

J. A. DAVIS.
Sewing Machine.

No. 94,187.

Patented Aug. 31, 1869.

Fig. 9

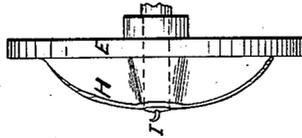


Fig. 8.



Fig. 7.

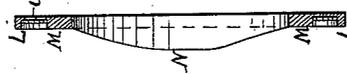


Fig. 6.

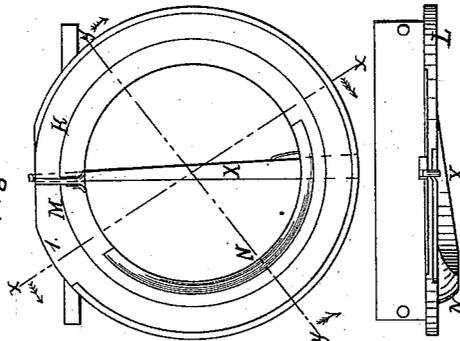


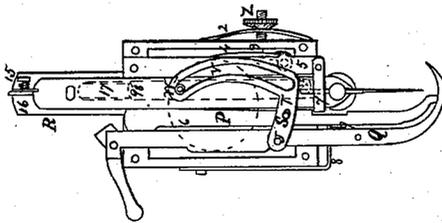
Fig. 4.



Fig. 5.



Fig. 3.



Witnesses.
John J. Halsted
Wm. A. Damack.

Inventor
Job A. Davis
By Crosby Halsted & Gould
his attorneys.

United States Patent Office.

JOB A. DAVIS, OF WATERTOWN, NEW YORK.

Letters-Patent No. 94,187, dated August 31, 1869.

IMPROVEMENT IN SEWING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, JOB A. DAVIS, of Watertown, in the county of Jefferson, and State of New York, have invented certain Improvements in Sewing-Machines; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practise it.

My improvements consist mainly in the following features, namely :

My improvements relate to the construction of a vertical circular shuttle-race and of a vertically-revolving shuttle-carrier, with reference to their action on the shuttle-thread; to the structure and action of the top-feeding devices; to the governing of the needle-thread; and to details hereinafter mentioned.

In the accompanying drawings—

Figure 1 is a side view, and

Figure 2, a front view of my machine as improved, showing the shuttle and its thread in two different positions.

Figures 3 to 9 inclusive represent details of construction, more particularly referred to hereafter;

Figures 7 and 8 being sections of fig. 6, through the lines *x x* and *y y*, respectively.

A is the frame or table.

B, the driving-shaft.

C, the lower shaft, driven by a connecting-bar or link, D, the upper end of which is actuated by an eccentric on B, and the lower end connected by a crank-pin to a disk on shaft C; the central portion of this link having a bevel-sided slot therein, playing on a corresponding bevel-sided gib, which is adjustable to meet wear by means of tightening the screw which holds it in place, the screw being shown at *d*, the gib being shown in dotted lines, and the slot not being shown.

To the front of shaft B is permanently affixed, so as to revolve with it, a circular plate or fly-wheel, E, to the outer face of which is secured a cradle or bed, to receive the shuttle F; this cradle G and the disk constituting the shuttle-driver.

Across the front face of this disk, and diametrically, is an arched swell, H, shown in side view in fig. 9, and at centre of its hub is a hook, I.

The cradle is so located, relatively to this swell or rib, as always to be in advance of it some forty-five degrees, more or less, when the machine is in operation.

K is a stationary plate or ring, depending from the bed-plate in a vertical plane, and serving for a circular race for the shuttle. It is so made as to have a projecting-rim, L, at its outer edge, to keep the shuttle from flying out; this, however, being cut away near the cloth-plate, as shown at *l*, to enable the shuttle to be removed and inserted.

M is another elevation or ridge, which serves as a wall for the inner side of the shuttle in its revolution, and this ridge M is continued around particularly at the top of the race, so as to insure the lifting of the shuttle to its proper height, to take the loop of the needle-thread, which it would be very apt to miss if guided by the driver only, inasmuch as the weight of the shuttle, when at its highest point, would cause it to drop in its cradle, and away from the loop. By employing this fixed ridge, however, the shuttle must always pass the needle at the same elevation, and still lie loose enough in its cradle to allow the loop to pass freely over it, and without jerking it from its seat or bed.

