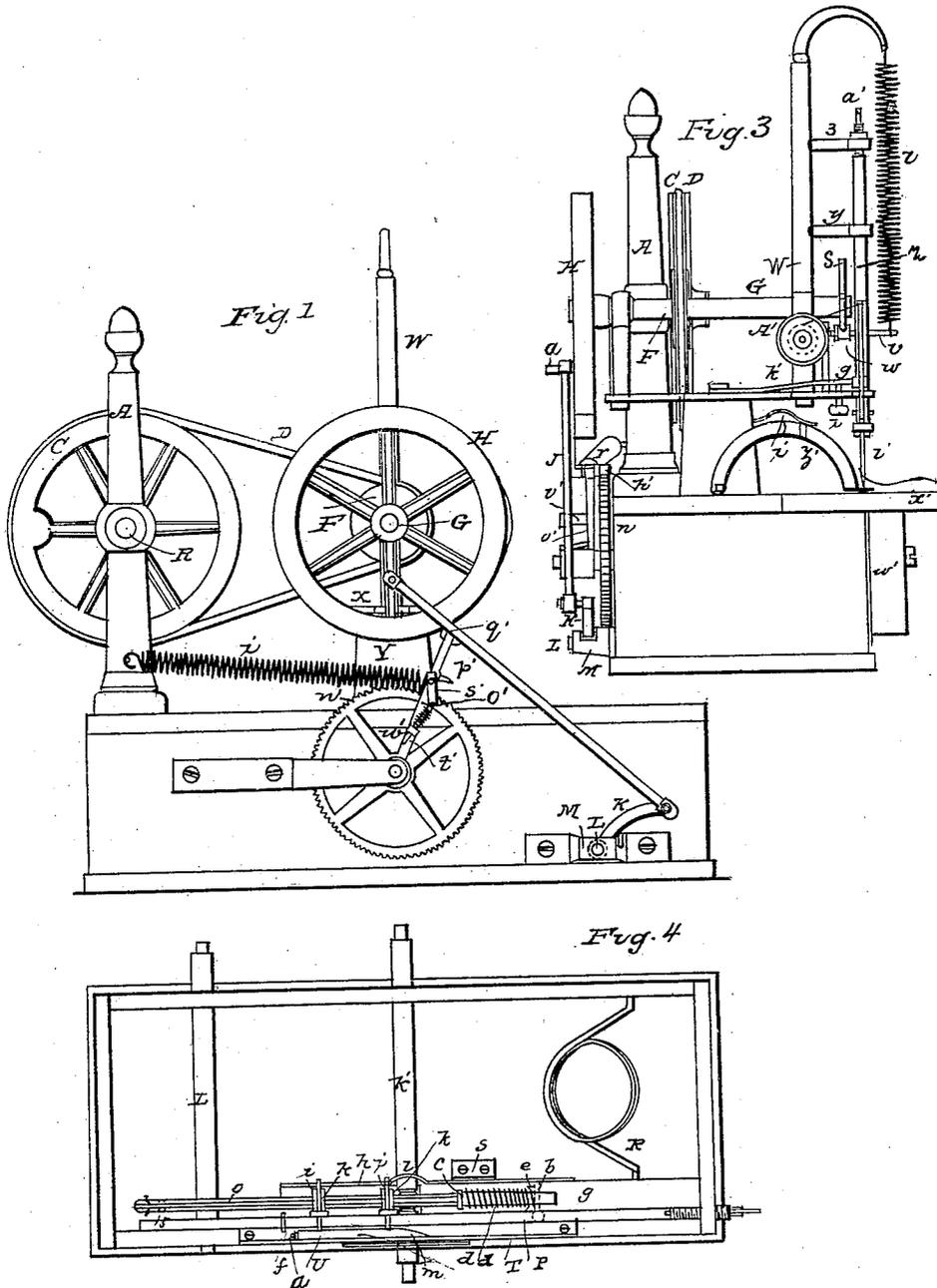


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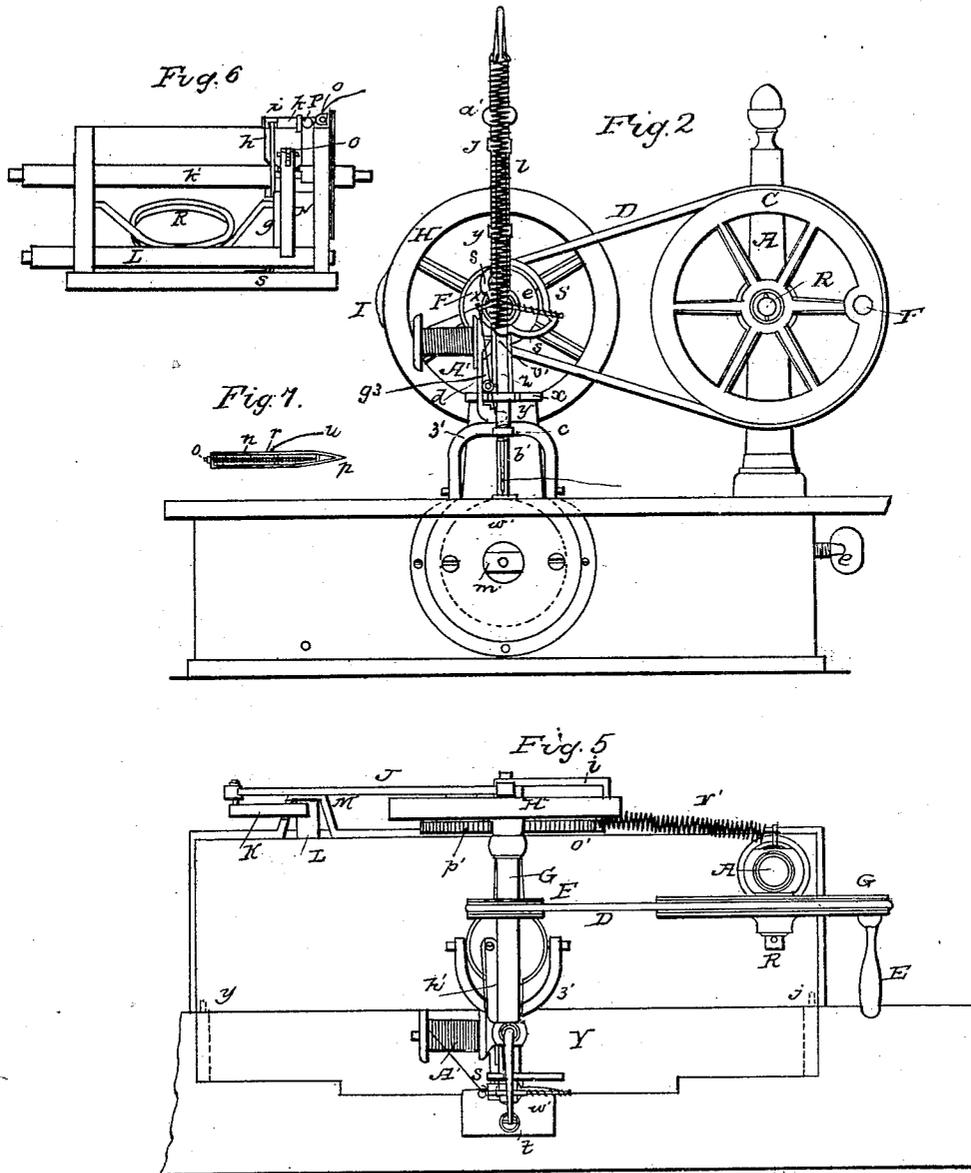


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UNITED STATES PATENT OFFICE.

WM. H. AKINS AND J. D. FELTHOUSEN, OF ITHACA, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 8,282, dated August 5, 1851.

