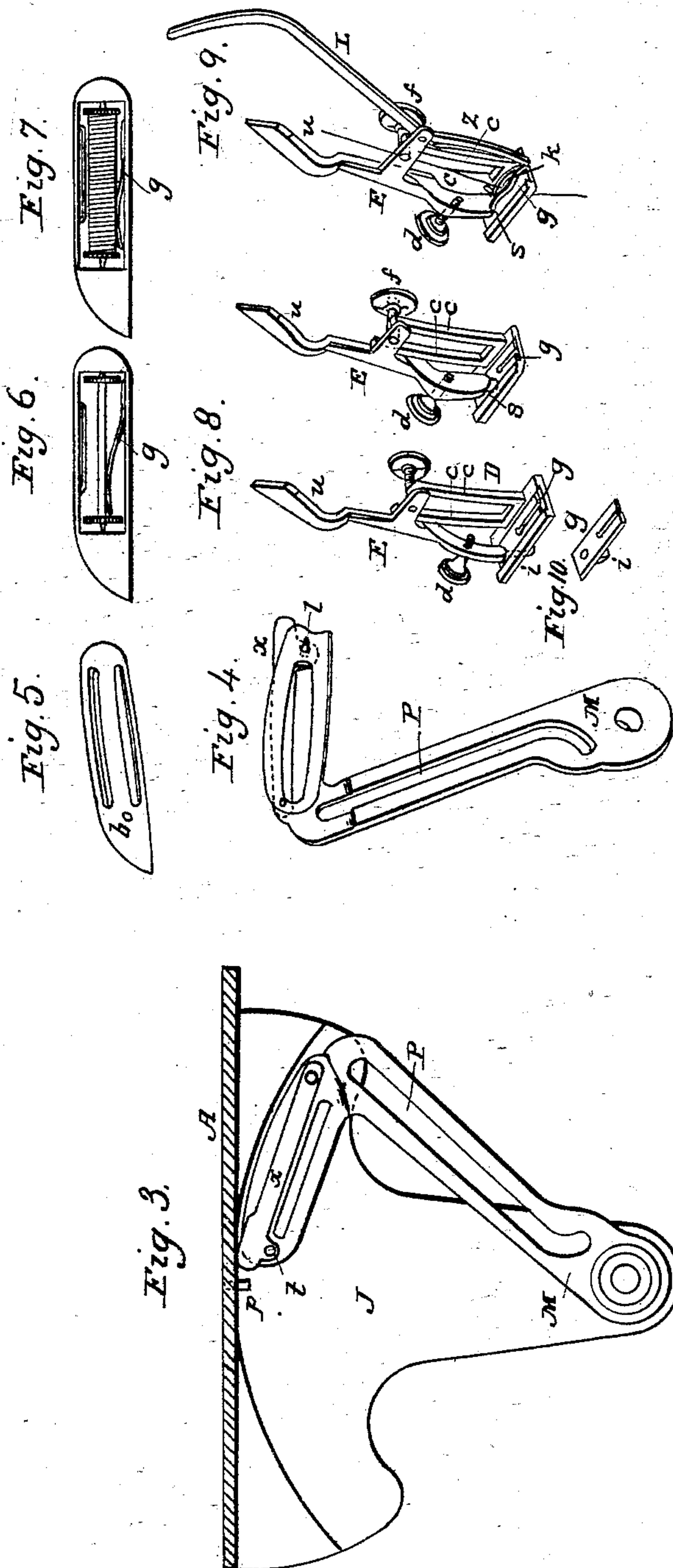


J. B. WOODRUFF.

Sewing Machine.

No. 16,321.

Patented Dec. 23, 1856.

