3 Sheets—Sheet 1.

M. SCHWALBACH.

Sewing Machine.

No. 56,805. Patented July 31, 1866.

Fig. 1

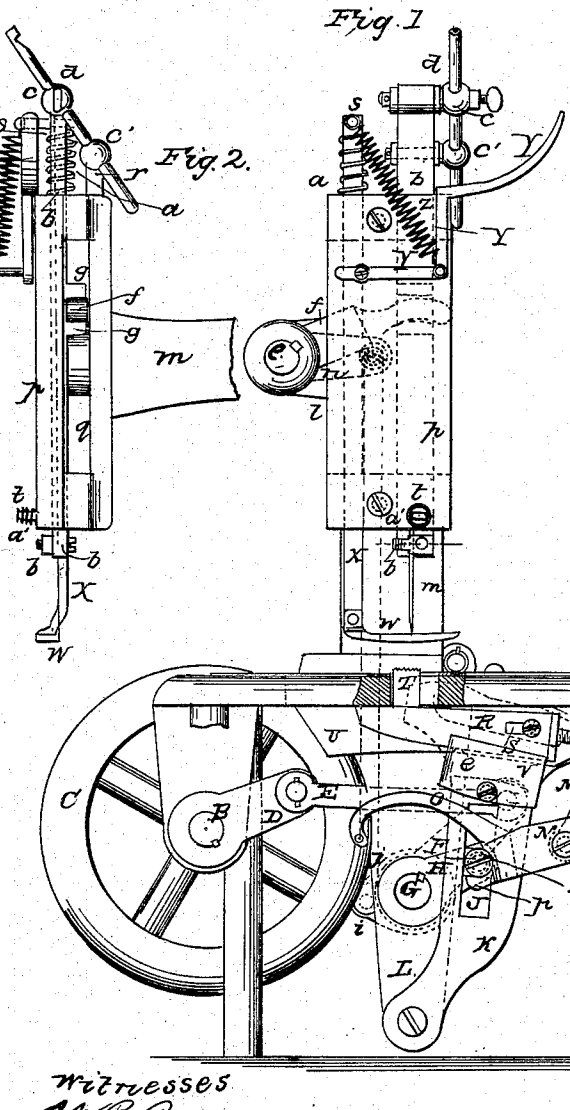
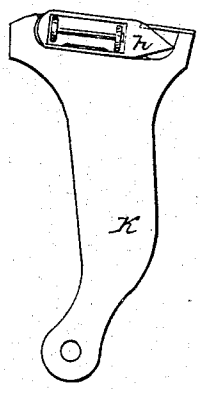


Fig. 2.

Fig. 3



Witnesses

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3 Sheets—Sheet 2.

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Fig. 4

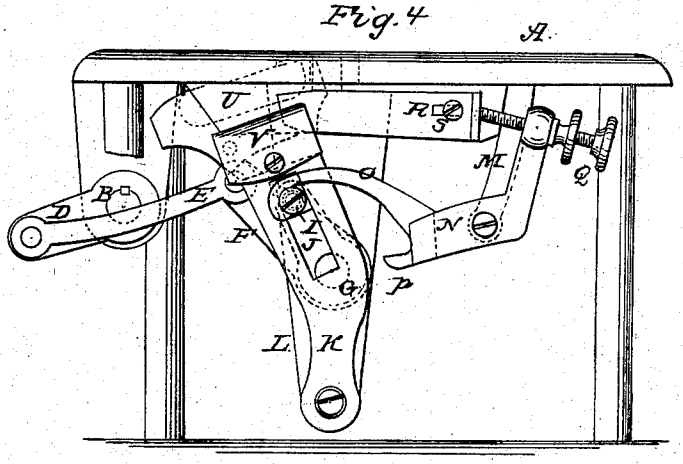


Fig. 5

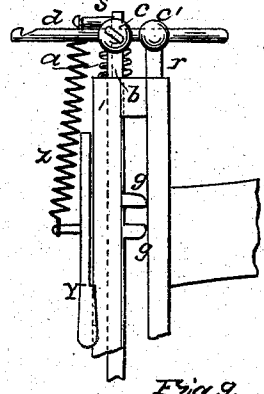


Fig. 6.

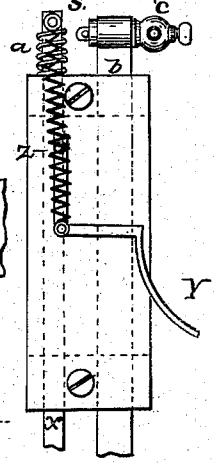
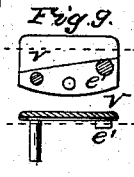


Fig. 8

Fig. 9.



