2 Sheets—Sheet 1.

J. BENNOR.

SEWING MACHINE.

No. 112,678. Patented Mar. 14, 1871.

Fig. 1.

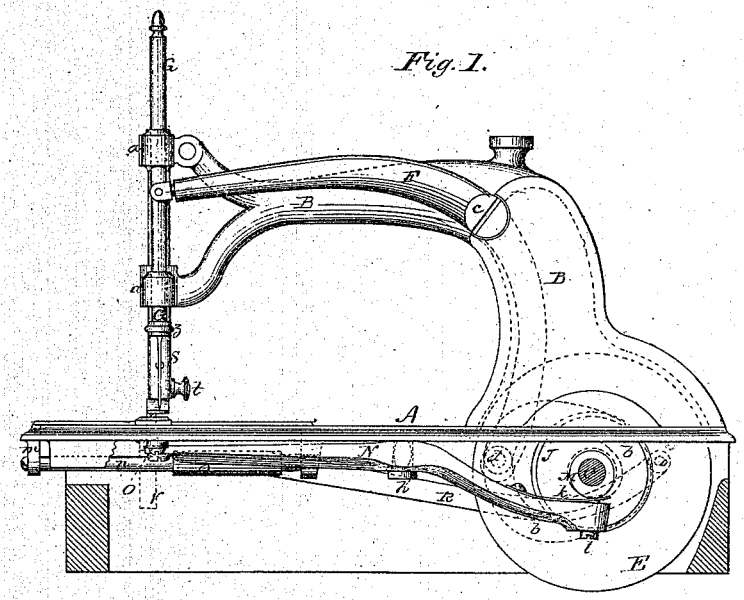
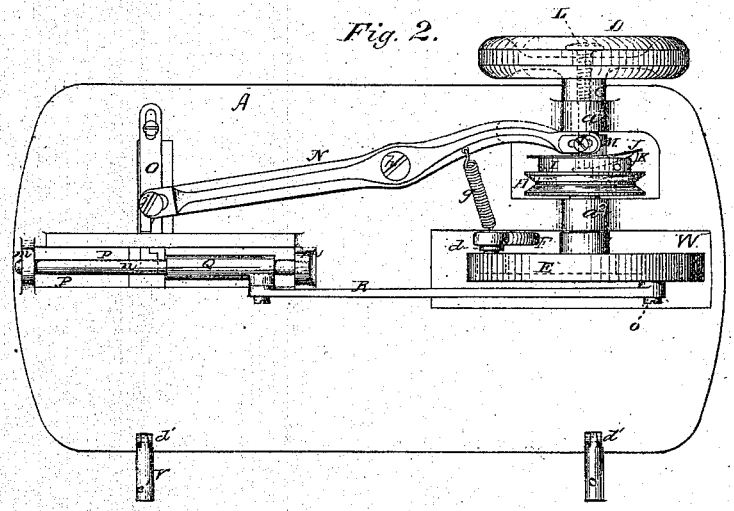


Fig. 2.



Witnesses:

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Robt. E. Brunton

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2 Sheets—Sheet 2.

J. BENNOR.

SEWING MACHINE.

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Fig. 3.

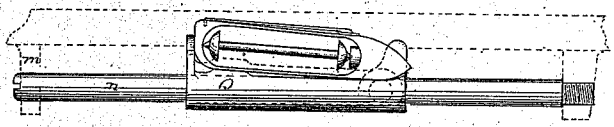


Fig. 4.

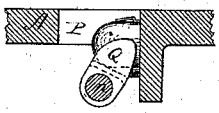


Fig. 5.

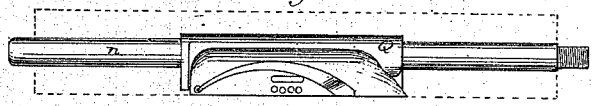


Fig. 8.

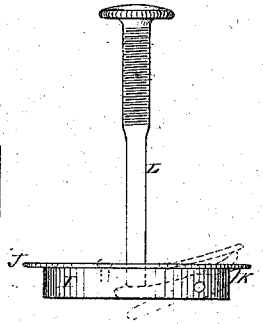


Fig. 6.