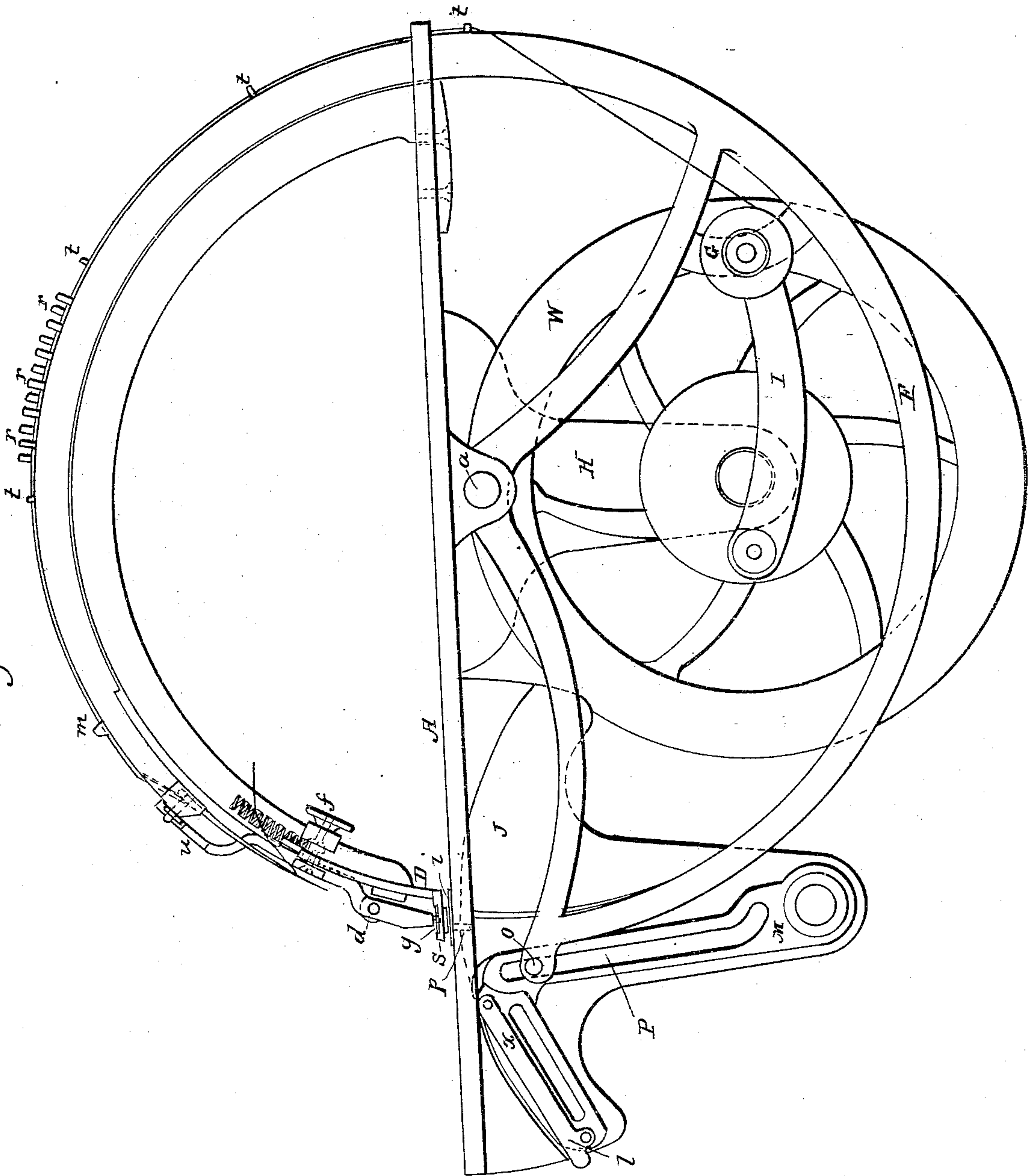


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Fig. 2.

