2 Sheets—Sheet 1.

W. A. MACK.

SEWING MACHINE.

No. 38,592. Patented May 19, 1863.

Fig. 1.

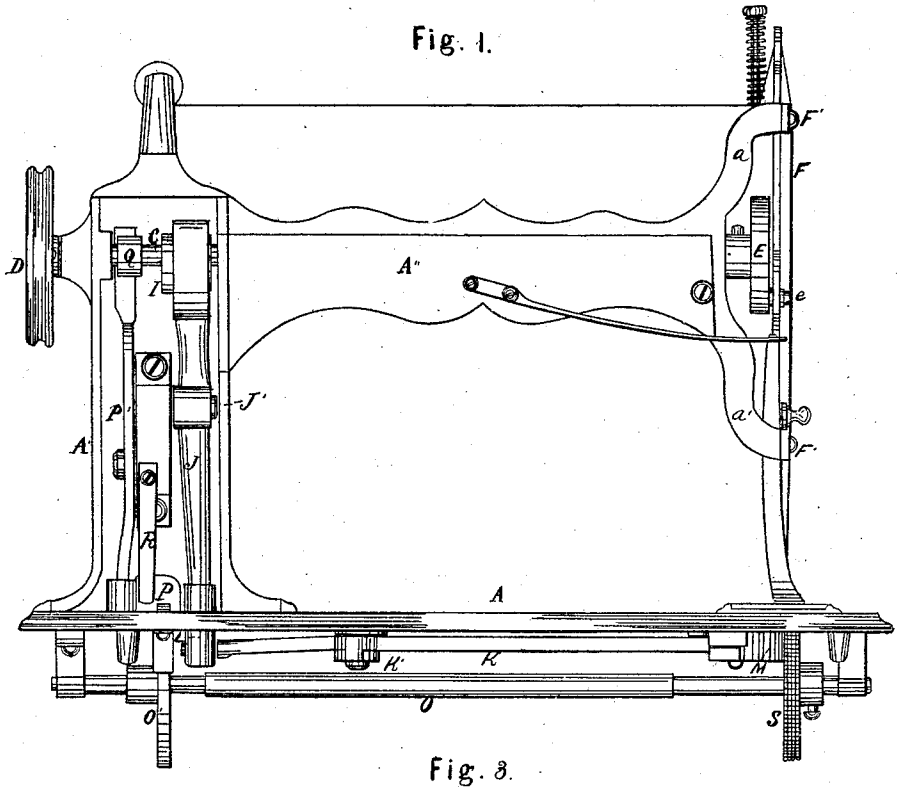
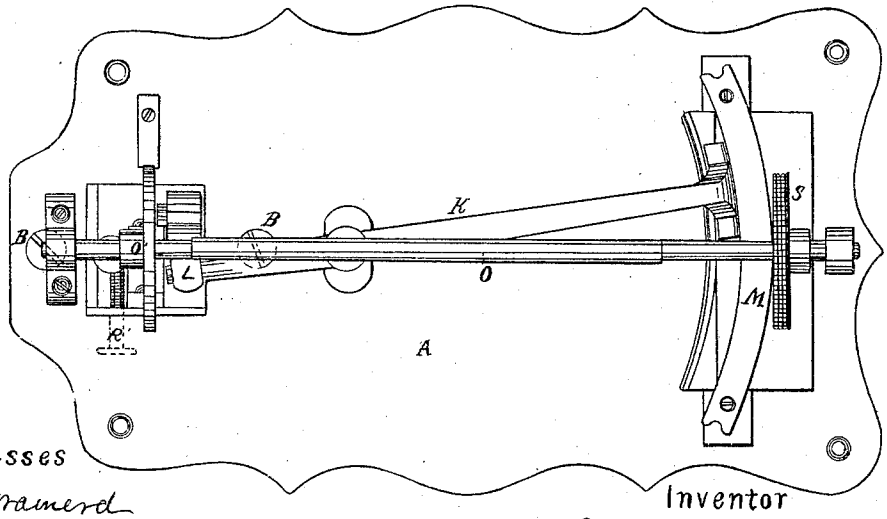


Fig. 3.



Witnesses

J. Brainerd

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2 Sheets—Sheet 2.

