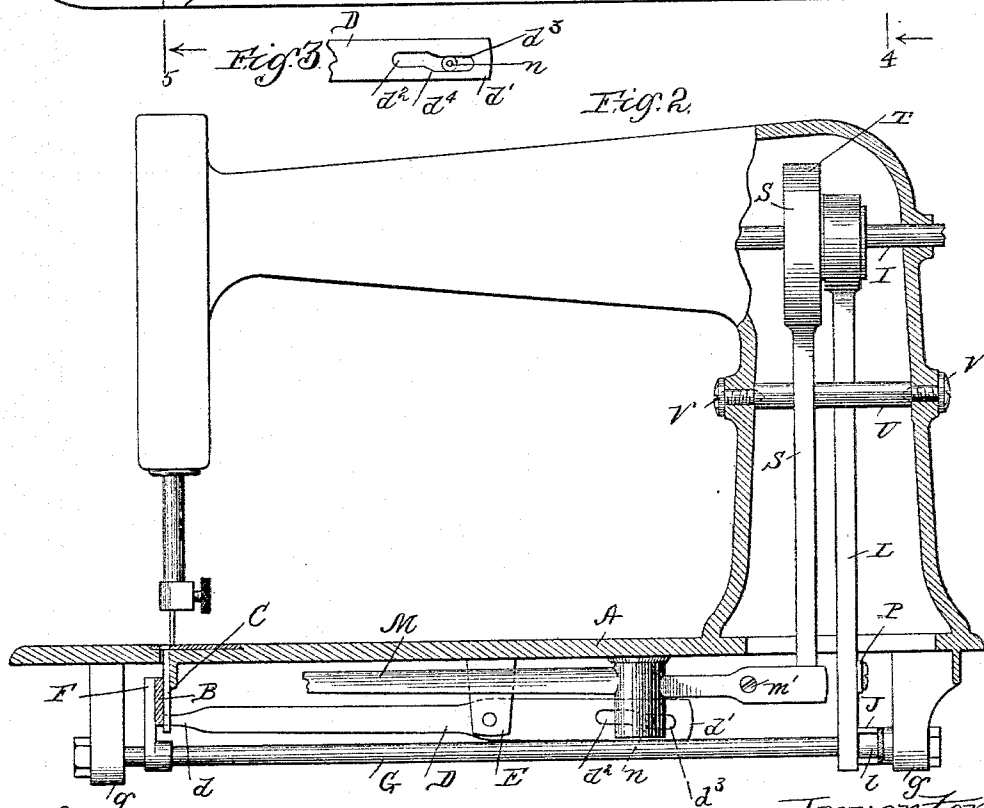


2 Sheets—Sheet 1.

Patented Jan. 1, 1895.



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FEEDING MECHANISM FOR SEWING MACHINES.

No. 531,770.

Patented Jan. 1, 1895.

Fig. 5.

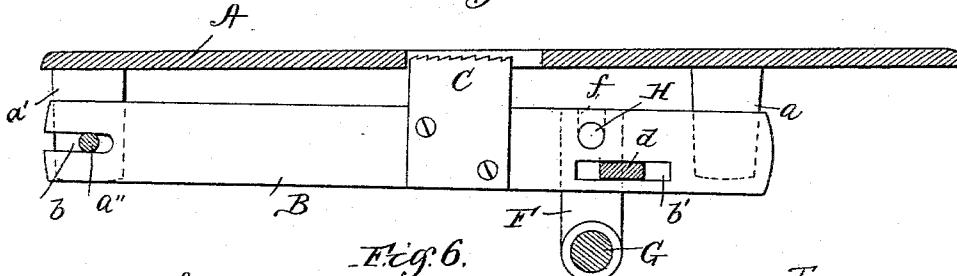


Fig. 6.

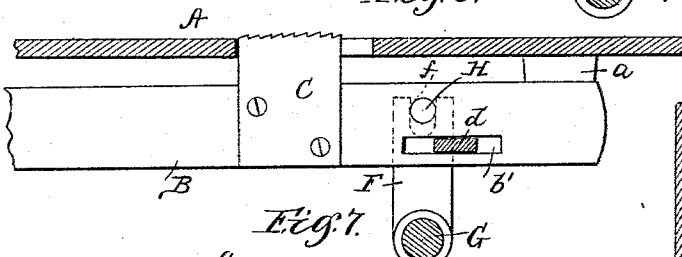


Fig. 7.

