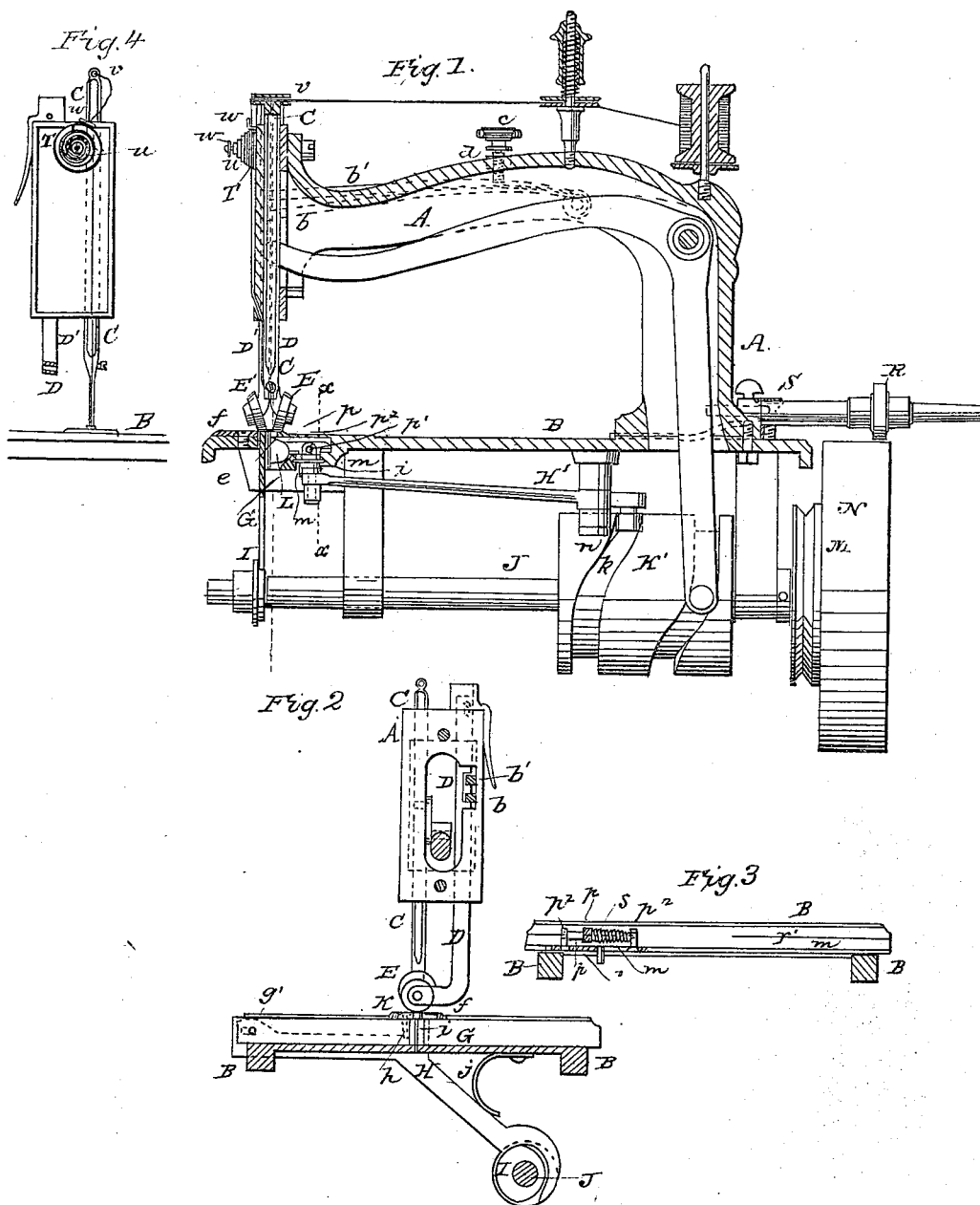


J. S. McCURDY.

Sewing Machine.

No. 53,743.

Patented April 3, 1866.



