Aug. 20, 1929. J. H. REED 1,724,964

SHUTTLE MECHANISM FOR SHOE SEWING MACHINES

Filed Oct. 18, 1922

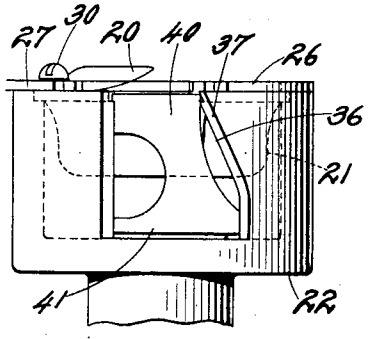


Fig. 4.

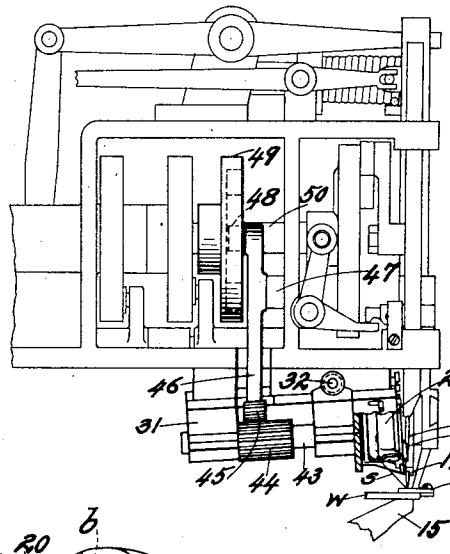


Fig. 1.

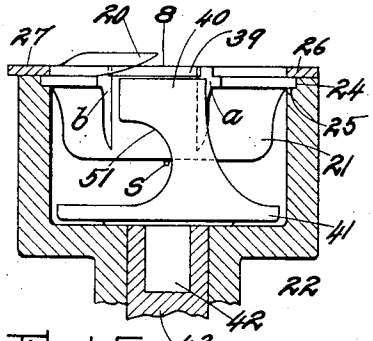


Fig. 5.

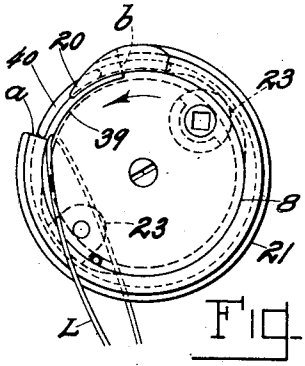


Fig. 6.

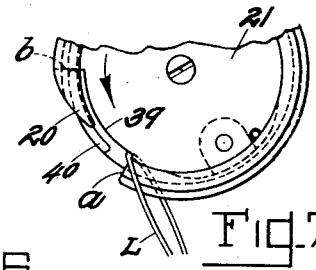


Fig. 7.

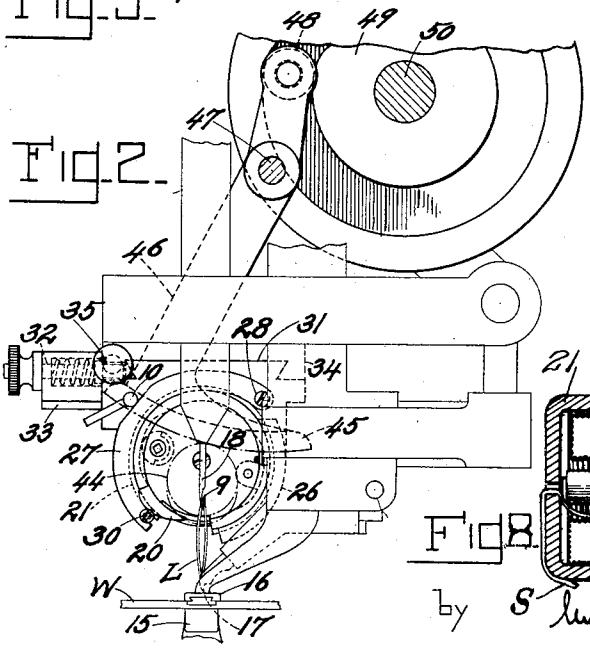


Fig. 2.

