F. HEYER.

Sewing Machine.

No. 30,731. Patented Nov. 27, 1860.

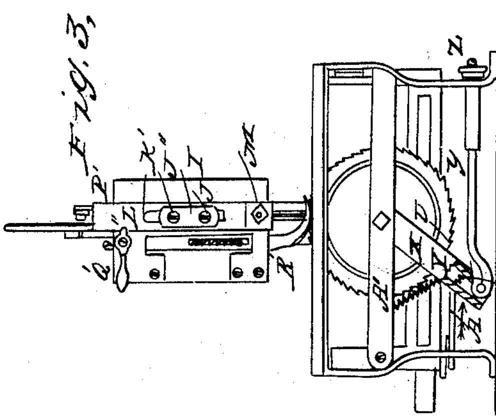

Fig. 3.

Fig. 6.

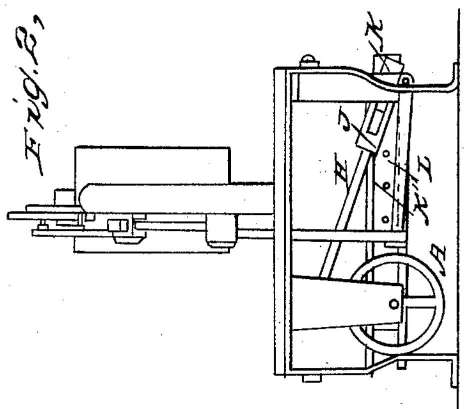

Fig. 2.

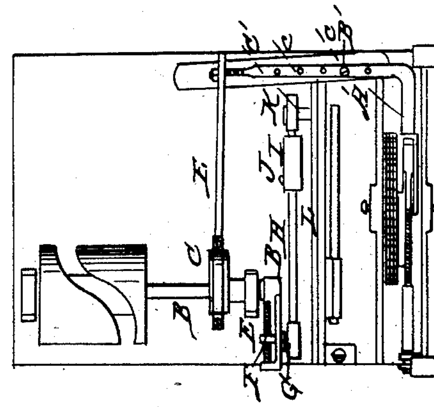

Fig. 5.

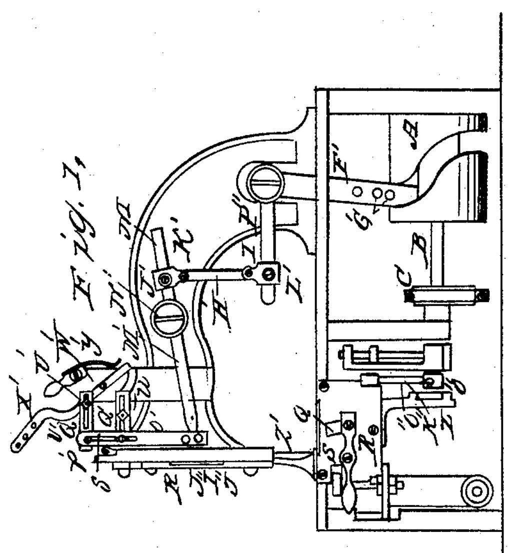

Fig. 1.

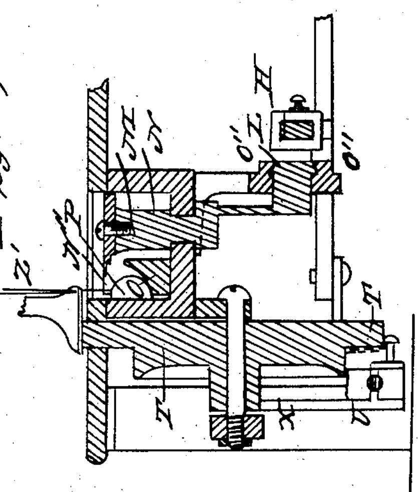

Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK HEYER, OF RICHMOND, VIRGINIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **30,731**, dated November 27, 1860.

To all whom it may concern:

Be it known that I, FREDERICK HEYER, of Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Improvement in Sewing-Machines; 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 a part of this specification, in which—

Figure 1 represents a side view, Fig. 2 a rear view, Fig. 3 a front view, Fig. 4 a vertical longitudinal section, and Fig. 5 a bottom view, of the machine; and Fig. 6, a section of the shuttle.