WITNESSES
J. H. Coombs
et Leclerc

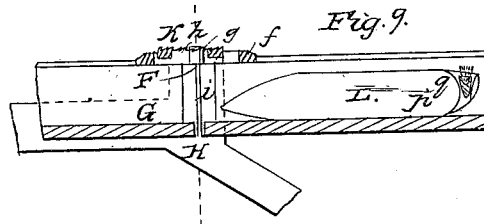
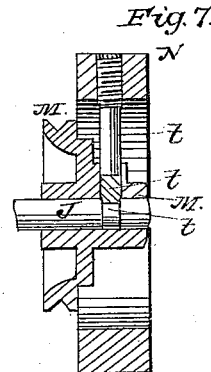
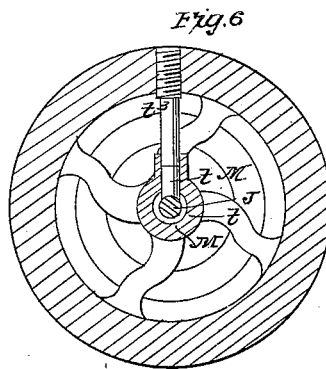
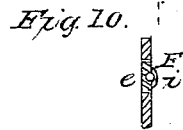
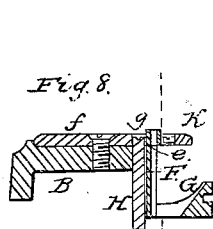
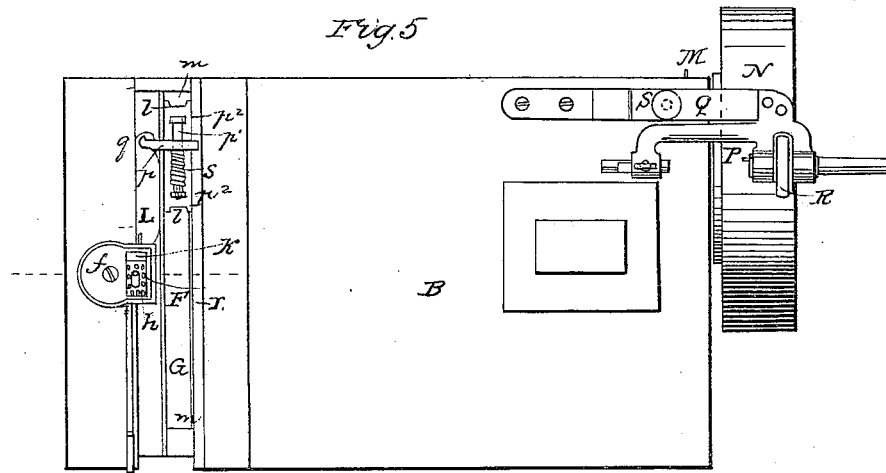
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UNITED STATES PATENT OFFICE.

JAMES S. McCURDY, OF BRIDGEPORT, ASSIGNOR TO ELIAS HOWE, JR., OF FAIRFIELD, CONNECTICUT.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 53,743, dated April 3, 1866.

To all whom it may concern:

Be it known that I, JAMES S. McCURDY, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements 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 part of this specification, in which—

Figure 1 is a vertical section of a shuttle sewing-machine with my improvements, the plane of section being at right angles to the shuttle-raceway and to the direction of the feed-motion. Fig. 2 is a vertical section of the same, taken at right angles to Fig. 1 and directly through the shuttle-race, and showing the parts on the needle side of the race. Fig. 3 is a longitudinal vertical section of the bed-plate and part of the shuttle-driving mechanism, in the plane indicated by the line *x* in Fig. 1. Fig. 4 is a left-hand-side view of the needle-bar, needle, and thread take-up apparatus. Fig. 5 is a plan of the machine without the stationary arm and needle-operating apparatus. Figs. 6 and 7 are vertical sections, at right angles to each other, of the driving-wheel and part of the driving-shaft. Fig. 8 is a transverse vertical section of the shuttle-race, needle-die, feed-bar, and part of the bed-plate on a larger scale than the previously-mentioned figures. Fig. 9 is a longitudinal section of parts of the shuttle-race and feed-bar on a scale corresponding with Fig. 8. Fig. 10 is a horizontal section of the stationary needle throat or die, showing it in an inverted position.

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

This invention consists in a stationary throat or die of peculiar construction, into which the needle passes and by which it is guided after passing through the cloth, and in relation to which two independently but simultaneously operating pressure-rollers are so arranged that when the feeding device is depressed out of contact with the cloth the latter may turn between the said throat or die and feed-rollers about a fixed center.