N is a swell or cam-elevation on the inner portion of the race, and located as shown in fig. 6; its function being to deflect the shuttle-thread inward, in the same manner that the swell H on the driver deflects it outward; the swell N forcing out from the shuttle the maximum amount of thread needed, and keeping the same taut until the needle is at its highest point, so that when the needle shall have reached its highest point, the shuttle-thread is able to be drawn up as if the shuttle had actually reached its lowest point, while, in fact, the shuttle has still some distance to travel before reaching its lowest point.

Both these swells, it will be observed, really act as let-offs and take-ups.

The hook I acts in conjunction with the swell on the shuttle-driver, to keep the thread thereon, and for the proper period to hold and detain it out of the way of either the needle or the shuttle.

The swell on the race may, if desired, be made extreme enough to be a sufficient take-up in itself, without any swell on the shuttle-driver for that purpose.

Various modifications also may be used in place of the swell on the race, so long as they effect the same object, as, for instance, a pin or a hook to pull off and hold up the thread at the proper period, or a pin on a radial bar on the driver, and forced beyond its periphery by a spring at the axis; this pin, during the revolution of the driver, coming in contact with a stationary pin acting to force the radial bar toward the centre or axis, release the thread, and leave it free between the needle and the shuttle.

To avoid the noise incident to the metallic shuttle running with its face against the face of the metallic race, as well as to avoid the wear of these two hard surfaces upon each other under the millions of revolutions made by a shuttle in frequent or constant use, I line the face of my circular race with a thin fillet or ring of wood, as shown at O.

P is a vibrating feed-lever, not fulcrumed, but lodged between the presser-bar Q and needle-bar R. It is made gradually narrower toward its lower end, to al-

low it to vibrate; its sides at its upper end being in contact with these bars. Its bottom or acting surface is preferably roughened or serrated.

A pin, S, on this lever, enters a slot, as shown in the slotted piece T, one arm of which turns on a pin, U, on the presser-foot, and the other arm of which has a long arched slot, V, as shown, in which plays a pin, W, on the needle-bar R.

The needle-bar, it will be observed, is composed of a front plate and a back plate, the needle being inserted in the former, which is narrower than the back plate. Pins and holes serve to keep the parts together, so that when in action they move as one.

The rising and falling of the needle-bar so acts upon the plate T as always to lift the presser-foot when the feed-lever is down, and to lift the feed-lever when the presser-foot is down upon the cloth, the pins upon each alternately acting as the fulcrum on which T turns. In this respect there will be observed this important distinction between such a feed and a mere top feed as usually applied, that in the latter, when the feed-lever is lifted, (if lifted at all,) the cloth is loose, and free to be shifted out of place by the slightest touch, while in my feed there is always pressure on the cloth to hold it properly in place, either from the presser or from the feed-bar.

Underneath the table is a lever, X, fulcrumed, as shown, to the lower and outer side of the race-plate, a spring, Y, serving to force it in one direction, to restore it to its normal position after it shall have been moved in the direction of and to aid in the feed, and this last-named movement is imparted to it simply by the pressure between it and the feed-lever of the cloth, and by the movement of said feed-lever while the cloth is so interposed.

The acting surfaces of these two levers, however, come into sufficiently close contact to move in unison with the finest fabrics interposed, and indeed with nothing interposed.

The effect and operation of such a feed are that there is no liability of slippage, as there must be where a top feed acts to press the cloth upon the table, the latter offering resistance proportionate to the amount of pressure, added to many other accidental causes which may check the free movement of the cloth.

The extent of the feed is made adjustable by means of a screw-nut, Z, which serves to press inward, and flatten spring 2, until it bears upon and forces inward pin 3, which thus becomes a fulcrum-point, against which arm 4 on plate 5, shown in fig. 3, touches and turns; when the revolving cam 6 on the driving-shaft, shown in dotted lines in fig. 3, bears against it; a piece, 7, on the lower end of plate 5, serving to push the feed-lever to the left, (looking at fig. 3.)

The lever is restored back to its position after feeding, by the pressure of spring 8, the free end of which is bent, so as to enter the space between the presser-foot bar and feed-bar, as shown at 9.

In figs. 2 and 5, 10 designates the spring-thread clamp, which is pressed against the face-plate 11, to clamp the thread, by means of screw 12, a notch in the lower part of the spring serving as a guide for the thread.

13 designates a pin on said spring projecting through a hole in face-plate 11, and which is of such length as not to come in contact with or be affected by the needle-bar, except when the thread of the needle is to be drawn through the needle's eye, and at such periods the movement of the needle-bar acts upon the pin, and presses the spring outward, and releases its grip upon the thread, and thus all chafing of the thread when pulled through the needle-eye.