To all whom it may concern:

Be it known that we, WILLIAM H. AKINS and J. D. FELTHOUSEN, of Ithaca, in the county of Tompkins and State of New York, have invented a new and useful Improvement in Sewing-Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part thereof, in which—

Figure 1 represents a view from the rear of the machine, with a portion of the parts on the opposite side removed. Fig. 2 represents a view of the front of the machine, with a portion of the rear (which is represented in Fig. 1) removed. Fig. 3 is an end view from the left of the machine. Fig. 4 is a top view of the interior, taken underneath the table and shield. Fig. 5 is a top view with the table and shield in place. Fig. 6 is an end view, from the left of the machine, of the parts underneath the table and shield, and which represents the end of the box inclosing said parts as removed; and Fig. 7, the bottom and interior of the shuttle.

Similar letters in the several figures represent the same parts.

The nature of our invention and that which distinguishes it from all other things before known consists, first, in passing the shuttle between the needle and its thread while the needle is momentarily stopped in going down, and while also the thread is strained taut, and after the shuttle has passed through, allowing it to remain stationary while the needle is returning or rising up until the stitch is drawn up, when, by releasing the needle from the operation of the cam which regulates its motion up to this point, the needle comes up with a sudden jerk, tightening up each stitch after the manner of hand-sewing, when the shuttle returns and forms a stitch composed of a "loop" and "half-turn," and making a stronger stitch, with less liability to unravel by the breaking of a thread than by the so-called "looped stitch" alone; second, in regulating the rise of the needle and the throw of the shuttle, so as to allow it to sew thin or thick material, and make short or long stitches, as may be desired, the motion of said needle and shuttle not being arbitrary, as in the ordinary crank or cam motion, but adjustable to suit the kind of work to be sewed and to move

just far enough to accomplish their purpose, and no farther; third, feeding in the cloth to be sewed from right to left, or vice versa, without stopping the machine, which, in sewing double or parallel seams, obviates the necessity of cutting the thread and changing the cloth end for end, and also, in sewing curved seams, it enables the operator to turn the cloth to the right or left, as may be most convenient for disposing of the material which hangs or lies upon the sewing-table, and turning it from instead of into the machine, which in practice is found to be of great convenience; fourth, the manner of stepping the shuttle-drivers over the loop in the needle-thread as the shuttle passes back and forth.

To enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the drawings.

On a column, A, standing upon the table of the machine, is arranged an axle, B, upon which is placed the main driving-wheel C, having its periphery grooved out for the reception of the belt D, and which may be turned by the handle E or by any other well-known means. The belt D, which passes over said driving-wheel C, also passes over a pulley, F, also grooved on its periphery for the reception of said belt, said pulley being arranged on the shaft G, and gives motion to said shaft, and through it to the whole of the moving parts of the machine. On one end of the shaft G is arranged the balance or fly wheel H, having on its periphery a cam, I, for the purpose of drawing back the pawl upon the rag-wheel, which communicates motion to the machinery for feeding the cloth under the needle, and which will be hereinafter more fully described.

To one of the spokes of the fly-wheel H is attached, by a wrist-pin, a, the connecting-rod J, the other end of said connecting-rod being attached to the curved arm K, which is placed upon the end of the shaft L, having its bearings at that end in a bolster, M, secured to the outside of the machine, passing through the machine, and having its opposite end resting in the opposite side thereof, and which said connecting-rod gives to said shaft L a vibratory motion, which is communicated to the shuttle, as will be hereinafter described.

To the shaft L is secured an arm, N, Fig. 6, which is slotted in its end, and into which slot

passes the end of the pitman O, where it is secured by a pin passing through said arm and pitman, and upon which pin they may slightly play. The other end of said pitman O is also slotted, and through said slot passes a pin, *b*, which is firmly secured to the driving-bar P.

