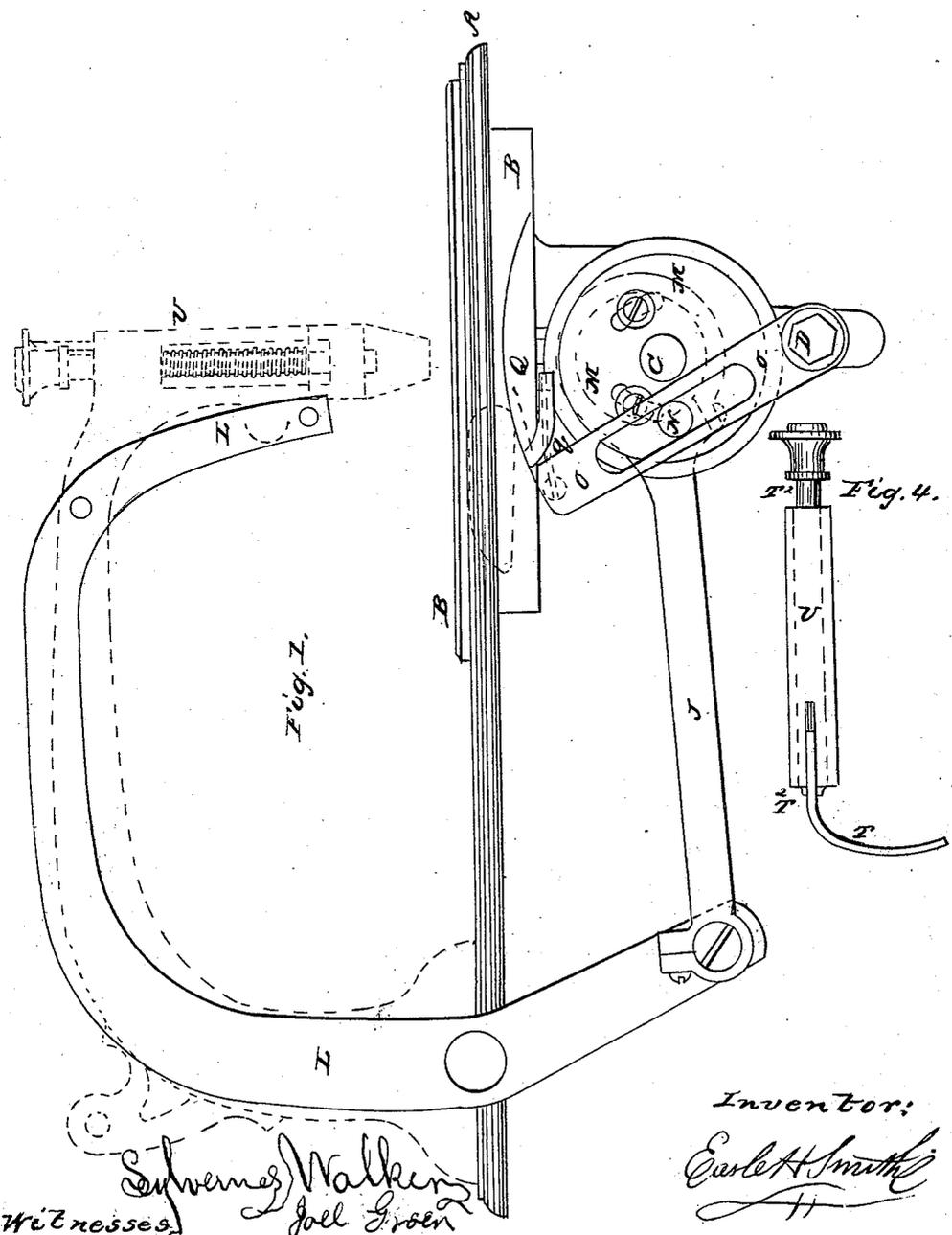


E. H. SMITH.
Sewing Machine.

No. 53,353.

Patented March. 20, 1866.



Witnesses:
Sydney Walker
Jacob Green

Inventor:
E. H. Smith

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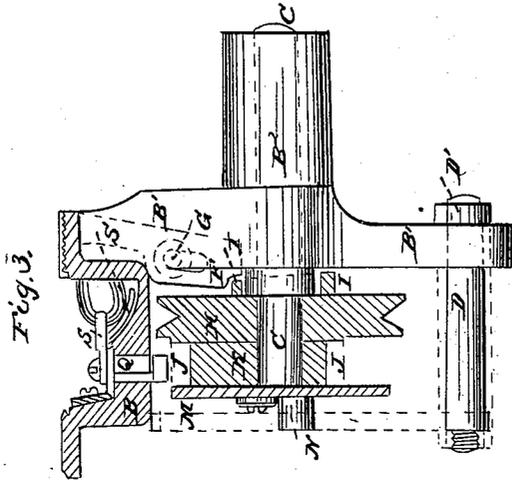


Fig. 3.