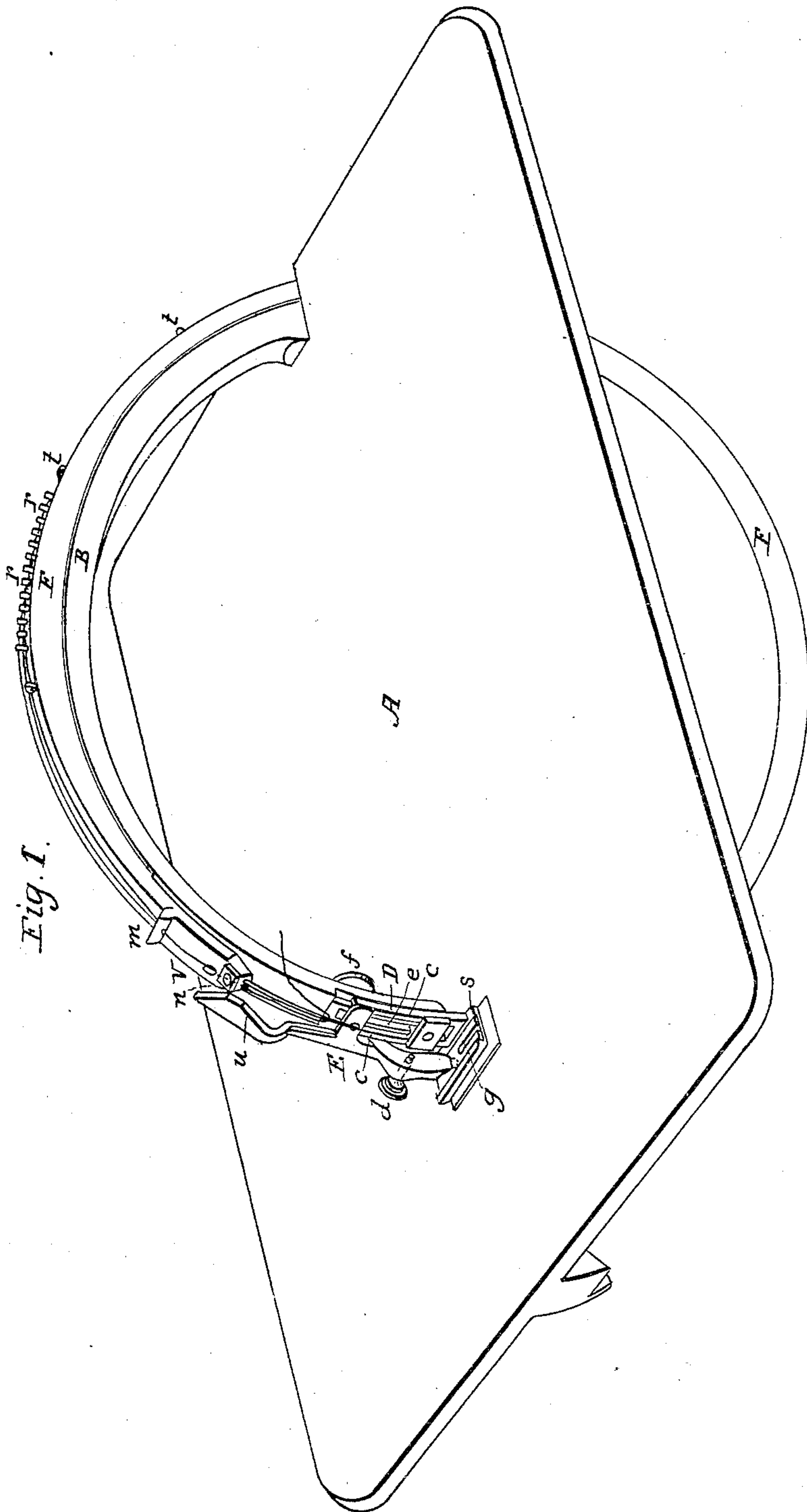


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UNITED STATES PATENT OFFICE.

JEROME B. WOODRUFF, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **16,321**, dated December 23, 1856.

To all whom it may concern:

Be it known that I, JEROME B. WOODRUFF, of Washington city and District of Columbia, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification.

Figure 1 represents a view in perspective. Fig. 2 is a side elevation, showing the mechanism beneath the plate or table. Fig. 3 is a side view of the shuttle-race, with a fragment of the plate in section with the shuttle-driver attached. Fig. 4 is a perspective view of the shuttle-driver reversed to exhibit its interior. Figs. 5, 6, 7 are views of the shuttle, showing its exterior and interior. Fig. 8 is a view in perspective of the feed mechanism detached for the purpose of showing its construction more clearly. Fig. 8 is a detached view of the feed mechanism, showing the loop-guide and needle-thread in position while the needle is at its highest point. Fig. 10 is a detached view of the sliding feed-bar.