On the pitman O is arranged a collar, *c*, against which rests one end of a spiral spring, *d*, the other end of said spring resting against a key, *e*, which passes through and travels in the slot in the pitman, and is forced up tight by said spring *d* against the pin *b*, so that said pin will carry the driving-bar P back and forth, as it is operated upon by the pitman O, until the driving-bar P strikes against the end of a set-screw, Q, in the end of the box, when the spiral spring will yield by means of the pressure of the key *e*, and pin *b*, passing through the slot in the pitman, and which allows a continuous motion of the pitman to be kept up, while the driving-bar P, and consequently the shuttle which it operates, remains for a moment stationary, so that the needle may draw up that portion of the stitch made simply by passing the shuttle through between the needle and its thread. After the pitman has made its entire stroke and returns by the operation of the arm N, to which it is attached, the spiral spring *d* again expands, forcing up the key *e* and pin *b* through the slot before described until they reach the end of the slot, (which slot, or, rather, the end of which slot, is represented by a dotted line in Fig. 4,) where they are held by said spring, and the pitman in returning brings back the driving-bar P and the shuttle with it, making a half-turn with the shuttle-thread around the stitch already formed and drawn up by the needle.

By means of the set-screw Q the distance which the shuttle shall travel and then stop may be regulated, so that it shall only move just far enough to clear the needle, or the precise time it shall remain still may be regulated to suit the motion of the needle when set for sewing thicker or thinner material.

The driving-bar P is guided in its proper direction by and moves in as support, *f*, fastened to the side of the machine in rear of the shuttle, and its front end is bent down at right angles to said bar, and slides in a groove in a support, *g*, which is hinged to the bottom of the machine by the hinge S, and behind which support is a spring, R, for keeping it close up against the side of the machine. The hinge and spring is for the purpose of allowing the said support to be pushed back, so as to draw the pins out of the shuttle when it becomes necessary to renew the thread therein, and when said shuttle is replaced the spring R forces up the pins into place again.

On the rear of the support *g* is secured a curved guide, *h*, along which moves the arms *i i*, said arms being notched in one end, so as to span said guide and be governed in their motions by it.

To the driving-bar P are attached the slot-

ted sleeves *k*, through which the arms *i i* move in and out as they are directed by the curve in the guide *h*, and the other ends of said arms *i i* are pointed off, so as to fit into small holes in the side of the shuttle, as seen by dotted lines in Fig. 6, and where said arms *i i* cross the driving-bar P said bar is notched, so as to allow the tops of said arms to be flush with the top of said bar, and by resting in said notches said arms are carried with said bar, and as the points of said arms *i i* extend into the shuttle it (the shuttle) is carried back and forth with the bar.

The curve *l* in the guide *h* is for drawing the arms *i i* alternately out of the shuttle for the purpose of passing or stepping the shuttle through or over the needle-thread, and when the arms come to the straight part of the guide *h*, they are immediately entered again into the shuttle, so that one of said arms is always in position to drive the shuttle. The curve in the guide is immediately opposite the needle, so as to draw back the arm at that point.

T is the raceway, through and along which the shuttle U is driven by the driving-bar P, and through a slot in the side and a hole in the bottom of which raceway, as seen at *m*, Fig. 4, partly in dotted lines, the needle passes to receive the thread of the shuttle and form with its own thread the stitch.

The shuttle U is made hollow, having its front sloped off on three sides, so as to leave the fourth, or that side of it next the upright part of the race way T, straight. This allows the point of the shuttle to freely enter between the needle and its thread. The rear end of the shuttle may be square. On the inside of the shuttle is placed a spindle, *n*, for carrying the shuttle-thread, said spindle being secured in place by a nut, *o*, in rear of the shuttle on the outside thereof, as seen at Fig. 7. In the front part of the inside of the shuttle is a bar, *p*, through a hole in which passes the shuttle-thread, and from thence behind a spring, *r*, on the side of the shuttle, also on the inside, and then through a hole in the top of said shuttle, as seen at Fig. 4. (The shuttle-thread is represented in green and the needle-thread in blue colors.) The thread is drawn off from the spindle endwise, and by this means obviates the necessity of a bobbin on the spindle, and which admits of using a smaller shuttle, the bar and spring affording sufficient friction to the thread to prevent it from drawing off any faster than it is required for catching the needle-thread and forming its part of the stitch.