Similar letters of reference in each of the several figures indicate corresponding parts.

The leading feature of novelty in my said invention is a device for adjusting the shuttle-race to suit shuttles of various sizes, as will be hereinafter more fully explained.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A crank, D, is keyed to the inner end of driving-shaft B. The crank D is made with a slot, through which the shank E of the crank-pin plays. A screw-shaft, F, which has its bearings in both ends of the crank, works through a female screw in the shank E of the crank-pin. A connecting-rod consisting of two parts, H and I, which are clamped together by a clamp-screw, J, connects the crank-pin to a pin, K, projecting from a bar, L, which slides in horizontal dovetail grooves O″ O″. An arm, M, extending upward from the bar L into the shuttle-box N, supports the shuttle-carrier N″. The arm M is secured to the bar L by means of screws K″.

The ends of the shuttle P are placed between the two shuttle-carrier arms N″, and the back of the shuttle rests against the shuttle-race O. The ends of the shuttle-race O pass through slots Q in the sides of the shuttle-box, and are fastened to the rear ends of levers R, one at each end of and outside of the shuttle-box. These levers are pivoted at S, each pivot S being the center of the curvature of the slot Q, so that on depressing or lifting the front ends of the levers R the shuttle-race will be raised or lowered, and (on account of its moving in a circle the center of which is in the pivots S) it will be made to approach the front of the shuttle-box while being raised, and vice versa. By this means shuttles of various sizes may be inserted without the necessity of removing and replacing any part of the machine, and the space between the shuttle-race and front of shuttle-box and the height of the shuttle above the bottom of the shuttle-box will be regulated by operating the levers R so as to suit every thickness of shuttle and the exact position required in reference to the needle. The shuttle receives the required reciprocating motion in the following manner: As the shaft B revolves, the crank D and connecting-rod H I impart a horizontal reciprocating motion to the sliding bar L and to the arm M and shuttle-carrier N″, connected to said bar. The length of throw of the shuttle or shuttle-carriers can be regulated by working the screw-shaft F so as to screw the crank-pin G in or out, and thereby shortening or lengthening the crank D. Such an adjustment of the crank, however, would throw the middle of the reciprocations of the bar L, arm M, and shuttle-carriers to one or the other side of the vertical line passing through the needle. To cause that needle always to coincide with this vertical line, no matter how the length of the crank and length of throw of the shuttle is adjusted, another adjustment is afforded by the clamp-screw J, which allows the connecting-rod H I to be lengthened or shortened.

A drum, *a*, with a cam-groove in its surface, is fastened to the rear end of the driving-shaft B. A pin inserted into one of the holes, G′, in the arm F′ of a lever, F′ P″, takes into this cam-groove. The lever F′ P″ is pivoted to the frame of the machine, and a sliding piece, L′, is clamped to the other arm, P″, of the lever, by means of a clamp-screw, I′. Another lever, M′, is fulcrumed at N′, and a similar sliding piece, K′, is clamped to the rear arm of lever M′ by means of a clamp-screw, J′. Both ends of a connecting-rod, H′, are pivoted to the two sliding pieces L′ K′, respectively. The forward end of the lever M′ plays in a hole in the vertical sliding block I″. The needle-carrier (to the lower end of which the needle *z*′ is fastened by a clamp-screw, M″,) is made with a vertical slot, the sides of which fit the block I″, and is secured to the block by clamp-screws J″. A vertical bar, O′, extends from the block I″ in rear of the needle-carrier, and has a vertical slot, S′, through which two clamp-screws pass, for the purpose of adjusting and clamping to the bar two horizontal arms, Q′ Q′, at

various heights. Each of these arms has a horizontal slot, T′, through which a clamp-screw, U′, passes.