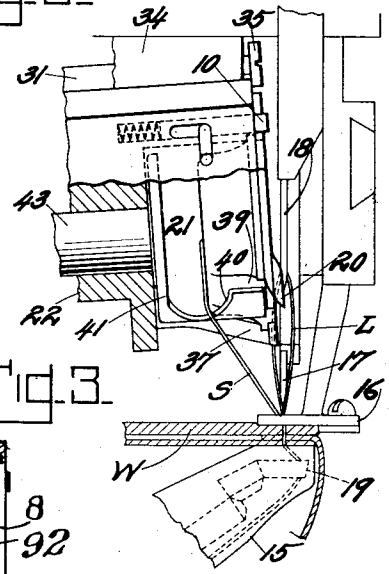


Fig. 3.

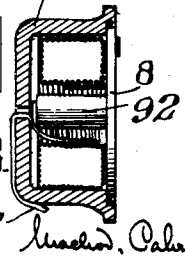


Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES H. REED, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SHUTTLE MECHANISM FOR SHOE-SEWING MACHINES.

Application filed October 18, 1922. Serial No. 595,266.

This invention relates to shoe sewing machines of the type shown in my prior applications for Letters Patent, filed January 22, 1921, Serial No. 439,255; August 12, 1921, Serial No. 491,694; August 13, 1921, Serial No. 491,897; and March 10, 1922, Serial No. 542,666.

The present case is in the nature of a continuation, in part, of application Serial No. 491,695, and a division, in part, of applications Serial Nos. 439,255, 491,897, and 542,666, with respect to such subject matter as the present case has in common with said prior applications.

The machine in question is intended primarily for sewing McKay shoes, although adapted also for use for many other purposes, as, for example, for stitching along the shanks on the inside of shoes of the Goodyear welt type. Such a machine sews a lock-stitch seam and has a straight barbed needle and a shuttle supplying a shuttle thread on the outer side of the shoe, while within the shoe there is a cooperating work supporting horn provided with an oscillating looper or whirl which supplies a cop thread to the needle when the latter has passed through the work.

The present invention relates to the shuttle mechanism of machines of this type and has for its object to provide means for supporting and oscillating a discoidal shuttle, whereby said shuttle is adapted to take the loop of cop thread directly from the needle, the mounting of said shuttle being of such a character as to accurately guide the shuttle as well as to facilitate the removal thereof from the machine for the purpose of renewing the shuttle thread or otherwise, and the operating mechanism being so constructed and arranged as to perform its intended function in a satisfactory manner while presenting no obstacle to the shuttle thread or to the free passage of the needle loop about the shuttle.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of a preferred embodiment thereof illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of a portion of the head of a shoe sewing machine having a shuttle mechanism constructed and arranged in accordance with the invention.

Fig. 2 is a front elevation, on a somewhat enlarged scale, of the shuttle mechanism and the other parts of the machine adjacent thereto.

Fig. 3 is a side elevation, partly in section, and on a further enlarged scale, of the shuttle and associated parts.

Fig. 4 is a bottom plan view, on a still further enlarged scale, of the shuttle race and the shuttle therein.

Fig. 5 is a bottom plan view, on substantially the scale of Figure 4, of the shuttle and its actuating member, the shuttle race being shown in section.

Figs. 6 and 7 are detail front or face views, on substantially the scale of Figs. 4 and 5, of the shuttle, illustrating the operation thereof.

Fig. 8 is an axial section of the shuttle.