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3 Sheets—Sheet 3.

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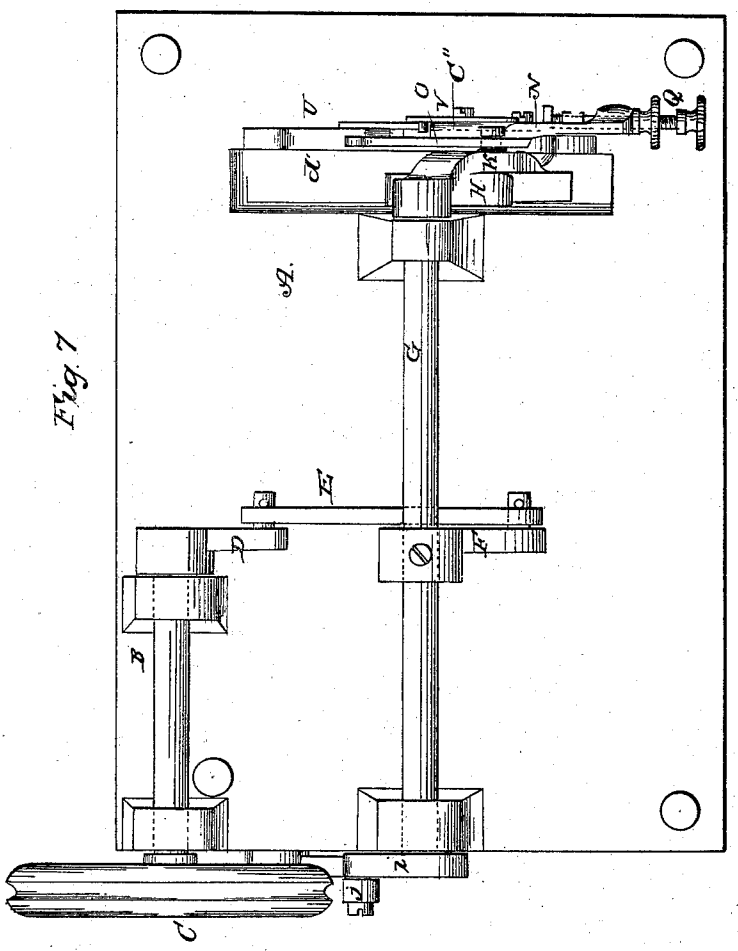

Fig. 1.

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UNITED STATES PATENT OFFICE.

M. SCHWALBACH, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **56,805**, dated July 31, 1866.

To all whom it may concern:

Be it known that I, M. SCHWALBACH, of Milwaukee, Milwaukee county, State of Wisconsin, 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 thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a front elevation of a sewing-machine made according to my invention. Fig. 2 is a detailed side view of the needle-bar and other parts adjacent to it. Fig. 3 is a detailed view of the shuttle-carrier. Fig. 4, Sheet 2, is a detailed front view of the feeding devices and shuttle-carrier. Figs. 5 and 6 are additional views, showing different positions of the needle-bar and parts adjacent to it. Fig. 7, Sheet 3, is an under-side view of the machine. Fig. 8 shows the clamp which holds the needle to its bar. Fig. 9 is a detailed view of the inside of plate V.

Similar letters of reference indicate like parts.

In this improvement the connections of the shuttle and needle-shafts with the driving-shaft are so made and arranged that the pulley may be turned in either direction without stopping the operation of the needle or breaking the thread. The needle-bar is operated in an upright slide by a lever attached to the needle-shaft, and carries a tension-rod that regulates the supply and tension of the thread. The shuttle is carried in a socket formed in the upper part of a vibrating lever, so that it moves in a curved path and not horizontally.

The feeding devices are made and operated in a novel way, and the needle is secured to the needle-bar by a block which is held to the bar by a set-screw.

The letter A designates the cloth-bed of a sewing-machine, supported upon legs of a proper height. B is the driving-shaft, carrying a driving-pulley, C, at its rear end, and at its front end having a crank, D, which is connected by a rod, E, with a crank, F, keyed to the lower or shuttle shaft, G, at about the middle of its length. This shaft G has bearings in pieces L, which hang down from the table A at or near the ends of the machine.

The letter *e* designates the upper or needle shaft, which is journaled in brackets *l* (one of which is seen in Fig. 1) that project from the usual right-angled arm or standard *m*.