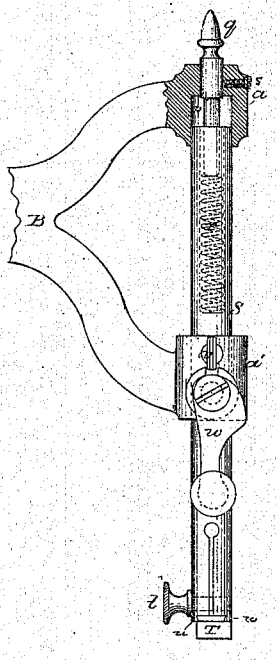


Fig. 7.

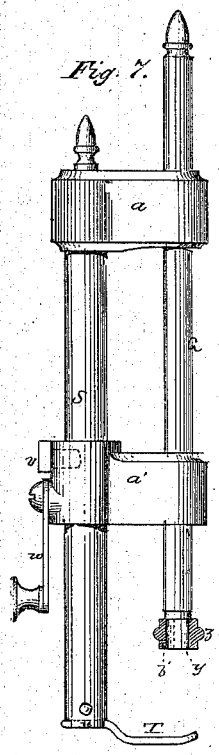


Fig. 12.

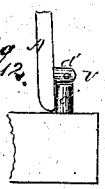


Fig. 9

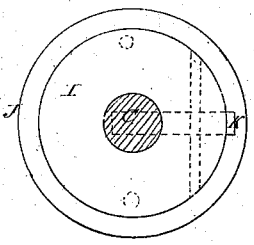
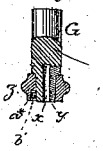


Fig. 10.



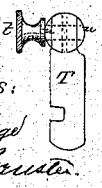
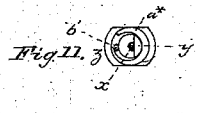


Fig. 11.



Witnesses:
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his attys

United States Patent Office.

JOSEPH BENNOR, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 112,678, dated March 14, 1871.

IMPROVEMENT IN SEWING-MACHINES.

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, JOSEPH BENNOR, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawing.

My invention consists—

First, in a novel arrangement of devices for regulating the length of the stitch;

Second, the construction of the shuttle-carrier, whereby the nose or point of the shuttle is kept lower than its heel;

Third, in a novel device for clamping the needle to its bar; and

Fourth, in an arrangement of the presser-bar spring in a cavity in the upper end of said bar, in connection with an adjusting-screw, all as hereinafter more fully explained.

Figure 1 is a side elevation of my machine, with a portion broken away.

Figure 2, a bottom plan view of the same.

Figure 3, a side view of the shuttle, shuttle-carrier, and the guide-rod, upon which the latter plays.

Figure 4, a cross-section of the bed and shuttle-carrier guide-rod, just in rear of the carrier.

Figure 5, a top plan view of the shuttle, shuttle-carrier, and guide-rod.

Figure 6, a side view of the front end of the upper stationary arm of the machine, and the presser-bar mounted therein, a portion being broken away to show the arrangement of the spring.

Figure 7, a front view of the stationary arm with the needle and presser-bars mounted therein.

Figure 8, a side view of the adjustable spring-disk, or cam, for operating the feed-plate laterally and regulating the length of movement.

Figure 9, a rear-face view of the same.

Figures 10 and 11, respectively, a vertical section, and a bottom plan view, of the needle-clamp.

A is the bed-plate of my machine, made of the form shown, and provided, near its right-hand end, with a large opening, W, and on its under side, in line with said opening, with two ears or studs, *a a*.

B is a stationary arm, made hollow at its rear end, and attached to the top of bed A, with its open end over or above the hole W.

The end of this arm extends forward above the bed A, and is forked at its front end so as to form two arms or heads, *a*, to support the needle and presser-bars, as hereinafter described.

C is the driving-shaft, mounted in the ears a^2 transversely of the under side of the bed A, and provided at its outer end with a fly-wheel, D

E is a large wheel, attached to the inner end of shaft C, and extending up through opening W into the lower end of arm B, this wheel having a cam-groove, *b*, formed in its rear or inner face, as shown in dotted lines in fig. 1.

F is a curved arm for operating the needle-bar; it is pivoted to the side of arm B at *c*, and its rear end extends down through said arm and has attached to it a roller, *d*, which plays in the groove *b* of wheel E, as shown, while its front end extends forward by the side of arm B to near its end.