My invention consists, first, in a rigid feed-bar without either vertical or lateral motion, and sliding back and forth in ways or guides in a horizontal plane; also, in the arrangement of a series of pins through which the needle-thread is laced in order to give the required tension to correspond with the shuttle-thread without affecting its twist; also, in constructing the needle-bar for sewing-machines in the form of a segment of a circle, operating the shuttle-driver by one end direct and carrying the needle by the other end, said bar forming the arc of a circle of which the point of suspension is the center; also, in the construction of a slotted shuttle-driver so arranged and operated that while the needle is being withdrawn from the cloth the shuttle incased in the bowl of the driver will have passed through the loop of the needle-thread about the time the eye of the needle appears above the surface of the plate or table, still continuing its motion forward to complete the stitch formed by the interlacing of the two threads; also, in carrying the shuttle back and forth by means of a single pin, so that the thread may pass over both the point and heel of the shuttle without obstruction, the spring to which the pin is secured and by which it is operated serving also to hold the shuttle against which

it bears to the face of the race, so that the needle-thread may not pass beneath it, causing a missing of stitches.

Like letters indicate similar parts in all the figures.

To enable others skilled in the art to make and use my improved sewing-machine, I will proceed to describe the same in detail.

A in the annexed drawings represents a table or plate to which the mechanism is secured, and upon which the material to be sewed is placed. To the rear side of this plate A is firmly secured a circular bar, B, its front end extending over and nearly to the surface of the plate. To the front end of this bar B is arranged the adjustable holder D, the bar B having guides *c* formed on its surface, corresponding to the sides *c* of the holder D. The holder D may be raised and lowered and retained in position to suit the different thicknesses of material placed beneath the step *s* on its lower end by means of a thumb-nut, *f*, or in any other convenient manner.

To the adjustable holder D is pivoted a lever, E, the lower end of which extends through a suitable opening formed in the sliding feed-bar *g*, or is pivoted thereto, by which lever the sliding feed-bar *g* is operated to move the material being sewed along. That part of the sliding feed-bar *g* which constantly rests upon the material and moves it forward is curved or inclined toward the needle, so that when it is moved backward or from the needle it will slide smoothly over the surface of the material, and when moved forward or toward the needle the edge *i* presents sufficient resistance to move the material along the distance required for the length of the stitch, which distance is regulated by the set-screw *d*, passing through the lever E between its pivot and lower end. The lever E, above its pivot, is formed into an incline plane, *u*, by which incline the lower end is thrown by the cam *m*, in the upward motion of the needle-bar, to its extreme forward position, as shown in Fig. 1, previous to or at the same time the stitch just taken is being completed. This lever E is operated alternately by the cam *m* and incline plane *n*, formed on the needle-bar F. In the downward stroke of the needle-bar, and while the needle is through the material, the incline *n* strikes against the set-screw *d*, throwing the lower end of the lever E, and carrying there-

with the feed-bar *g* back the distance required for the length of the stitch, and in the upward motion of the needle-bar the cam *m* operates against the incline *u* on the lever *E*, throwing its lower end, by which the sliding feed-bar *g* is moved, to its extreme forward position toward the needle, the feed-bar *g* carrying the material forward for the succeeding stitch. In the annexed drawings the material for the succeeding stitch is fed before the last preceding stitch is complete and while the two threads are slack; but the feeding of the material may take place at the same time the previous stitch is being finished, as in my other patented inventions.

Upon the needle-bar *F* is arranged a series of pins, *v*, for the purpose of giving to the needle-thread sufficient and uniform tension to correspond with the shuttle-thread without affecting its twist.

The spool *G*, from which the needle receives its supply of thread, is placed in any convenient position upon the needle-bar *F*, and simply held sufficient to prevent paying off its thread faster than required. The thread is then passed through guide-loops *t* and laced through any desired number of the pins *v* to give the proper tension, thence through an eye, *v*, near the end of the needle-bar, and thence through the eye of the needle, when it is in readiness for operation. The needle-bar *F* is also a segment of a circle, and is pivoted at its center *a*, so as to be balanced, or nearly so, and vibrates in the arc of its circle. To the front end of the bar *F* is secured the needle by means of a loop and nut, or in any other convenient manner, while to the lower end of this bar, and beneath the plate, is fitted a pin, *o*, to the slot *P* in the shuttle-driver *M*, by which said shuttle-driver is operated in harmony with the other mechanism. The required range of motion may be given to the needle-bar by means of a connecting-rod, *I*, and balance-wheel *W*, as in the present instance, or in any other convenient manner.