The shaft G, upon which is arranged the pulley F and fly-wheel H, is supported in the uprights V W, which are secured to a cross-plate, X, resting on and firmly secured to a pillar, Y, standing on top of the frame of the machine, and on the end of the shaft G, opposite that upon which is placed the fly-wheel, is arranged a cam, *s*, which drives down and governs in returning the needle-bar Z until said bar rises to a sufficient height to draw up the needle out of the cloth, when the cam *s* ceases

to control the needle-bar *Z* aforesaid, and the bar is suddenly drawn up, and the needle with it, by the spiral spring *t* giving a quick jerk to the needle and tightening up the stitch made after the manner of hand-sewing. The upright *W* is sufficiently high to admit of holding one end of the spiral spring *t*, and is curved round at top, as seen in Fig. 3, for that purpose. The other end of said spiral spring is secured to an arm, *v*, passing through the needle-bar *Z*, and as the needle-bar is driven down by the cam *s* the spring *t* is elongated, and as the cam turns round the spring keeps the needle-bar close up against it, until the needle, as before described, is drawn up clear of the cloth, when the friction-roller *w*, Fig. 3, upon the arm *v*, and on which the cam *s* operates, is suddenly drawn into a recess, *x*, Fig. 2, in the cam, allowing the spring *t* to suddenly contract and jerk or tighten up the stitch, as before described. The upper end of the needle-bar passes through a guide or arm, *y*, which projects from the upright *W*, and the lower part of it is guided by passing through a hole in a projection of the plate *X*; and immediately over the arm *y* is a similar arm, *z*, in the end of which is a set-screw, *a'*, against which the needle-bar *Z* strikes as it is drawn up by the spring *t*, and by which set-screw the needle-bar may be adjusted so as to bring the needle which it carries clear of the cloth to be sewed, whether thicker or thinner.

It will be perceived that neither the motion of the needle or of the shuttle are arbitrary, as in the common cam or crank motion, both being capable of adjustment, so as to travel a greater or less distance, as may be requisite.

The end of the needle-bar *Z* is slotted and bored out to receive the needle *b'*, which has its eye in or near the end thereof, and a recess immediately behind said eye for the purpose of affording an entrance for the point of the shuttle between said needle and the thread which it carries, and when the needle is in proper place in the needle-bar the nut *c'* is screwed onto the end of said bar, holding the needle firmly in place. Immediately above said needle *b'* in the bar *Z* is hinged an arm, *d'*, which extends upward parallel with the needle-bar, and the upper end of which arm *d'* passes through an eye on a curved spring-arm, *e'*, which passes through said needle-bar.

On the arm *d'* is a cam projection, *f'*, against which a friction-roller, *g'*, Fig. 2, on the spring-arm *h'*, Fig. 3, strikes and forces out said arm *d'* in the arc of a circle, which strains up or contracts the spring on the curved arm *e'*. This arrangement is for the purpose of holding the thread tight which passes through the eye of the curved spring-arm *e'*, and is held in said eye by the friction of the upright arm *d'* against said eye while the shuttle is in the act of entering between the needle and its thread, there being no loop formed for that purpose. On the contrary, the thread is held more taut at that point than at any other during the forming of the stitch. There is a set-screw, *i'*, passing through the cross-plate *X*,

and which bears against the end of the spring-arm *h'*, so that said spring-arm may be raised or lowered to adjust the friction-roller on the end thereof, so as to catch against the cam *f* at the proper time for holding the thread tight—viz., while the shuttle is passing between the needle and its thread.

The thread, instead of passing through the eye of the curved spring-arm *e'*, may pass through a hole near the end of the arm *h'*, immediately over the set-screw *i'*, and be held by the friction of said set-screw on the said arm, and thence through the slot in the end of the needle-bar *Z* to the eye of the needle, as shown in Figs. 2, 3, and 5 by the blue lines.