As the wheel E is revolved the cam-groove *b*, acting on the roller *d*, vibrates arm F and gives to its front end a vertical vibratory motion.

G is the needle-bar, mounted in the two ends *a* a^1 of arm B, and connected in any suitable manner to the end of arm F, so that, as the latter vibrates, the needle-bar is moved up and dowr

The cam-groove *b* is so curved as to give but one movement, up and down, to the needle-bar at each revolution of wheel E.

H is the band-wheel, mounted on shaft C, near its middle; and

I is a concentric disk or hub, secured to or formed on the side of the wheel H.

An elevation is made in the bed-plate A, to give room for the wheel H, which would otherwise strike against the same.

J is a thin circular steel disk, attached to the front side of hub I, and concentric therewith.

This disk is attached to the hub on one side of the center only, so that its other and free side may be sprung or bent outward from the face of the hub, as shown in fig. 2, and in dotted lines in fig. 8.

The disk thus arranged, when bent outward, forms an adjustable side-face cam, the throw of which is regulated by the extent to which it is sprung outward from the hub I.

K is a lever, set into a radial slot in the hub I, immediately behind the disk J, and pivoted at its middle to the hub.

L is a thumb-screw, extending through the axis of shaft C, from the outer end of the same inward against the inner end of lever K.

As the screw is turned inward it forces outward the outer end of lever K, and thereby the disk J, so the throw of the latter is increased.

M is a fixed cam, on shaft C, adjoining the cam-disk J, the face of this cam being eccentric to the axis of the shaft

N is an arm or lever, for operating the feed-plate; it is pivoted near its middle to the under side of the bed-plate, and bears at its rear end, against the cams M and J so that, as the cams revolve, it is given both a lateral and a vertical motion.

The pivot *h*, upon which the arm works, is made

bulging at its middle, while the hole in which it works is cylindrical, so that while the arm is allowed the compound or universal motion produced by the joint action of the cams it cannot play or rattle on its pivot.

A spring, *g*, is connected from the rear end of the arm N obliquely upward to the bed-plate, for the purpose of keeping the arm always in contact with the cams, drawing it back when the cams recede, after having pushed it forward.

O is the feed-plate, slotted at its front end, and attached, by a screw passing through said slot, to the under side of the bed-plate, and bent, at its opposite end, so as to project up through a slot to the upper side of the bed-plate, where it is provided with teeth in the usual manner.

The forward end of arm N is slotted, and a screw, *j*, is passed through the slot into the feed-plate, so that, as the arm moves, it operates the feed-plate.

The cams M and J are so located in relation to each other that, as the shaft C revolves, the front end of arm N, and thereby the feed-plate O, is first raised and carried forward and then lowered and drawn back, and so on, continuously. Thus I produce the well-known "four-motion feed" in a very simple manner.

The end of arm N, instead of bearing directly against the face of cam M, has a flat spring, *k*, attached to its upper side, upon which spring the cam works.

A screw, *l*, is passed through the end of the arm against the under side of spring *k*, so that, by setting up the screw, the spring is raised, and the cam caused to depress the arm a greater distance and thereby raise the feed-plate higher.

Thus, by adjusting the screw *l*, the height of movement of the feed-plate may be varied as desired; while, by turning the thumb-screw L, its length of movement is changed and fine or coarse stitches produced.

P is a longitudinal slot or opening, made through the bed, to serve as a race for the shuttle and its carrier.

On the under side of the bed, at each end of this opening, a lug or ear, *m*, is formed, and a round rod, *n*, is mounted in said lugs immediately under the opening, to serve as a guide for the shuttle-carrier.

Q is the shuttle-carrier, made of the form shown, and slipped onto the rod *n* before the latter is secured in place.

R is a pitman, attached at one end to the shuttle-carrier and at the opposite end to an eccentric screw or wrist on the rear face of wheel E, so that, as the wheel revolves, the carrier is given a reciprocating movement on rod *n* under the slot P.

The interior of the shuttle-carrier is so formed that the shuttle, when therein, has its rear end held higher than the point, as shown in fig. 3.

When thus arranged I find that the thread or loop slips over the shuttle with more ease than when the shuttle lies in a horizontal position, and that as a consequence I can operate my machine with greater rapidity and less power than others.