W. A. MACK.

SEWING MACHINE.

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Fig. 2.

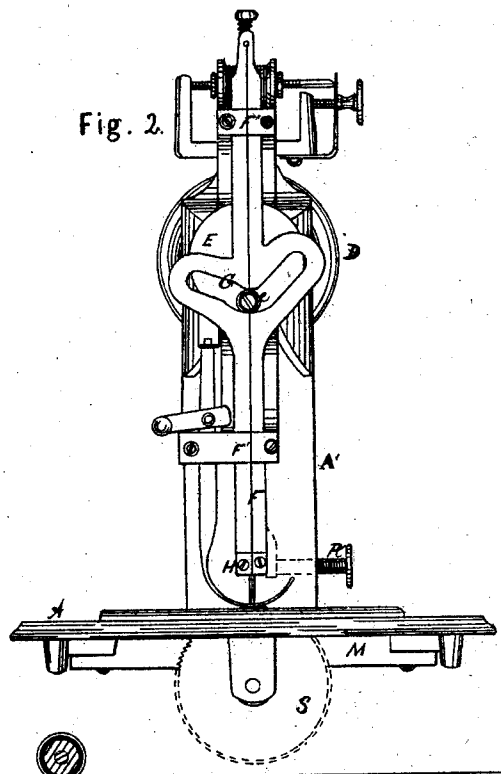


Fig. 5

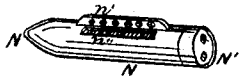


Fig. 6.

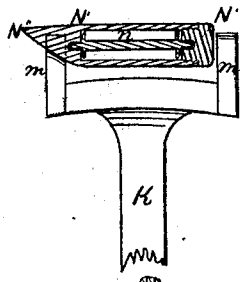
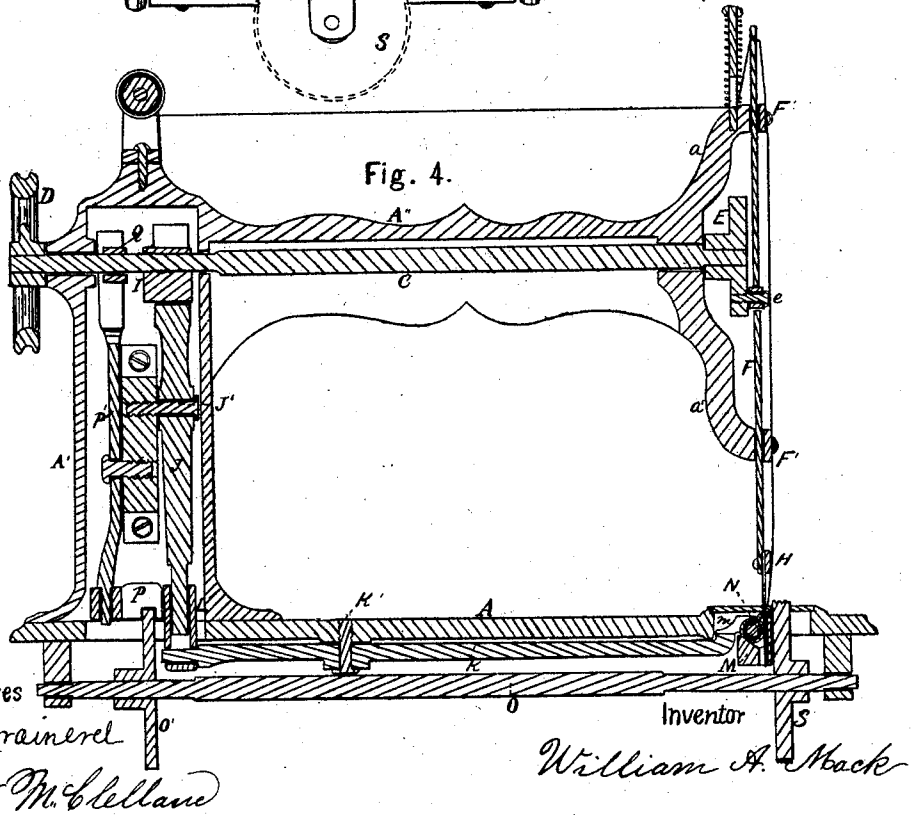


Fig. 4.