From the lower side of the plate *A* extends the shuttle-race *J*, to the lower end of which is secured the slotted shuttle-driver *M*. This shuttle-driver is operated by means of the pin *o* in the lower end of the needle-bar *F*, working in the slot *P*. When the shuttle-driver is at its extreme backward position, as seen in Fig. 3, the needle is through the material and the pin *o* has passed from the straight part of the slot *P* and entered the curve near the lower end of the driver. When the needle has risen sufficient to form a loop for the point of the shuttle to enter, the shuttle-driver has moved forward, so as to bring the point of the shuttle between the needle and its thread, and then, while the needle is rising to the surface of the plate, or thereabout, the shuttle-driver, by means of the pin *o*, passing from the curved to the straight part of the slot *P*, carries the shuttle through the loop of the needle-thread, when its speed commences and continues to decrease until it stops simultaneously with the

needle, by which means the stitch is drawn into the body of the material by the tightening of the two threads at the same time. A straight slot may be used, but a curved one is found preferable, because a less motion of the shuttle-driver is required to pass the shuttle through the loop of the needle-thread in its proper time.

On the bowl of the shuttle-driver is placed a spring, *x*, to which spring is secured a pin, *l*, for the purpose of holding in position and carrying back and forth the shuttle. This pin *l* passes through an eye or opening in the bowl of the driver, as shown in Fig. 4, and enters a corresponding eye formed in and near the point of the shuttle. To withdraw the pin from the eye *b* of the shuttle to permit the free passage of the needle-thread over the shuttle, a cam, *p*, projects downward from the plate *A*, which cam *p* catches beneath the curved end of the spring *x*, raising it sufficient to permit the needle-thread to pass beneath the end of this pin *l*, when the spring, by the continued forward motion of the driver, passes off the cam *p*, allowing the pin *l* to re-enter the eye *b* in the shuttle, in order to hold it in position within the bowl of the driver in its backward as well as forward motion. The spring *x* passes beneath the cam *p* in its backward motion, instead of over it. By this arrangement it will be seen that the shuttle is carried back and forth by a single pin, leaving both the point and heel free for the passage of the needle-thread without obstruction.

To the lever *E* is pivoted a loop-guide, *L*. On the lower end of this guide *L* are secured two curved springs, *k*, between which springs the needle-thread, during the completion of the stitch, is drawn, as seen in red lines, Fig. 9. The upper end of the guide-lever *L*, to throw the springs forward to receive the thread between them, is operated by means of the cam *m* on the needle-bar *F*; and to return it in position, so that the springs *k* shall pass from beneath the needle, a spring, *z*, is arranged on its inner side, and bearing against the holder *D*, throwing off the lower end of the guide-bar *L*, to which the springs are attached, carrying between said springs the loose thread formed by the descent of the needle. By this arrangement the loose loop of the needle-thread is always guided in one direction by the thread being drawn between the springs *k* during the time the stitch is being completed and drawn from between the springs by the downward motion of the needle in the succeeding stitch.

Having thus fully described my improved sewing-machine, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The construction of a feed-bar, *g*, sliding in a dovetail or slotted guide and moved by a lever, *E*, connected with the feed-bar *g* by a swivel-joint or its equivalent, so as always to move the feed-bar *g* in a plane with the material being sewed, the feed-bar *g* being moved back the distance required for the length of the stitch while the needle is in the material,

and when the needle is withdrawn is moved forward, carrying the material therewith.

2. The arrangement of a series of pins through which the needle-thread is laced for the purpose of giving a uniformity of tension without affecting its twist, or their equivalent.

3. I am aware that needle-bars have been made to vibrate in the arc of a circle, which I do not claim; but I do claim a balanced needle-bar for sewing-machines, when constructed in the form of a segment of a circle, operating the shuttle-driver by one end direct and carrying the needle by the other end, when the whole of said bar forms the arc of a circle of which the point of suspension is the center, as described.

4. A slotted shuttle-driver, the same being

operated direct from the needle-bar, and so arranged that the shuttle may pass through the loop of the needle-thread in its proper time, gradually decreasing its speed and stopping at or about the same time with the needle, as described, or its equivalent.

5. I do not claim carrying the shuttle back and forth by two pins—one at the heel and one at the point—independent of a shuttle-carrier, for this has been done by Messrs. Blodgett & Lerow, and patented to them; but I do claim carrying the shuttle back and forth by a single pin, as herein described.

JEROME B. WOODRUFF.

Witnesses:

J. S. BROWN,

GEORGE W. ADAMS.