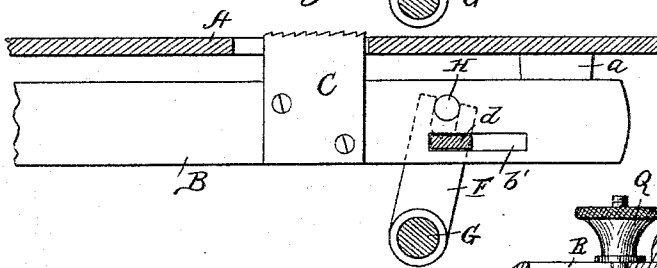


Fig. 4.

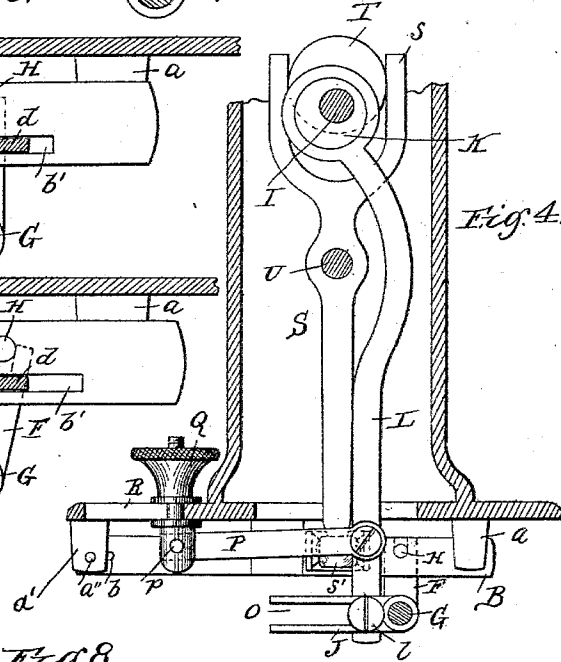
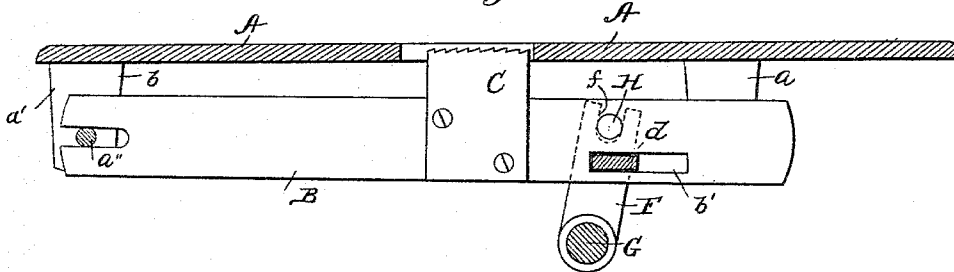


Fig. 8.



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FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 531,770, dated January 1, 1895.

Application filed September 22, 1892. Serial No. 446,538. (No model.)

To all whom it may concern:

Be it known that I, WILLIS S. BROWN, a citizen of the United States, residing at Belvidere, in the county of Boone and State of Illinois, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact specification.

My invention relates to the feed mechanism of sewing machines, and more particularly to improvements in the means for imparting to the feed the movement commonly known in the art as the "four way movement." The ideal feed movement, is one in which the feed travels in a strictly straight line throughout the entire length of at least its feeding or advancing stroke, whereby the goods will be positively engaged by the feed at the beginning of the stroke, and will be as positively released at its termination.

One of the objects of my invention, therefore, is to provide improved means for causing the feed to travel in a strictly straight line throughout its feeding or advancing stroke, and to descend from such line the instant such stroke is completed.

Another object of my invention, is to provide a feed mechanism in which the means for raising and lowering the feed shall be practically inactive during the action of the means for reciprocating the feed, and shall hold the feed at an unchanging altitude throughout the length of each stroke.