It also consists in a certain construction of the shuttle driver and race of a track at one side of the shuttle-race, whereby, although the shuttle, at the time when the loop of the nee-

dle-thread is required to slip over its heel, is left so far free of the driver as to permit the unobstructed passage of the loop between them, yet all play between them at the ends of the stroke is prevented, and the rattling noise of the shuttle, so objectionable in a shuttle sewing-machine, is obviated.

It also consists in an improvement in the thread-controller or take-up device for taking up the slack of the needle-thread and keeping it out of the way of the point of the needle when the latter is descending preparatory to its entrance into the cloth, whereby the use of levers is dispensed with and the mechanism of the machine considerably simplified.

It also consists in the attachment of the driving wheel or pulley to the driving-shaft of a sewing-machine by friction so graduated as to overcome the resistance of the working parts while operating properly, but to permit the said pulley or wheel to slip on the shaft in case of the needle striking the needle plate or die in its descent, or in case of the occurrence of any obstruction to the proper operation of the machine, thereby preventing displacement of the cams on the shaft or other derangement of the machine.

It further consists in a novel mode of applying and adjusting the spooler, whereby it is easily thrown into or out of gear with the driving-wheel or pulley as desired.

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

A is the stationary arm of the sewing-machine, arranged upon the bed-plate B in the usual manner, and having attached to it the guides for the needle-bar C, and the independent presser-bars D D', to each of which one of the two presser-rollers E E' is attached. These bars are arranged side by side in the guide at the end of the arm A, in the same position commonly occupied by the single presser-bar, and the lower ends are bent in such manner (shown in Figs. 1 and 2) as to permit their attached pressure-rollers E E' to occupy positions one on one side, and the other on the other side, of the needle, the axes of the said rollers being in the same plane with the axis of the needle, but being so inclined, as shown in Fig. 1, that the lowest portions of the edges of the said rollers will press upon

the cloth nearly close to where the needle passes through it. The pressure is applied to the rollers by means of two separate springs, *b b'*, which are attached to the back of the arm A by means of a pin, *a*, and the pressure of which is graduated by a screw, C, screwing through a tapped hole in a lug, *d*, on the back of the arm A, the upper spring, *b'*, which presses upon the outer or left-hand pressure-bar D', passing through a long notch in the inside or right-hand presser-bar D. Each spring presses independently upon its respective presser-bar without acting upon the other presser-bar, so that each pressure-roller is allowed to rise independently of the other one when the portions of the cloth passing under them are of different thicknesses.

F is the stationary throat or die into which the needle passes, and in which it is guided and prevented from being bent by being caught by the point of the shuttle or by other means. This die, which is best represented in Figs. 8, 9, and 10, is secured in that side of the shuttle-race G on which the needle works. It has a vertical hole, *e*, extending directly through it, just large enough and suitably situated for the free passage of the needle. That part of the said die which is situated between the top and bottom of the shuttle-race is so cut away on the side toward the interior of the race as to form a vertical slit, *i*, which is wide enough for the loops of the needle-thread to pass through it into the shuttle-race, but not wide enough to allow the escape of the needle from the hole *e*. The upper part is of annular or tubular form, with a rounded upper edge, which projects upward, as shown at *g*, in Fig. 8, slightly above the upper surface of the work-plate *f*, which is fitted into and projects slightly above the general surface of the bed-plate B, and which extends over a portion of the shuttle-race. The lower parts of the edges of the pressure-rollers E E' are, by the inclined position of the said rollers, brought directly over the rounded annular edge of the said stationary throat or die F, and thereby, when the feeding device does not protrude through the upper surface of the work-plate *f*, are made to hold the cloth against the said edge in such manner that the said edge constitutes a central bearing concentric with the axis of the needle, upon which the cloth may be turned freely by hand in any direction to facilitate the sewing in curved lines.