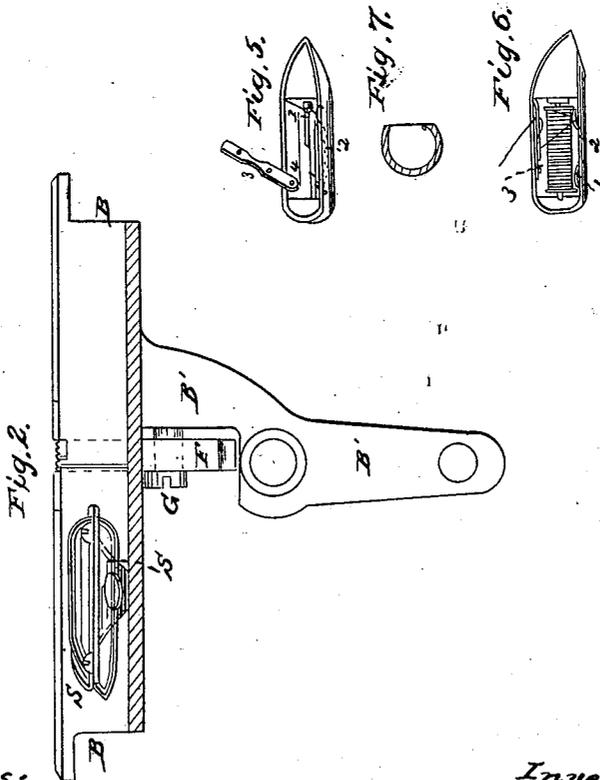


Fig. 5.

Fig. 7.

Fig. 6.

Fig. 2.

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UNITED STATES PATENT OFFICE.

EARLE HARRY SMITH, OF SHERWOOD, NEW JERSEY.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **53,353**, dated March 20, 1866; antedated September 20, 1865.

To all whom it may concern:

Be it known that I, EARLE HARRY SMITH, of Sherwood, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form part of this specification, in which the marks of reference correspond in all the figures.

My said improvements form a simple and durable machine in which the needle and shuttle are driven by cranks direct, and hence capable of very rapid and quiet operation.

My invention comprises a system of movements thoroughly uniform, excepting in so far as the inherent alternating requirements of the sewing-instruments necessitate a variation in the motion of the shuttle.

My invention also embodies a certain arrangement and combination of parts, whereby the reciprocations of the driving mechanism of the needle and shuttle counterbalance each other and neutralize the tendency to vibration; also certain specific forms, construction, and arrangement calculated to simplify the process of manufacture of the machine and reduce the cost.

To enable others to make and use my invention, I will proceed to describe the construction and operation of the same.

In the drawings annexed, Figure 1 is a side elevation. Fig. 2 shows the shuttle-race detached. Fig. 3 shows the shuttle-race and part of the driving mechanism in section. Fig. 4 shows the pressure-foot set in the end of the fixed arm. Fig. 5 shows the shuttle and tension-bar. Fig. 6 shows the drawing of the thread from the bobbin. Fig. 7 is a section of the shuttle.

A is the bed and frame of the machine. B is the shuttle-race, and is set in the bed and secured therein. Said race has a hanger, B', cast therewith, having a hub or boss, B². The boss and the end of the hanger receive, respectively, the shaft C and fulcrum-pin D. The latter is firmly fixed by a nut, D'.

F is the feed-bar, and is also secured to the hanger by a screw, G, passing through a slot in said bar. The upper end has points to take hold of the cloth, and the bar receives an up-

and-down and back-and-forth motion from an eccentric acting on the lower end thereof.

On the shaft C is fixed the driving-pulley H, having cast upon one side thereof a small eccentric, I, which gives the vertical motion to the feed-bar; and the perimeter of the eccentric has a sort of cam shape to give the lateral motion. The bar, therefore, moves up and down and oscillates on the screw G. On the other side of the pulley, also cast in one piece therewith, is a larger eccentric, K, for operating the needle-arm L, which it does through the agency of the strap J. Upon the face of the eccentric K is a plate or disk, M, carrying a wrist or crank pin, N, which runs in a groove or slot in a lever, O. This lever is set and oscillates on the fulcrum-pin D, and the upper end of said lever is connected with the shuttle-driver Q by means of a link or any suitable device. The plate M is attached to the eccentric K by screws, which pass through slots in said plate, so as to admit of the adjustment of the crank-pin N relatively with the eccentric K, for the purpose of timing the needle and shuttle.

