M. SCHOENFELD.

SHUTTLE MECHANISM FOR EMBROIDERING MACHINES.

APPLICATION FILED MAY 21, 1910.

1,003,521. Patented Sept. 19, 1911.

Fig. 1.

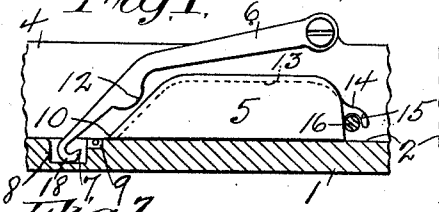


Fig. 2.

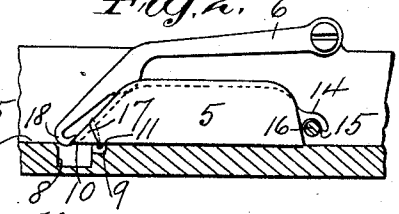


Fig. 3.

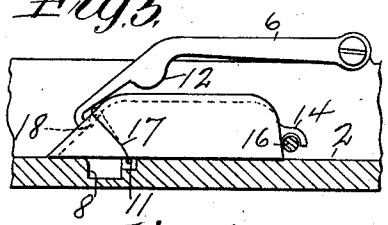


Fig. 4.

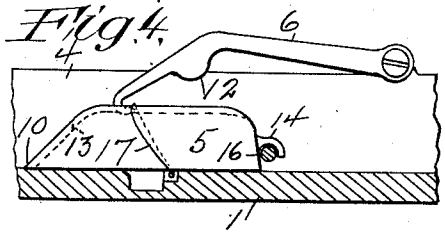


Fig. 5.

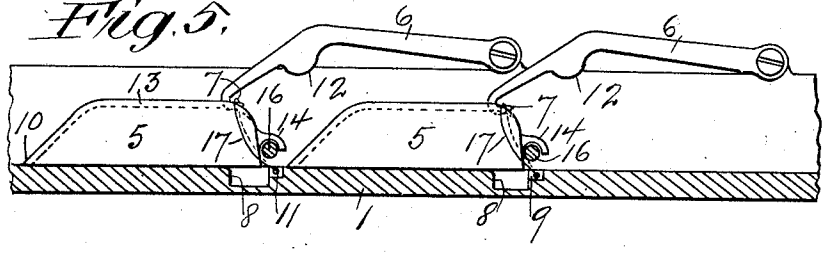


Fig. 6.

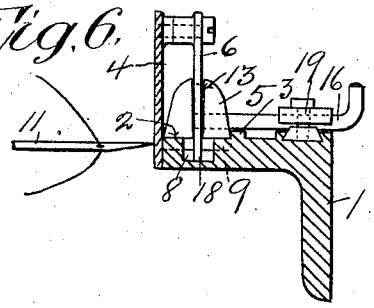


Fig. 7.

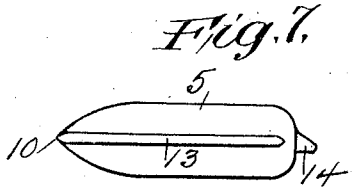


Fig. 8.

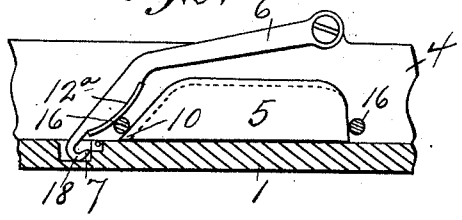
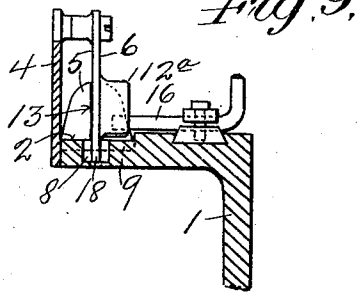


Fig. 9.



Witnesses:

W. Williamson

H. Whitehead

Inventor

Morris Schoenfeld

By his Attorney

Charles G. Hensley.

UNITED STATES PATENT OFFICE.

MORRIS SCHOENFELD, OF RORSCHACH, SWITZERLAND.

SHUTTLE MECHANISM FOR EMBROIDERING-MACHINES.

1,003,521. Specification of Letters Patent. Patented Sept. 19, 1911.

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To all whom it may concern:

Be it known that I, MORRIS SCHOENFELD, a citizen of the United States, and a resident of Rorschach, in the Canton of St. Gall, Switzerland, have invented certain new and useful Improvements in Shuttle Mechanism for Embroidering-Machines, of which the following is a specification.