The cams J and M, which operate the feed-plate, the cam-groove *b*, which drives the needle, and the wrist *o*, which communicates motion to the shuttle-carrier, are all so arranged in relation to each other as to operate the feed, the needle, and the shuttle at the proper times and intervals.

These various movements take place in the same order of succession as in the machines now in common use, as the stitch, or the manner of forming the same, constitutes no part of my present invention.

S is the presser-bar, mounted in the ends *a* a^1 of arm B, just behind the needle-bar G.

It is made of a cylindrical form, with a hole drilled into its upper end, and is passed loosely through the lower end or head a^1, but only partially through the upper one *a*, as shown in fig. 6.

The hole *p* in the upper head *a*, in which the end of the presser-bar fits, extends only part of the way through the head, but still far enough to permit the necessary vertical play of the bar.

Through the upper side of the head *a*, in line with the hole in the end of the presser-bar, a hole is drilled, to receive a rod or stem, *q*, and, after first dropping a spiral spring, *r*, into the end of the presser-bar, the said stem is inserted, as shown, so as to enter the presser-bar and bear on the spring; the stem is then secured by a jamb-screw, *s*.

By loosening the screw *s* and adjusting the stem *q*, the tension of the spring, and consequently the pressure on the bar, may be varied at will.

When thus applied the spring is perfectly protected from dust and injury, and the presser-bar caused to present a more ornamental appearance than usual.

The lower end of the presser-bar is split, as shown, and provided with a thumb-screw, *t*, for compressing the parts together.

The two arms of the bar are each provided, on its lower end, with a lip, *u*, and the presser-foot T is formed with a neck, which may be inserted between said lips and then fastened by turning up the thumb-screw *t*.

The presser-foot, thus attached, may be readily adjusted or detached, to permit the insertion of other devices, as binders, hemmers, &c.

The presser-foot is held in position when down, and prevented from turning, by a stud, *v*, on the presser-bar, which plays in a slot cut in the head a^1, this slot being cut from the upper side of the head downward.

To the head a^1, immediately below the stud *v*, is pivoted a cam-lever, *w*, which, upon being turned, first raises the presser-bar until the stud is above the upper face of the head, and then pushes the stud around on top of the head, thereby turning the presser-bar and swinging the presser-foot around to one side, away from the needle and from over the feed-plate.

When thus arranged the foot permits the ready adjustment and threading of the needle, and removal of the work.

The lower end of the needle-bar is cut away flat on one side, and has a groove, *x*, cut vertically in the flat side, as shown.

Against the flat grooved side a semi-cylindrical jaw, *y*, having a shoulder on its upper end, is placed.

Over the end of the needle-bar, and around the jaw *y*, is placed a ring, *z*, of such size as to play loosely thereon, but so as to engage under the shoulder of the jaw *y* and hold the same in place.

On the lower end of the ring an eccentric flange or rim, a^*, is formed, and a pin or stud, *b'*, is inserted into the side of the needle-bar, so as to support the ring thereon, and to bear against the inner face of the flange a^* when the ring is turned around.

When the ring is turned around the stud *b'*, bearing against the eccentric flange, forces over the ring and causes it to hug the jaw *y* tightly against the flat grooved side of the needle-bar.

To insert the needle the ring is turned and the jaw loosened, and then the needle-shank inserted into the groove, and then the ring turned until the jaw is pressed tightly against the shank, so as to hold it in place.

The needle-shank is preferably flat on one side, and inserted with the flat side next to the jaw, as the operator is thus enabled to adjust it to the required position very readily.

Having thus described my invention,

What I claim is—

1. The cam-disk J, having one edge permanently secured in position, in combination with the pivoted lever K, and screw-rod L located within the shaft, with its head extending outside, for regulating the throw of the cam, and thereby the length of the stitch, substantially as described.

2. The shuttle-carrier Q, constructed and arranged substantially as described, whereby the shuttle is carried with its point lower than its heel, as set forth.

3. The needle-bar G, in combination with the jaw *y* and cam-ring *z*, all constructed and arranged to operate as herein described.

4. The arrangement of the spring *r* within a cavity formed in the upper end of the presser-bar S, in connection with the adjusting-pin *q*, said bar and pin having their bearings in the heads *a a'*, as herein described

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