S is the shuttle carrier or cradle, and is attached to the driver Q in the usual manner.

By the arrangement of the parts shown in Fig. 3 all the primary actuating devices for all the motions of the machine are brought into a compact group, and they, with the other operating or moving devices, except the needle-arm, are attached to one and the same piece of casting thereby insuring beyond the possibility of change the permanence of the relative position of all those parts of the working machinery that require to be fixed and unalterable. This construction and arrangement of the principal parts of the machine also simplifies the process of manufacture and reduces the cost.

The eccentric K and wrist or crank pin N are so placed relatively that the direction of the motion of the lever O is always the reverse of that of the eccentric-strap J, and this feature has the effect of neutralizing more or less those vibrations of the machine necessarily attendant on a high speed of reciprocating motions. The result is the machine does not so readily become deranged and the wear is materially diminished.

T is the pressure-foot to hold the work down

in process of sewing. It is important to prevent any lateral motion of this foot. To do this I provide a wide bearing and guide by slitting the fixed arm, Fig. 4, right through and extending the foot up into the slit, as shown in the drawings. This makes a good bearing and permanent, and is important in any sewing-machine, as it removes the potent cause of breakage of needles and preserves the proper action of a hemmer or gage.

The continuous motion of the needle makes it preferable to present a round surface instead of a sharp corner at the bottom of the needle side of the shuttle; and I therefore make the shuttle cylindrical in form, excepting on the side next the shuttle-race and at the upper inside corner, which is left intact to afford sufficient space for the insertion and removal of the bobbin at the side, Figs. 5, 6, 7.

To cause the thread to draw off at right angles, or nearly so, with the axis of the bobbin, I provide a curved thread-guide, 1, and in order that this guide and the thread which is guided over it shall occupy as little space as possible within the shuttle, I form a slit, 2, in the lower side of the shuttle, into which the curved part of this guide may project. As a means of producing and varying the tension, I apply to the shuttle a tension-bar which is pivoted at one end inside of the shuttle, so that it may be turned out to adjust the tension, at other times remaining in the shuttle. Said tension-bar is shown with two holes, one about the mid-length of the bobbin and one about the mid-length of the shuttle. Between these holes the thread is wound around the bar more or less, according to the degree of tension required. (See Fig. 6.) In this machine the motion of the needle, as derived from an eccentric, *C*, is, so far as a crank or eccentric can make it, uniform throughout both the ascending and descending stroke, as well as the upper and lower terminations thereof, corresponding as nearly as possible, and the motion of the shuttle, as effected by the wrist or crank pin and slotted lever, corresponds at opposite ends of the stroke; but when the crank-pin is passing through the lower half of its circuit the movement of the lever is faster than at other times, and the position of the shuttle is such with respect to the motions of the crank-pin and lever that the forward movement of the shuttle takes place when the crank-pin is passing nearest the fulcrum *D*.

In Fig. 1 the position of the parts shows the shuttle (dotted) as having just completed its

forward or advance movement. This combination of an eccentric to move the needle and a crank and lever to move the shuttle, while producing motions almost completely uniform, differs from other crank-motion machines in that the inherent alternating action of the needle and shuttle is provided for, while the dwell or retardation of the motion of the needle is avoided, yet the sewing is accomplished by the needle and shuttle simply, rendering unnecessary the use of all rotative, vibrating, or similar extraneous co-operating devices.

Operation: Motion being given to the driving-pulley, the needle descends, and then, rising, the shuttle advances and takes the loop, passing through before the needle's eye, rising, reaches the cloth. After passing through the loop of needle-thread the shuttle begins to return, slackening up its thread before the needle ceases to rise. When the upward stroke of the needle is completed there is a part of the shuttle-thread drawn up through the cloth. Afterward the shuttle draws this thread down to and then into the cloth.

In the above description I have endeavored to be confined to what is considered new. Such matters, therefore, as the tension of the needle-thread and the take-up which controls the thread between the needle's eye and the cloth are omitted, inasmuch as those common to other shuttle-machines may be employed.

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

1. The employment of an eccentric or its equivalent to actuate the needle with the uniform motion ordinarily due to a crank or eccentric, in combination with a revolving wrist and oscillating lever operating together and actuating the shuttle, the arrangement of the shuttle with respect to the motions of said wrist and lever being substantially as specified.
2. The arrangement and combination of the eccentric and strap, wrist, and lever, as specified, whereby such parts and the motions thereof act as a counter-balance to each other, for the purposes and substantially as described.
3. Constructing the shuttle-race with a hanger cast therewith provided with a boss receiving and forming the bearing for the driving-shaft, and supporting the feed-bar and shuttle-driving lever, substantially as specified.

EARLE H. SMITH.

Witnesses:

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