Through the center of the stand passes the shaft *k'*, which has its bearings in a bar, *l'*, Fig. 1, in the rear of the stand, and in a bar, *m'*, Fig. 2, in the front thereof. On the rear end of this shaft is placed a rag-wheel, *n'*, and also an arm, *o'*, working loosely on said shaft, and upon which arm is arranged a curved pawl, *p'*, which catches into and operates said rag-wheel for the purpose of feeding the cloth underneath the needle, as will be hereinafter described.

On the extreme end of the arm *o'* is placed a friction-roller, *q'*, which is struck by the cam *I* on the fly-wheel *H*, which draws back the pawl *p'*, at the same time elongating the spiral spring *r'*, and after the cam passes the pawl catches into the teeth of the rag-wheel *n'*, and (by the contraction of the spiral spring *r'*, which is attached to said arm by one of its ends' and to the pillar *A* by the other end) draws round the rag-wheel the necessary distance for the length of each stitch. The curved pawl *p'* is attached to one end of a pin which passes through the arm *o'*, and on the other end of said pin is arranged an arm, *s'*, projecting downward, which has a socket in its lower end, as shown by dotted lines in Fig. 1, into which socket fits loosely the end of a pin, *t'*, which plays through a movable guide, *u'*, arranged in a projection, *v'*, on the arm *o'*.

Around the pin *t'* is a spiral spring, the upper end of which is secured to the upper part of the pin, and the lower end of said spring bears upon the oscillating guide *u'*, the whole forming a spring toggle-joint for turning and holding the pawl *p'*, so as to drive the rag-wheel in either direction without stopping or changing the motion of the driving-wheel, the spring keeping said pawl in place when so adjusted. By this means the cloth may be fed under the needle from right to left, or vice versa, by moving the toggle, which has been found practically of very great convenience and utility, as it allows double or parallel seams to be sewed without cutting the thread or changing the cloth end for end, and, besides, enables the operator to dispose of the bulk of cloth outside of the line of sewing by turning it from instead of into or toward the machine.

To the front end of the shaft *k'*, and within the circular-shaped rest *w'*, is arranged a toothed feeding-wheel, the teeth of which pro-

ject sufficiently far through a slot in the top of said rest *w'* to catch the cloth and feed it under the needle as said toothed feeding-wheel is turned by the operation of the pawl and rag-wheel before described, said feeding-wheel running to the right or left as the pawl may be set for working and carrying the cloth in either direction. The rest *w'* is used when sewing in curved seams—such, for instance, as coat-sleeves; and for straight seams the table *x'* is attached by means of the dowel-pins *y'*. (Shown by dotted lines in Fig. 5.) The shield *Y'* is for covering over the shuttle and other operating parts of the machine, to protect them from dirt, &c.

z' is a cloth-holder, which is kept in place by a spring, *j'*, bearing upon it, and is designed to prevent the needle from raising up the cloth as it is drawing up the stitch, the needle passing through a hole made in said cloth-holder.

The thread is supplied to the needle from a spool, *A'*, which turns on a spindle attached to the machine, and from which spool the

thread is supplied in such measured quantities as the size of the stitch may require.

Having thus fully described our invention, what we claim therein as new, and desire to secure by Letters Patent, is—

1. The combination and arrangement of the pitman, driving-bar, shuttle, and adjustable set-screw, for the purpose of allowing the pitman a continuous motion while the shuttle-bar and shuttle is momentarily stopped to allow the needle to draw up the stitch, as here-in described and represented.

2. Bringing up the needle with a sudden jerk after the stitch is formed for the purpose of tightening up the stitch, after the manner of hand sewing, and adjusting the same to any thickness of material to be sewed.

WM. H. AKINS.

J. D. FELTHOUSEN.

In presence of—

J. ROME,

P. H. DRAKE,

P. I. PARTENHEIMER.