The machine as a whole comprises a horn 15 upon which the work W is supported and upon which it is held by a presser-foot 16 which is periodically raised to permit the work to be advanced by a feed point 17 as the stitching progresses. At 18 is shown a vertically reciprocating straight needle having at its lower end an open hook or barb 9 adapted, when said needle has been moved downwardly through the work, to have placed therein a loop of cop thread by means of a whirl or looper 19 within the horn 15.

The specific construction of the parts thus far referred to except in so far as they directly cooperate with the shuttle, constitute no part of the present invention and may be substantially as shown and described in my prior applications above referred to, or otherwise as may be preferred. Generally speaking, such mechanisms are well known in the art and require no description in detail.

In the operation of the machine, the needle 18 comes up through the work W with a loop L of the cop thread caught in its barb, as shown in Figures 2 and 3. When said needle has reached its uppermost position, as shown in said figures, said loop is taken from the open hook of said needle by a hook 20 on a discoidal shuttle 21 mounted for oscillation in a shuttle race 22. In the machine described in my prior applications, Serial Nos. 491,897 and 542,666, the shuttle race is so mounted that the front face of the shuttle

is disposed at a slight inclination to the vertical, and in accordance with my invention the arrangement is such that the hook 20, which lies in front of the plane of the front face of the shuttle and extends circumferentially thereof, will, during the oscillation of the shuttle, cross the path of movement of the needle 18 when at the bottom of the shuttle, but will, when at the top of said shuttle, clear said needle and its needle bar. In operation, the shuttle hook 20 lifts the loop L from the needle 18 and thereafter, as the shuttle is turned further, carries the loop to the top of the shuttle and passes it about the same, said shuttle, together with the shuttle thread, being thus passed through the loop.

The shuttle 21 is formed with an open forward side which is normally closed by a removable cover 8 secured in place by means of suitable locking devices 23. Said cover is provided on its inner side with a thread receiving post 92 for the shuttle thread S, thereby permitting said cover to serve also as a bobbin, said shuttle thread leaving the shuttle through a substantially axial opening in the back thereof. The particular construction of the shuttle per se, with its detachable cover 8 and thread supply, forms the subject matter of another application, filed October 14, 1922, Serial No. 594,457.

The shuttle 21 is formed adjacent its forward side with an annular rib or flange 24, which is guided in an annular seat 25, formed about the edge of the open forward side of the shuttle race 22. The flange 24 is removably held in position on the seat 25 by arcuate keepers 26 and 27, the former of which is permanently secured, as by screws, to the front face of the shuttle race. The other keeper 27 is pivoted at one end to the front face of the shuttle race, as indicated at 28, whereby said keeper may be swung aside to permit the ready removal of the shuttle. Said keeper is normally held in position to retain the shuttle in place by means of a sliding, spring-pressed bolt or latch 10, the end of said keeper 27 opposite the pivot 28 being shaped to engage a stud 30 on the shuttle race, whereby said keeper is positioned. It will thus be seen that ready access is afforded to the interior of the shuttle by means of the detachable cover 8, which is at the outer side of said shuttle adjacent the open forward side of the shuttle race, and that said shuttle may also be readily removed from the shuttle race through the open front of the latter by releasing the bolt 10 and swinging the keeper 27 to one side on its pivot. In order to facilitate the removal of the shuttle, the shuttle race is arranged to be moved rearwardly away from the needle 18 and other working parts of the machine and to this end is formed upon a slide 31 guided for movement into and out of operative position in a dovetailed guide 34 on the underside of the machine frame, said slide being normally locked, with the shuttle in its operative position, by means of a spring-pressed bolt 32 guided in a bracket 33 carried by the slide 31, said bolt engaging a suitable opening in the guide 34. In order that the position of the shuttle may be accurately determined, the forward movement of the slide 31, or the movement thereof toward the needle, is limited by the head of a stop screw 35 in threaded engagement with the forward end of the guide 34.