In order to effect this, I have made a short groove, 14, in the face of the needle-bar, as shown in fig. 4, and have made the pin long enough to enter but not touch this groove, but when the bar has moved far

enough to allow the groove to pass the pin, the latter is forced outward by the ungrooved portion of the bar.

It is evident, that instead of the groove, a swell or elevation on the face of the bar, acting on a somewhat shorter pin, would effect the same result.

A spring-tension device, 15, at the top of the needle-bar, and rising and falling with it, exerts a uniform tension on the thread. The degree of tension may be made adjustable, if desired, in any well-known manner.

This tension-device, acting in conjunction with the spring-clamp 10, serves to keep the needle-thread straight on one side of the needle while the bulge or loop in the thread is formed for the shuttle to pass through.

The feed-bar P, it is here proper to observe, performs quite a different duty from that performed by the "helper," so called in my patent No. 58,614, dated October 9, 1866. In that invention the needle performed all the duty of feeding the cloth, stitch by stitch, and the "helper" moved laterally when the needle was at its lowest point and in the cloth.

In the present application the feed-bar swings laterally, and feeds the cloth when the needle is entirely out of the cloth, the needle, therefore, performing no duty whatever to effect the feed.

The feed-bar P may be held by a fixed pin passing through a slot in the bar, and serving as a pivot, on which it may swing, and yet be permitted to rise and fall as before stated.

The employment of lever X to assist the feed-lever to make a more perfect feed, by positively gripping the cloth between them, and carrying it forward, distinguishes my feed from that known as the top feed, which, as before stated, not only jams the cloth between the feed-lever and the table, but is always liable, on its return movement, to carry the cloth back with it, while also, in my present-described construction, after the feed has taken place, the lever P is lifted from the cloth, and exerts no pressure on it, and at the same times releases lever X, which flies back to place without acting on the cloth.

The presser-foot used in the machine described in this application, while similar in construction to that described in the above-named patent, 58,614, has a period of action directly its opposite, namely, in the present case the presser is lifted from the cloth during the highest ascent of the needle, and presses on the cloth during the needle's lowest descent.

As a means for adjusting the needle-bar, to compensate for wear, so as not to disturb the position of the needle laterally relatively to the needle-hole and shuttle, the back plate 16 of the needle-bar is centrally slotted lengthwise, the sides of this slot being bevelled, and this plate is held in place by and slides vertically upon a stationary gib-piece, 17, shown in dotted lines in fig. 3, and in cross-section in fig. 4; screws 18, at top and bottom, holding the piece 17 to the frame, and by means of its bevelled edge, also holding the back plate in place.

When the bevelled sides of the plate and gib become worn by constant wear, the mere screwing up tighter the screws 18, adjusts the pressure, meets the deficiency of steady movement caused by wear, and restores the parts to their proper relation without at all deranging the position of the needle as when gibs are applied, as they have heretofore been, to one side only of the needle-bar.

It is evident that such central-adjusting gib may also, if desired, be applied in a similar manner to the presser-bar or the feed-bar, or any other reciprocating bar of a sewing-machine, where compensation for wear may be needed, and, as heretofore stated, I have in this machine applied it to the connecting-link-lever, extending from the driving-shaft to the lower shaft.

The shuttle-driver may have a little spring reach-

ing slightly over the heel of the shuttle, to prevent its getting out of place, and particularly to prevent its rising when at the top of its route or circuit.

I claim—

1. The combination, with the vertical stationary race of a rotating shuttle, of a swell or take-up, N, constructed and located on the race, substantially as shown, and operating upon the shuttle-thread as shown and described.

2. The combination, with the revolving shuttle-carrier, of the arched swell or rib H, located upon and extending diametrically across the carrier, and having a fixed central hook thereon, and operating upon the shuttle-thread, as shown and described.

3. The combination of the arched rib or swell H on the carrier with the swell N on the race, the two conjointly operating upon the shuttle-thread, substantially as set forth.

4. The combination, with the rib H and swell N,

of the hook centrally located upon the shuttle-driver, and operating conjointly upon the shuttle-thread, substantially as set forth.

5. The combination, with the lever X, of the presser-bar and the top-feeding lever, arranged and operated substantially as described, so that one of the latter shall always be lifted from the cloth while the other bears upon it, substantially as shown and set forth.

6. The combination of the slotted lever T, constructed and operating substantially as described, with the needle-bar, feed-bar, and presser-bar.

7. The combination, with the groove or projection on the needle-bar, of the spring-thread clamp 10 and its pin 13, and the tension-device, attached to and moving with the needle-bar, substantially as set forth.

JOB A. DAVIS.

Witnesses:

JOHN J. HALSTED,
WM. A. BARNACLO.