The present invention relates to shuttle mechanism for embroidering machines of the large type where a number of sewing needles and corresponding shuttles are arranged in numbers along the machine.

In practice at present the continual replenishing of the shuttles as their bobbins become exhausted of the thread is one of the serious problems in the operation of the machine as the machine must either be stopped while the bobbins of a number of the shuttles are being replenished or the shuttles must be replenished while the machine is in operation and as the size of the shuttles in present practice is limited the supply of thread carried by each shuttle is small and therefore they run out and require considerable attention. In the present practice the shuttles have been made as long as practicable and the other dimensions of the shuttle are also limited. If the shuttle is increased in height, that is in present practice, the sloping nose of the shuttle must be made longer in order to enlarge the thread loop to pass the shuttle therethrough, but the length of the shuttle is also limited.

The object of the present invention therefore is to facilitate the opening of the thread loop that the shuttle body can be made much larger and carry a much larger supply of thread. This enlarging of the thread loop is brought about by an element which is so mounted that it will coöperate with the nose of the shuttle and permit a shuttle of large proportions and comparatively short inclined nose to be used, whereby the increase in the size of the shuttle will not require a corresponding increase in the length of the inclined nose and therefore permit the needles to be arranged as close as heretofore.

In the embodiment of my invention herein shown I have fulcrumed an engaging finger over the shuttle with a hooked end which engages the thread loop as it is formed by the needle and which is raised by the passage of the shuttle in its track and this hooked engaging finger causes the thread to ride over the sharply inclined nose of the shuttle, whereby the shuttle can be passed through the thread loop quickly, notwithstanding its size.

In the drawings forming a part of this application, Figures 1 to 5 are elevations of parts of a shuttle mechanism embodying one form of my invention, and showing the parts in the different positions they occupy at different periods during the stitching operation, Fig. 6 is a cross section thereof showing the relation of the shuttle drive, the engaging finger and the shuttle, Fig. 7 is a plan view of one of the shuttles, Fig. 8 is an elevation similar to Fig. 1, but showing my invention in a modified form, in which there is a shuttle driving element engaging each end of the shuttle, Fig. 9 is a cross section of this modified form.

In the present application of my invention I have shown a bed 1, forming the base 2 of the shuttle track, and the flange 3 forms one side of the track, while the needle plate 4, disposed near the embroidering fabric, forms the opposite side of the shuttle track. In this shuttle track there are arranged a number of shuttles 5, which are reciprocated back and forth in the tracks and in their movement are adapted to pass through the loop of the thread which is passed through the embroidery fabric and the needle plate to the rear of the machine. The bed 1 is provided with needle channels 9, running across the bed, and the needles 11 after passing through the needle plates move in these channels, where they form by their quick return action a loop 17 in the thread. In proximity to the needle channels there are other channels 8, the purpose of which will appear hereinafter.

The shuttles are somewhat modified in construction in order to carry out the purposes of my present invention. The body 5, which is made much larger than in former practice, has the usual pointed nose 10, but the incline from the nose to the top of the shuttle may be very steep, whereby the shuttle length will not be unduly extended, and it is because of this sharp incline in the front of the shuttle, when large shuttles are used that other means must be employed to aid in the enlargement of the thread loop in order to pass the shuttle quickly through the thread loop without breaking the thread. In other words, means must be employed to guide the thread loop over the shuttle. The

shuttle itself is provided with a longitudinal groove 13, which extends from the pointed nose 10, up to the incline and along the top of the shuttle where it rises to the surface toward the back of the shuttle. The rear of the shuttle has a curved projecting element 14, in the form shown in Figs. 1 to 7, and in the under curved part 15 of this projection the drive finger 16 engages, the latter being carried by a longitudinally reciprocatable drive bar 19, which is operated in the usual way. By engaging under the projection 14, the drive finger 16 can operate the shuttle both back and forth and there is therefore provided only one drive finger for each shuttle, though this may be modified as will appear in reference to Figs. 8 and 9.