Witnesses

J. Brainerd

A. W. McClellan

Inventor

William A. Mack

UNITED STATES PATENT OFFICE.

WILLIAM A. MACK, OF SEVILLE, OHIO.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **38,592**, dated May 19, 1863.

To all whom it may concern:

Be it known that I, W. A. MACK, of Seville, in the county of Medina and State of Ohio, have invented new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side view. Fig. 2 is a front view. Fig. 3 is a view of the under side. Fig. 4 is a longitudinal vertical section, and Figs. 5 and 6 are views of the shuttle.

Like letters refer to like parts.

The nature of my invention relates, first, to the devices for throwing the shuttle; second, to the construction of the shuttle and shuttle-race, and, third, to the devices for driving the feed-wheel.

In the accompanying drawings, A A′ A″ represent the frame of the machine. This consists of a bed-plate, A, standard A′, and arm A″. The bed-plate A, when the machine is in working order, is mounted upon a table and secured by screws at the corners. The standard A′ is secured to the bed-plate A by means of screws B, which pass upward through the bed-plate into the base of the standard. The standard A′ and arm A″ are cast in one piece, with the exception of the side shown in Fig. 1, in which the sides are detachable for the purpose of gaining ready access to the interior of the standard and arm.

C represents a driving-shaft, which passes the whole length of the arm A″. Upon the left-hand end, as seen in the figures, is secured a driving-pulley, D. The pulley fits closely to the standard A′, and prevents the shaft from end-chasing in one direction. Upon the opposite end of the shaft is secured the crank-wheel E, which is secured upon the shaft close to the end of the arm and preserves the shaft from moving endwise toward the standard A′. The crank-wheel E carries the wrist e, whose revolution upon the wheel E describes an exact circle. The arm A″ divides at the front end into two branches, a and a', thus forming the bearings and guides for the needle-bar F, which rests in depressions in the front end of each, where it is secured by a cap on each, as shown at F′.

The needle-bar F consists of a bar of steel, about five-eighths of an inch wide, one-eighth of an inch thick, and about one foot or less in length. The middle portion is occupied by a cam-slot, G, of peculiar shape, forming an irregular rounded angle, (shown in the figure,) which gives the needle-bar a kind of intermittent motion—that is, the movement upward is steady and regular, while the downward stroke is quick at first, and upon reaching the lowest point suddenly rising a little to allow the nose of the shuttle to pass between the needle and thread, then again slightly downward, thus giving slack to the thread the moment the shuttle passes through the loop, and then quickly rising to draw in the slack and tighten the stitch. The simultaneous movement of the shuttle is governed by devices hereinafter described. This intermittent motion of the needle-bar is very important, as it prevents the shuttle from breaking the needle-thread in its passage through the loop. The needle is secured to the needle-bar by means of the screw-clamp H. (Shown in Figs. 2 and 4.)

Upon the shaft C, within the standard A′, is secured an eccentric, I, so placed upon the shaft as to cause the shuttle-arm to vibrate at the right moment to pass the shuttle through the loop, as above described. The motion forward, being given when the body of the eccentric is nearest to the pin J′, is more rapid than on its return, when the body of the eccentric is up. Consequently the movement of the shuttle forward is more rapid than upon its return, and by this accelerated forward movement, as compared with the backward movement, the passage of the shuttle through the loop is much facilitated.

The movement of the shuttle is produced by means of two arms, J and K. The arm J is pivoted to the standard A′ at about one-third of its distance above the middle of the arm J, as shown at J′. The upper and short end of this arm is divided or forked and embraces the eccentric I. The lower end of this arm enters a short tube, L, as shown in Fig. 4, which forms one part of a universal joint. The lower end of the pipe L is pierced transversely with a round hole, into which fits the short end of the arm K, having also a round tenon, and by this means the compound universal joint which connects the arms J and K is formed. The arm K is pivoted to the under side of the bed-plate A at a distance of about one-third of its length

from the end, connecting with the tube L, as shown at K′, the long end of the arm reaching forward to the shuttle-race M, where it divides into two branches or wings, *m m*, Fig. 6, forming thereby what is termed the "cradle" of the shuttle. These wings, which form the cradle, sweep around within the shuttle-race M, and move the shuttle back and forth in the working of the machine.