With these ends in view, my invention consists in certain features of novelty in the construction, combination and arrangement of parts by which the said objects and certain other objects of minor importance hereinafter described, are attained, as fully explained with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1, is a bottom plan of a sewing machine bed, provided with my improvements. Fig. 2, is a vertical longitudinal section thereof, taken on the line 2—2, Fig. 1, portions being broken away. Fig. 3, is an enlarged detail view hereinafter described. Fig. 4, is a transverse sectional view,

taken on the line 4—4, Figs. 1 and 2. Fig. 5, 50 is an enlarged transverse sectional view, taken on the line 5—5, Fig. 1, showing the feed at the limit of its return or rearward stroke, immediately before making its upward stroke to engage the goods. Fig. 6, is a similar view, 55 showing the feed at the limit of its upward stroke, immediately before making its forward or feeding stroke. Fig. 7, is a similar view, showing the feed at the termination of its forward or feeding stroke. Fig. 8, is a 60 similar view, showing the feed at the limit of its downward stroke.

Like signs of reference indicate like parts throughout the several views.

It is well known that when a body is subjected to the pressure of two contrary forces at once, the line of movement of such body will be the resultant of such forces, which will be a direction midway between the directions of the two positive forces, or more or less near the direction of one of them, accordingly as the one is greater or less than the other; and on the same principle, if a sewing machine feed is subjected to the action of two moving parts at once, the movement of the feed will be in the direction of movement of neither of such parts, but in a contrary direction, resulting from the two. Proceeding upon this well known principle of physics, I provide separate and independent means which operate upon the feed at separate and distinct periods, for producing respectively, the two requisite movements, *i. e.*, the forward and backward and the rising and falling movement. In this way, I am enabled to cause the feed to rise or fall not until the forward and backward movement has been completed, and then to cause it to rise or fall positively and with great rapidity, and practically before the return movement of the feed begins. I accomplish this, by means of a pivoted lever, whose sole duty is to raise and lower the feed, and which does not move until the feed is at the extremity of its strokes; and an oscillating crank-arm, actuated by an eccentric, whose duty is to reciprocate the feed in a horizontal direction, independently of the said lever. The oscillating crank-arm being actuated by

an eccentric, there will be a brief period at the end of each stroke in which the arm does not move at all. It is at these periods, that the lever imparts to the feed its rising and falling movement.

Arranged under the cloth plate or bed plate A, is the feed bar B, upon which the feed proper, C, is mounted, as usual. The feed bar, B, may be mounted between depending lugs or ears, a, a' , arranged one on either side thereof, at both ends, and serving to restrict the bar to a vertical and longitudinal movement. The bar works freely through the lugs a , but at its farther end, where it passes between the lugs a' , it is provided with a longitudinal slot b , through which passes a pin a'' , mounted transversely in the lugs a' , and serves to support this end of the bar, while permitting it to go and come during the longitudinal reciprocation of the feed. At the other end of the bar B, near the lugs or ears a , is formed a longitudinal slot b' , into which fits the end d of a vertically oscillating lever D, pivoted in suitable hangers E, to the under side of the bed A, and by means of which lever the feed bar is caused to rise and fall the requisite distance for causing the feed to engage and disengage the goods.

The longitudinal reciprocation of the feed-bar, is accomplished by means of an upright crank-arm F, mounted upon a crank shaft G, and having an elongated slot f , in its upper end, in which engages a pin H, projecting from one side of the bar B, the slot f being elongated for the purpose,—as will be seen,—of permitting the crank arm to force the feed-bar in either direction, without compelling it to move in the arc of a circle, or to change its altitude. The upper end of the slot f , is preferably open, as shown more clearly in Fig. 5, for convenience in putting the parts together. The pin H, if desired, may be arranged at a point over the slot b' , as it is not essential that the end d of the lever D should project entirely through such slot b' .

The end d of the lever D, is preferably rectangular in cross-section, and oblong, for the sake of affording a greater bearing surface; and in order that the feed bar B may reciprocate back and forth without striking such end d , the slot b' , is extended beyond both sides thereof, as more clearly shown in Fig. 5.

The rock shaft G, may be journaled below the feed-bar B, lengthwise of the bed-plate, in suitable hangers g , and be given an oscillatory or rocking motion by some suitable connection with the needle-bar shaft, I. I prefer, however, to accomplish this rocking movement of the shaft G, by means of a crank arm J, secured to one end thereof and being connected to an eccentric K, on the shaft I, by means of an upright rod, or pitman L, having a strap at its upper end, embracing the eccentric, and a suitable connection at its lower end for adjustably connecting it to the crank arm J. Thus, it will be seen that when

the needle bar shaft I is rotated, the requisite rocking motion will be imparted to the shaft G, which, through the medium of its upright crank arm F, will produce the desired longitudinal reciprocation of the feed.