Motion is communicated to shaft *e* from shaft G by a crank, *i*, on the back end of the latter shaft, which crank is connected by the rod *j* with a crank, *n*, fixed on the shaft. These parts are seen, partly in dotted outline, in Fig. 1.

b is a vertical needle-bar, which slides in a groove made for it in the guide-plate *p*, fixed on the forward end of standard *m*. Between the plates and the end of the arm is an opening, *q*, to receive a vibrating arm, *f*, extending from the needle-shaft. The end of said arm passes between lugs *g g*, which project into the opening *q* from the needle-bar. The rocking of the shaft *e* causes its arm *f* to vibrate in the opening *q* and to carry the needle-bar up and down the proper distance. The top of the needle-bar carries a pin, *c*, which is free to rotate in its bearing. The head of the pin is perforated to receive a take-up rod, *d*, which is fastened to the pin by a set-screw. That end of the rod which extends toward the front has a hole through which the thread goes on its way to the needle. The other end of the rod goes through the head of a like pin, *c'*, which is supported by a standard, *r*, and is also free to turn in its bearings. When the needle-bar is carried upward the forward end of the tension-rod is carried up with it, and its rear end is depressed, being held in the head of the hinder pin, *c'*, which, as well as the pin in the needle-bar, is free to turn to permit this change of position in the rod. Fig. 2 illustrates this position of the rod and needle-bar. When the needle-bar is brought down the tension-rod is brought to the position seen in Fig. 5. Thus it is seen that the tension-rod is made to vibrate on the hinder pin, *c'*, as upon a pivot, and is also free to slide to and fro in it as the needle-bar makes its reciprocations.

The needle is held against the front of the needle-bar in a shallow groove by means of a clamp, *b*, of peculiar construction. (Shown in detailed view in Fig. 8.) The clamp is three-sided, its sides being at right angles with each other, and the shorter of the three having a tongue which fits in a shallow groove in the back of the bar. The clamp is held from moving vertically by being let into a mortise on

the edge of the bar, and by a set-screw, which also draws the front of the clamp up against the needle-bar.

By means of this construction the needle can be removed and replaced with ease by loosening the screw which holds the clamp, without removing the clamp itself. The adjustment is therefore easily accomplished.

The presser-foot W extends from the end of a bar, X, which is raised by a spiral spring, *a*, which rests on the plate *p* and presses upward against a pin, *s*, that is fixed in the top of said bar X. The presser-foot and its bar are brought down by means of a right-angled lever, Y, pivoted to the face of plate *p*, and connected to the presser-bar X by a spiral spring, Z, one end of which is fastened to the pin *s* and the other end to the lever at the angle which is nearest to the fulcrum of said lever. The handle of the lever extends from it at a right angle, and is curved outward near its end, and is made of sufficient length to allow it, when brought down to its lowest position, to rest against a stop, *t*, that projects from the face of plate *p*.

When it is desired to bring the presser-foot down against the feeding-dog the lever Y is pushed downward until its handle rests against the stop *t*, at which time the lower end of that part of the lever which is pivoted to the plate *p* is to the left of a vertical line that intersects the pin *s*, so that the lever will remain stationary, its spring Z meanwhile holding the presser-bar down with an elastic force. The stop *t* is in the same plane as the needle, or nearer thereto, and has a vertical hole through it to serve as a thread-guide. A light spiral spring, *a'*, is placed around it, which is allowed to bear against the thread and push it outward. When a pull is made on the thread on the descent of the needle the spring is forced backward toward the plate *p* by the tension made on the thread, and when the needle rises the spring *a'* serves to take up some of the slack thread which is then found above the needle.

The crank D makes a complete revolution about its shaft; but the cranks F *i* of shaft G and crank *n* of shaft *e* are only partially rotated, so as to make their shafts rock far enough to produce the requisite reciprocations of the needle and shuttle.

The shuttle is carried in a socket made in the top of the shuttle-carrier K, which is pivoted to the lower end of the forward hanging piece, L, and is moved by a crank, H, from the end of shaft G through a pin, I, which works in a straight slot, J, of the shuttle-carrier K.

The feeding-dog T works up through a slot in the table, being formed on the upper side of a sliding plate, R, which rests and slides in a horizontal position over a shelf, *c''*, Fig. 7, formed on the outer face of the shuttle-carrier. The plate R is held up straight by the aid of a plate, V, which is screwed to the forward edge of the shelf *c''*, so as to inclose the plate R between the plate V and the side of a curtain, U, which hangs down from the under side of the table A along the front edge of the transverse slot *d'*, in which the shuttle makes its reciprocations. The back or inner side of the curtain coincides with the front edge of said slot, and is the surface along and against which the shuttle-carrier and shuttle move. The plate V also serves to keep the shuttle-carrier and shuttle close up against the inner side of the curtain when the screw or screws which attach it to the carrier are tightened, so as to bring the plate R close up to the outer side of the curtain U. The plate V is also connected to the carrier by a pin. (Shown in dotted outline in Fig. 1.) The upper left-hand corner of plate V has a pin, *e'*, projecting a little ways from its inner side, for the purpose of holding up the feed bar or plate R when the carrier has been moved toward the right. The feed-plate R has a slot, S, at its right-hand end, which receives a pin or screw that is fixed in the curtain U. This pin or screw sustains that end of plate R, and the slot allows the plate to move to and fro.