The shuttle-race M consists of a curved trough embracing in extent about one-sixth of a circle whose center is in the pin K′. In its cross-section the front is vertical upon the inside and the bottom inclines upward at an angle of about thirty degrees, more or less, and in this curved and angular trough the shuttle is caused to move back and forth as before explained.

The shuttle N is about two inches long and half an inch in diameter. The body is a hollow cylinder, in which is contained the spool *n*. The heel of the shuttle is filled with a nicely-fitting screw, N′, which forms a bearing for one end of the spool, the other end being supported as shown in Fig. 6. The exterior of the screw N′ is neatly polished, and is of the same size as the body of the shuttle. The nose of the shuttle is rounded off upon the back side, as seen in Figs. 5 and 6, the point N″ resting closely against the front and vertical wall of the shuttle-race M.

Upon the upper margin of the shuttle is a rib, *n′*, which is provided with six or more round holes, smooth and polished, through which the spool-thread is laced to give it the required amount of tension. A greater or less number may be used, as may be required to give the proper tension. The thread passes out from the body of the shuttle through an opening, *n″*, in front of the rib *n′*, which opening is nearly as long the spool.

In consequence of the angular form of the shuttle-race and the above described form of the shuttle, it will be perceived that when this body (the shuttle) is placed in the shuttle-race the preponderance of the gravitating power of the shuttle will be outside of a vertical line drawn through the shuttle, and consequently the shuttle cannot by any sudden movement of the wings *m m* be thrown into an abnormal position.

The shaft of the feeding apparatus is shown at O. This shaft extends the whole length of the bed-plate. Beneath the standard A′ is attached a driving-wheel, O′. This is operated by a grip, P, upon the lower end of the vibrating lever P″.

The grip P has a slot upon the lower edge, into which the edge of the wheel O′ passes, as shown in Fig. 4, in which the wheel can move freely, while the gripe remains at right angles to its face. The lower end of the lever P′ passes loosely through a round hole in the outer end of the grip P, and thus forms an articulation. Now, when the cam Q, by the revolution of the shaft C, forces the upper end of the arm from the shaft C, the lower end at the same instant moves the outer end of the grip P in the opposite direction, causing it to grip or bind upon the face of the wheel O′, and thus rotating it a distance corresponding with the movement of the lower end of the lever P′. The action of the spring R is to carry the grip P back as far as the width of the slot will allow and to hold the grip obliquely upon the wheel. The spring R″ prevents the wheel O′ from turning backward, while it does not retard its forward movement. The upper end of this lever is operated by means of a cam, Q, upon the shaft C, which causes a vibrating motion of the lever upon the pin Q′, and thus operating the grip P upon the wheel O′. At each revolution of the shaft C the grip P is carried back upon the face of the wheel O′ by means of the spring R, which presses upon the back side of the grip and carries it upon the wheel to its proper position for a new hold. The extent of the movement of the grip upon the wheel O′ is governed by a set-screw, R′, against which the lower end of the lever P′ rests.

Upon the outer end of the shaft O is secured a burr-wheel, S, which passes through the bed-plate A close in front of the needle, and by its motion, which coincides with the needle O′, gives motion to the cloth, in order to form the stitches.

The cam Q is so adjusted upon the shaft C that the feed-wheel is moved forward while the needle-bar is up. By means of the set-screw R′, which governs the extent of the motion of the lever P′, the length of the stitch can be regulated even while the machine is in motion.

The devices for holding the spool, taking up the slack thread as the needle rises, and for holding down the cloth are of common forms, and which it is not necessary here to describe.

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

1. The universal joint formed by the union of the arms J and K with the socket L, these several parts being constructed, arranged and operated as and for the purpose specified.

2. The shuttle N, in combination with the curved shuttle race M, having an angular trough, when both the shuttle and race are constructed, arranged, and operated substantially as set forth.

3. The arm P′, grip P, spring R, and wheel O′, when these parts are constructed, arranged, and operated substantially as and for the purpose specified.

WILLIAM A. MACK.

Witnesses:

J. BRAINERD,

A. W. MCCLELLAND.