The shorter arm d' , of the lever D, is provided with a cam slot, consisting of two substantially horizontally portions, d^2, d^3 , connected together at their inner ends, midway of the slot, by a short incline, d^4 ; and formed on or secured to the shuttle lever M, and projecting preferably from the side thereof, at the point where it is pivoted to the cloth-plate or bed, is an arm or projection N, whose outer end engages in the said cam slot, or groove, and, if desired, may be provided with an anti-friction roller n , to reduce the friction. It will thus be seen that when the shuttle lever M oscillates upon its pivot, the arm or projection N will be carried back and forth in a straight line, or horizontal direction along the cam slot, or groove, in the lever D, and when such arm reaches the incline d^4 , moving in one direction, it will depress the arm d' , of the lever D, and cause the feed to rise into engagement with the goods; and when the arm N again reaches the incline d^4 , in its return movement, it will raise the arm d' , and withdraw the feed from engagement with the goods. The length of the cam slot or groove and the position or location of the incline d^4 therein, is such that the feed will make a complete stroke, that is to say, either a feeding stroke or a return stroke, while the arm N is traveling from the incline d^4 , to the extremity of the slot and back again to the incline. Thus, assuming that the anti-friction roller n , is at the mid-length of the cam slot, about to ride over the incline d^4 , and depress the arm d' , as shown in Fig. 2, and that when the roller is in this position, the feed is at the extremity of its return stroke, as shown in Fig. 5, the further movement of the roller n to the left, will immediately cause the elevation of the long arm of the lever D, which will result in the feed being quickly raised into engagement with the goods. When this takes place, the eccentric K is supposed to be on dead center and the arm F at rest, but immediately after the feed C has risen, or simultaneously with the completion of the upward movement of the feed, the eccentric K begins to oscillate the arm F to the right, and when this return movement of the feed takes place, the roller n retraces its course through the upper portion d^2 , of the cam slot, and by the time the feed C has completed its feeding movement, the roller n will have again reached the incline d^4 , and bearing upon the upper side of the slot, will cause the arm d' of the lever to rise, and, consequently, rapidly withdraw the feed from engagement with the goods. The roller n now being in the lower horizontal portion d^3 of the cam slot or groove, it will move therealong without changing the altitude of the feed, but,

on the contrary, will hold the feed at a fixed elevation until such roller *n* has traversed the horizontal portion d^3 , and again returned to the incline d^4 , during which time the feed will have completed its return stroke and arrived at the position illustrated in Fig. 5.

I have described the portions d^2 , d^3 , of the cam slot, in the lever D, as horizontal, but by that I mean that these portions are horizontal only when the projection or arm N is acting therein, and the purpose of this,—as will be understood,—is to permit the arm N to complete its oscillation after passing the incline d^4 in either direction, without affecting the position of the end of the lever D, in which it was placed by the engagement of the arm or projection N, with the incline.

As a means for causing the oscillation of the shuttle lever M, I provide the short arm of the same with a fork, *m*, whose prongs are adjustably connected together, by means of a set-screw *m'*, and between which engages the lower end of an upright lever S, fulcrumed in the arm of the machine and having a strap or yoke *s* at its upper end, in which works a cam or eccentric, T, mounted upon the needle-bar shaft I and being so disposed with relation to the cam K, as to produce the proper movement of the shuttle by the oscillation of the lever S. The lever S, may be provided with a cross-shaft U, whose ends are provided with conical sockets or bearings, in which en-

gage set-screws V, passing through the arm of the machine.

I claim—

1. In a feed mechanism for sewing machines, the combination of the feed bar having a longitudinal slot therein, a pivoted lever engaging in said slot and having a cam-slot consisting of two horizontal portions arranged at different elevations and connected by an incline, the shuttle lever having a projection engaging in said cam-slot, and means independent of said first lever for longitudinally reciprocating said feed bar, substantially as set forth.

2. In a feed mechanism for sewing machines, the combination of a feed bar having a slot therein, a pivoted lever confined to oscillate in a vertical plane and arranged at right angles to said feed bar and having its end engaging in said slot and supporting said bar, and said pivoted lever being provided with a cam slot consisting of two horizontal portions connected by an incline, the shuttle lever having a horizontal projection engaging in said cam slot and means independent of said first lever for longitudinally reciprocating said feed bar, substantially as set forth.

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