The tension-bar V is pivoted to the frame of the machine at W′. Its rear end is pressed downward by a spring, Y′, while its forward part plays between the ends of the two clamp-screws U′. The front end of the tension-bar is provided with several holes, X, for the needle-thread to pass through from the spool to the needle. As the driving-shaft B revolves, the cam-groove of drum A operates the lower end of lever-arm F′ back and forth. A vertical reciprocating motion is imparted to lever M′ by means of the link-connection H′, and thus the sliding block I″, needle-carrier P′, and bar and arms O′ Q′ Q, are caused to move up and down. The throw of the needle-carrier P′, and bar and arms O′ Q Q′, may be regulated by inserting the cam-groove pin in any of the holes G′, so as to shorten or lengthen the lever-arm F′, and may be more nicely regulated by adjusting the sliding pieces L′ and K′, and clamping them to the lever-arms P″ M′ at a greater or less distance from the fulcra of the latter. The needle-carrier can be adjusted to needles of various lengths by loosening the clamp-screws J″ J″ and sliding the needle-carrier up or down into the desired position, and then clamping it again. As the bar O′ and arms Q′ Q′ reciprocate together with block I″ the tension-bar V will alternately be depressed by the end of screw U, so as to release the tension of the thread at the time the loop is forming for the shuttle to pass through. The exact moment at which the tension-bar is struck by the screw U′, so as to slack the thread, may be regulated by setting the arm T′ farther up or down in the slot S′, and the throw of the tension-bar, and consequent amount of the slack of the thread, may be adjusted by moving the screw U farther in or out in the slot T′ of arm Q′.

A pressure-pad, R′, regulated by a small cam-lever, Q″, operates in conjunction with the needle-carrier in the usual manner.

The cloth-feeding wheel is made with a projecting rim, T, of somewhat smaller diameter, against the circumference of which a friction-block, U, is made to act at intervals, so as to impart to the wheel a periodical feeding motion. The block U is hinged to an arm, X, as seen at V′, this arm X being hung to the center of the feeding-wheel. The forward end of a reciprocating lever, A′, in moving in the direction of the arrow in Fig. 3, comes to bear on the lower end of arm X, so as to throw it in the same direction. The motion of the arm X causes the block U to bite on the circumference of the rim T, and the feed-wheel is thereby caused to move. When the lever A′ swings back, the arm X is also drawn back by the spring A″, and the block U releases its hold upon the circumference of rim T. Thus the feed-wheel will stand still while the arm X and friction-block U return to their original position. The other end of the lever A is worked from the eccentric C upon the driving-shaft B by means of an eccentric-rod, E′.

The throw of the lever A′, and consequent amount of feed motion of the wheel, can be regulated by inserting the fulcrum-pin B′ in any of the holes C′.

The amount of feed motion can be more nicely regulated by means of screw-rod *y* and screw-nut Z. This screw-rod, the inner end of which is pivoted to the lower end of arm X, slides through the frame of the machine, and may be shortened or lengthened, (by means of adjusting screw-nut Z,) so as to place the lower end of arm X, when at rest, nearer to or farther from the lever A′, and thereby to increase or lessen the way during which the lever A′ acts upon the arm X.

The shuttle, Fig. 6, is made with a conical stationary bobbin, D″, the rear end of which is dovetailed and slipped into a dovetail slot, B″, in the rear portion of the shuttle. The thread passes from the bobbin through an opening, F″, in the partition C″, around a pin, E″, in the forward part of the shuttle, back through another opening, G″, in said partition, and out through hole H″ in the side of the shuttle. The advantage of this arrangement is that the thread is uniformly drawn from the bobbin in the same direction—to wit, parallel or nearly parallel to the axis of the bobbin—while in the usual shuttles with cylindrical bobbins, where the thread passes directly from the bobbin to and through the hole in the side of the shuttle, the thread is drawn from the bobbin at angles constantly changing from either end of the bobbin toward the middle of the bobbin, and vice versa. This, of course, produces a constant change in the tension of the thread, the resistance of the bobbin against its paying out the thread being greatest when the thread is at its greatest angle, and smallest when drawn from the middle of the spool, and in line with the hole in the side of the shuttle.

In my shuttle it will be observed the angle the thread forms with the bobbin never changes, the opening F″ in the partition C″, through which the thread passes from the conical bobbin, being in line with the axis of the bobbin, and consequently the tension of my shuttle-thread is always uniform.

What I claim as my invention, and desire to secure by Letters Patent, is—

The pivoted levers R, operating in combination with the shuttle-race O, substantially as and for the purposes set forth.

The above specification of my improvement in sewing-machines signed by me this 20th day of June, 1860.

FREDERICK HEYER.

Witnesses:

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R. W. FENWICK.