H is the feed-bar, one end of which is slotted to work upon a stationary pin, *g'*, Fig. 2, and the other end of which is made to embrace or fit the feed-cam I upon the driving-shaft J of the machine, the said cam being so constructed that, with the aid of a spring, *j*, it will produce upon the toothed feed-dog K, attached to the said bar, the motion common to what is known as the "four-motion feed." This dog is made of a form (shown in Fig. 5) to entirely surround the tubular upper part of the stationary needle throat or die F, and so present a feeding-surface in front of, behind, and on each side of,

the needle, the said dog having provided in it an elongated opening, *h*, of just sufficient width to allow it to pass over the tubular upper part of the throat or die F, and being of a length sufficient to allow the dog the necessary length of motion for the longest desired feed without its striking the said throat or die. By thus constructing the feeding device to operate both in front of, behind, and on both sides of the needle, the cloth is prevented from being puckered by the feeding operation.

l is a slide which forms the main part of the shuttle-driver, fitted to work horizontally in guiding-grooves in the sides of an opening, *m*, which extends across the bed-plate parallel with and nearly close to the shuttle-race. This slide is connected with an elbow-lever, H', working under the bed-plate on a stationary pin, *n*, and receiving the necessary movement for driving the shuttle from the groove *k* in the cam K' on the driving-shaft. To the top of this slide is attached the finger *p*, by which the shuttle L is driven, the said finger being constructed like a lever and secured to a horizontal fulcrum-pin, *p'*, which is fitted to oscillate in bearings *p²*, secured on the top of the slide *l*. The part of the finger *p* which extends partly across the shuttle-race, as shown in Figs. 1 and 5, and enters a recess, *q*, in the heel of the shuttle for the purpose of driving it, is made of a wedge or taper form in its vertical section, as shown in Fig. 9, and the recess *q* is made of corresponding form, as shown in the same figure, so that when at a certain elevation the said portion of the finger may fit loosely in the said recess, as shown in red outline, and when depressed, it may fit snugly in the said recess, as shown in black outline. The opposite end of the said finger is kept in contact with the upper surface of a track, *r r'*, Figs. 1, 3, and 5, provided on that side of the opening *m* which is farthest from the shuttle-race, by means of a spiral spring, *s*, which is coiled around the fulcrum-pin *p'*, and one end of which is secured in the finger *p*, and the other end in one of the bearings *p²*. The said track *r r'* is straight and horizontal, except for a certain distance from each end; but near each end it is depressed, as shown at *r'* in Fig. 3, the lowest point of the depression being opposite the position occupied by the finger *p* when the heel of the shuttle is opposite the needle, which is the position of the shuttle when the loop of the needle-thread slips over it, and the surface gradually rising in either direction from the bottom of the said depression toward the straight parts of the track. While the finger *p* is passing over and near the lowest part, *r'*, of the depression in the track the spring *s* raises the wedge-shaped point of the said finger to such a height within the recess *q* of the shuttle, as shown in red outline in Fig. 9, that the shuttle is to such extent free of the finger as to permit the loop of the needle-thread to pass freely between them; but as the driver moves the shuttle toward either end of the stroke the end of the

finger which is on the track passes up the gradual rise and causes the other end to be depressed into the recess *q* of the shuttle far enough to make it fit snugly, so that at the ends of the stroke there is no play between the shuttle and driver, and as the stroke is reversed there is no rattling noise. The absence of play at and near the ends of the stroke is, moreover, advantageous in rendering the movement of the shuttle positive as it completes its forward movement, at which time the tightening of the stitch takes place.

T, Figs. 1 and 4, is a friction-roller, and U a spring for producing friction on the said roller for the purpose of controlling the slack of the needle-thread and preventing the said thread from fouling and slipping under the point of the needle during the first part of the descent of the latter and before it enters the cloth. This roller has in its periphery a V-shaped groove, the bottom of which is narrow enough for the finest sewing-thread to fit tightly within it, and it is fitted to turn freely upon a central screw, *u*, which attaches it to the end of the stationary arm A or needle-bar guide in such a position that the needle-thread may pass through its groove on the way from the guide *v* on the top of the needle-bar to the eye of the needle. The spring U is of conical volute form, and the screw *u*, passing through it, compresses the spring against the roller, and so causes the said spring to press the roller against the end of the arm A and thereby produce friction upon the roller, such friction being graduated by the screw to enable the roller to turn with the requisite degree of freedom, and no more.