The movement of the feed-plate toward the right is controlled by an adjusting-screw, Q, that passes through the top of an elbow-lever, N, which is pivoted below its angle to a bracket, M. The lower end of said lever is divided into two curved branches, the lower one of which, P, is short and the upper one, O, is long. The curve of the latter is concentric with the arc described by the pin I of crank H, which moves the shuttle-carrier. The pin I projects through the slot of the carrier and beyond the plane of the branches, being below the upper one thereof. When the pin I is moved toward the right it strikes the inside of the lower branch, P, and bearing it downward causes the lever N to vibrate on its fulcrum and brings the end of screw Q against the end of the feed-plate, and moves the feeding-dog T forward to feed the material that is being sewed. The return movement of pin I relieves the branch P, when the lever N begins to fall down toward the position given to it in Fig. 4. The pin I, on completing its movement toward the left, allows the lever N to fall back to its lowest position away from the feed-plate. At that time, also, the feed-plate is allowed to fall down to its lowest position, so as to bring the feeding-dog T below the level of the cloth-table, the left-hand end of the feed-plate R being beveled to allow it to fall rapidly when the carrier with plate V is moved off to the left. The inner face of plate V has a ledge, *f'*, (see Fig. 9,) on which the edge of feed-plate R slides, and on which, in connection with pin *e*, it is supported during the vibrations of the carrier and plate V. The feed-plate is carried toward the right, to be in readiness for a new feed-movement, by means of frictional contact with the plate V. When the shuttle-carrier is completing its movement toward the right the feed-plate is also raised so as to bring its dog T above the cloth-bed, and when the crank-pin I strikes the smaller branch P of the feed-lever M the feed takes place.

It will be observed that the direction of the feed is not changed by a change in the direction of rotation of the driving-pulley. The connection of the upper and lower shafts with each other and the connection of the driving-shaft with the lower shaft are such as that the two first-named shafts are rocked as far when the driving-pulley is revolved toward the left as when it is revolved toward the right, and consequently the needle and shuttle are moved in both cases the same distances in the same periods of time. The feed being effected through the crank-pin I and the shuttle-carrier, the order of the movements of the feeding devices are always the same, so that it is immaterial, in starting the machine, whether the motion of the driving-pulley is toward the right or the left.

The supply of thread for the needle is effected through the take-up and tension-rod *d*, which, being fast at the top of the needle-bar, is made to rise and fall with it, so far as the front part of the rod is concerned, while its rear portion vibrates about the top of the standard *r*. The rod consequently is made to incline first forward and then backward, its forward inclination taking place when the needle is descending, so as to give at that time a full supply of thread, and its backward inclination taking place when the needle is rising so as to take up the slack thread. The thread is wound about the rod back of its eye in its forward end to produce tension on the thread. The revolving pivots *c c'*, through which the rod is passed, permit the easy vibration of the rod, which also slides to and fro through the head of the hinder pivot or pin, *c'*.

The shuttle is carried to and fro through an arc of a circle, and not in a horizontal plane, as is common in sewing-machines. The highest part of the arc is opposite the place of the feed. It results from this arrangement that the shuttle is in a better position to take the loop of the needle-thread than if it moved in a horizontal plane, because the nose of the shuttle will be directed upward when it reaches the place of the needle.

I claim as new in sewing-machines and desire to secure by Letters Patent—

1. The combination of the take-up rod *d* with the needle-bar, when it is rigidly fastened to a rotating pin or pivot placed in the top of said bar and loosely fitted to slide in a rotating pin or pivot placed on a standard, *r*, substantially as and for the purpose above described.

2. The elbow feeding-lever N, carrying an adjustable feed-propelling screw at its upper end, and having curved branches O P on its lower end, between which the crank-pin of the shuttle-carrier vibrates, substantially as set forth.

3. The combination of the shuttle-carrier, the feeding-plate R, and the elbow-lever N, the whole operating in conjunction substantially as described.

4. The plate V, constructed substantially as above described, for holding up to the curtain U the shuttle-carrier, for holding the feed-plate R in proper position, and for moving the feed-plate backward when it is in its lowest position, substantially as described.

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Witnesses:

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