The shuttle flange 24 is cut away for a portion of its length adjacent the hook 20, as from the point *a* to the point *b*, to form a gap which cooperates with a gap 36 (Figure 4) in the race-way 22, to permit the needle thread to pass about the shuttle. The gap 36 is shaped to form a point 37 oppositely disposed with respect to the point of the shuttle hook 20 and cooperating therewith to take the loop from the needle, as more fully explained in my prior application, Serial No. 439,255, above referred to. Adjacent the gap in the shuttle flange 24, the body of the shuttle 21 is further cut away to form a notch 39 to receive the end of a shuttle actuator or finger 40, which is eccentrically carried by a disk 41 having a stem 42 which is fixed in the end of a shuttle actuating shaft 43 axially disposed with respect to the shuttle 21 and journalled in the slide 31. The shuttle shaft 43 carries a pinion 44 which cooperates with an arcuate rack 45 on one end of a lever 46 pivoted at 47 to the machine frame. Said lever carries at its opposite end a roller 48 cooperating with a cam 49 on the main shaft 50 of the machine, whereby said lever is oscillated and, through the rack 45 and pinion 44, oscillates the shaft 43 and shuttle 21. The pinion 44 is elongated, as shown in Figure 1, to permit the longitudinal movement, above described, of the slide 31 without disturbing the engagement of said pinion with the rack 45.

The disk 41 is spaced longitudinally, or in a direction parallel to the axis of the shuttle, from the back of said shuttle, thereby affording ample space for the passage of the shuttle thread S and the rear leg of the needle loop L as the latter passes about the shuttle. The position of the finger 40 is such that said finger is spaced, radially of the shuttle, from the bottom of the notch 39 in the body of the latter, thereby permitting the free passage of the needle loop L beneath said finger and between the same and the body of the shuttle when the shuttle hook 20 has reached the top of the shuttle and has cast off said loop, as shown in Figure 6. The end of the finger 40 engages one or the other of the radial shoulders *a* and *b* (formed where the shuttle flange 24 is cut away) at

a point which is radially spaced from the adjacent portion of the body of the shuttle, i. e., from the bottom of the notch 39, of whose end walls the shoulders *a* and *b* form continuations. The spacing of the shoulders *a* and *b*, circumferentially of the shuttle, is greater than the circumferential width of the finger 40, thereby providing a limited lost-motion connection between said finger and the notch in the shuttle of which said shoulders form a part. In order to turn the shuttle in a counterclockwise direction, as shown in Figures 2 and 6, so as to cause the shuttle hook to take the needle loop from the needle, carry it to the top of the shuttle, and cast it over the latter, the finger 40 engages the shoulder *a*. When the movement of the finger is arrested momentum of the shuttle will carry the same farther, causing the shoulder *a* to leave the finger, as shown in Figure 7, thereby leaving a space between said parts through which the loop L may be freely drawn.

As above explained, the finger 40 engages the notch 39, which, in one position of the shuttle, registers with the gap 36 in the shuttle race, and said finger is accordingly cut away, as shown at 51 in Figure 5, to permit the passage of the shuttle thread S without interference with said finger when the latter is in the position referred to.

What I claim is:—

1. In a lock stitch shoe sewing machine, the combination with the other stitch forming devices including a hook needle of a shuttle having a hook lying in front of the plane of the face of the shuttle arranged to take the needle loop directly from the needle, and a shuttle race having a loop engaging hook facing in the direction opposite to that in which the hook of the shuttle faces.

2. In a sewing machine, in combination, a frame, an actuating shaft journalled in said frame, a rotatable shuttle, a shuttle race therefor, a coaxial shuttle shaft, means carried by said shaft for engaging and turning said shuttle, a slide by which said shuttle race and shuttle shaft are carried, said slide being guided on said frame for movement in a direction substantially parallel with the axis of said shuttle shaft and shuttle, an elongated pinion on said shuttle shaft, a rack operated by said actuating shaft and engaging said pinion, and a latch for normally locking said slide with said shuttle in operative position.

In testimony whereof I affix my signature.

JAMES H. REED.