Above the friction-roller T a bent guide-pin, *w*, is secured in the end of the stationary arm A in such position as to compel the thread below the guide *v* to enter the groove of the roller T. The friction of the roller T against the stationary arm A is so regulated by the screws *u* that when the needle begins to descend and the thread becomes slack below the guide *v* the friction of the thread in the groove of the roller T, without being sufficient to turn the roller, is sufficient to overcome the friction of the eye of the needle, and so to prevent the slackness of the thread from passing below the said roller and from fouling and getting under the point of the needle, and the eye of the needle passes down the thread until it (the eye) enters the cloth, after which the doubling of the thread by the further descent of the needle produces such additional tension on the portion of the thread below the roller, while the portion above remains slack, that the thread slips out from the narrow part of the groove of the roller and is left so perfectly free above the cloth that no obstruction is offered to its being carried through the cloth in a doubled condition as the descent of the needle continues, nor to the extension of the doubled portion of the loop by the shuttle while the needle commences to rise; but as by the continued rise of the

needle-bar and needle the thread becomes tightly extended above as well as below the roller T, and is so made to press harder into the groove of the said roller, the said roller turns upon the screw *u*, and is thereby prevented from interfering with the upward movement of the thread by which the loop is drawn back through the cloth.

M is the driving-pulley on the shaft J for the reception of a band from a pulley on the treadle-shaft. This pulley has attached to its hub M' a wheel, N, which serves both as a fly-wheel and for driving the spooler. The hub M' is bored to fit the shaft J in such manner as to be capable of turning freely upon it. The portion of the shaft which is received within the hub has turned in it a shallow groove, *t*, for the reception of a friction-saddle, *t'*, which is fitted into a hole drilled radially into the hub, and which is pressed against the bottom of the groove *t* by a screw, *t''*, inserted, in line with the saddle, into a tapped hole in the rim of the wheel, the said screw being screwed tightly enough upon the saddle to produce sufficient friction between the saddle and the shaft to drive the machine while operating properly, but allowing the pulley to slip on the shaft in case of the point of the needle striking the needle-die or needle-plate in its descent, or in case of any derangement that would tend to stop any part of the machine, thereby preventing the slipping or displacement of the cams upon the shaft. The saddle *t'*, by entering the groove *t*, prevents any movement of the pulley lengthwise of the shaft.

P is the spooler, of ordinary construction, attached to the bed-plate B by a spring, Q, in such position that the india-rubber-faced friction-pulley R on its spindle is situated directly over the wheel N, and in such manner that when the said spring is in its normal condition the pulley R is held up by it out of contact with the wheel N.

S is a thumb-screw inserted through a hole in the spring Q in such manner as to be capable of turning freely thereon, and inserted into a tappet-hole in the bed-plate. When it is desired to set the spooler in operation the screw S is screwed down into the bed-plate and made to depress the spring and the spooler sufficiently to press the pulley R into contact with the wheel N, from which the spooler is thus made to derive a rapid rotary motion. When the spooler is done with it is only necessary to turn back the screw S and the spring lifts up the spooler high enough to bring the pulley R out of contact with the wheel.

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

1. A needle-throat or die so constructed and arranged that it forms a guide for the needle throughout the whole depth of and below the shuttle-race, and that its upper part presents above the work-plate a rounded annular edge of such character as to form a center between which and the pressing device or devices the

cloth may be turned about a center in line or concentric with the axis of the needle, substantially as herein described.

2. In combination with the throat constructed and applied as above described, the two independently but simultaneously-acting pressure-rollers *E E'*, applied and operating as herein specified.

3. The lever-like finger *p*, fulcrum-pin *p'*, spring *s*, and irregular-shaped track *r r'*, in combination with each other and with the shuttle-race and shuttle, substantially as and for the purpose herein specified.

4. The single-grooved friction-roller *T*, spring *U*, and guide *w*, applied in combina-

tion, and operating substantially as and for the purpose herein specified.

5. The attachment of the driving wheel or pulley to the main shaft of the sewing-machine by friction, in the manner substantially as and for the purpose herein specified.

6. The spooler attached to the sewing-machine by means of a spring, *Q*, applied, and having its position controlled by a screw, *S*, substantially as and for the purpose herein specified.

JAMES S. McCURDY.

Witnesses:

J. W. COOMBS,

A. LE CLERC.