Above the path of the shuttles and to the needle plate 4 I have fulcrumed the fingers or arms 6, which extend beyond their fulcrums and into the path of the shuttles, there being one of these arms for each shuttle. The arm is preferably curved at an angle as shown and preferably drops by gravity into the path of the shuttle. These arms are provided with a hooked engaging end 7, which, when the arm is permitted to rest in its lowermost position lies in the groove 8 of the shuttle track and just ahead of the needle channel, and ahead of the shuttle nose when the shuttle is in the position preceding the stitch, as shown in Fig. 1; and the hook is turned toward the needle and shuttle. There is also provided on this arm 6, an engaging projection 12, the purpose of which is to travel in the groove 13 of the shuttle and guide the arm 6 at least until the hooked end of the arm rises above the point of the shuttle.

The operation of the device is as follows; the parts in the position shown in Fig. 1 are ready for the stitch, with the arm 6 down, and the shuttle on the opposite side of the needle channel. The needle is passed through the fabric in the usual way and enters the needle channl 9, where the thread forms a loop and the shuttle is then moved forward by the reciprocation of the shuttle drive; and the engagement of the driving finger 16 behind the shuttle. As soon as the shuttle begins to move forward the nose enters the thread loop 17 and as the shuttle continues it encounters the arm 6. The projection 12 first contacts with the shuttle and preferably in the bottom of the groove 13. In doing so the arm 6 starts to rise, as shown in Fig. 2, when the hook of the finger 6 will begin to travel in the groove 13 of the shuttle and will engage the thread loop and cause it to rise on the front incline of the shuttle; and consequently the thread loop will be enlarged as rapidly as the shuttle travels until the arm or finger 6 rides up on top of the shuttle as shown in Fig. 4. The shuttle continues to travel until it reaches the position shown in Fig. 5, when the thread take up, which is not here shown, but which is well known in the art, begins to take up the thread loop. When the loop is drawn the thread passes off the hooked end 7, around the shuttle projection 14, between it and the drive finger 16 and out through the needle plate. Thereupon the direction of movement of the shuttle is reversed and it is returned to its former position ready for the next stitch; and in doing so the arm 6 rides down the incline of the shuttle nose and finds its place in the recess 8, where it will be ready for the next operation. The shape of the hook 7 is such that the point of the same does not contact with the shuttle groove base, but the rounded part 18 guides the finger in the groove after the projection 12 rises from the shuttle.

In the construction just described there is a single drive finger for each shuttle, engaging on only one end of the shuttle, but should it be desired to employ the former method wherein there are driving fingers engaging on opposite ends of the shuttle, one for driving it in one direction and another for driving it in the other, the construction may be modified as shown in Figs. 8 and 9. Herein the construction is modified by omitting the engaging piece 14 and instead, using driving fingers 16 on each end of the shuttle. I have provided a plate 12^a, which will contact with the front shuttle drive finger 16 and thus the arm 6 is raised until the hooked end passes above the point of the shuttle, after which it travels in the groove 13 the same as in the previous form.

From the above it will be apparent that the shuttle can be of large dimensions and the thread supply therein correspondingly larger and that though the nose of the shuttle is not unduly extended to provide a long gradual incline, the thread loop is, by the cooperation of the shuttle and the engaging finger, enlarged sufficiently and speedily enough to permit the shuttle to be passed through the loop. It will also be apparent that the engaging finger need not travel back and forth but can remain in a stationary position relative to the shuttle movement and that the finger is automatically operated by the shuttle itself without any complicated mechanism. The device is very simple and not likely to get out of order.

Changes may be made without departing from the spirit of my invention and the scope of the following claims. The parts may be changed in their position, so that they move in a different plane.

Having described my invention what I claim is;

1. An embroidering machine embodying stitching and shuttle mechanism, including a shuttle having a pointed nose, and a groove running upwardly from the point, a thread

engaging element mounted independent of the shuttle but operated thereby and having a hook adapted to extend below the shuttle path, and to travel in the groove of the shuttle, said engaging element having a projection which is engaged by the shuttle as the latter moves and by which the engaging element is partially raised.

2. An embroidering machine embodying stitching and shuttle mechanism, including a shuttle having a pointed nose and a groove running upwardly from the point, a thread engaging element mounted independent of the shuttle and having a hook adapted to extend below the shuttle path, said engaging element having a projection which is engaged by the shuttle as the latter moves and by which the engaging element is initially raised, the hook of the engaging element being adapted to engage the shuttle and release the said projection therefrom.

3. An embroidering machine embodying stitching and shuttle mechanism, including a shuttle drive finger, a shuttle having a pointed nose and provided with a groove running upwardly from the point, a thread engaging element mounted independent of the shuttle and having a hook adapted to extend below the shuttle path, said engaging element being adapted to be initially raised by engagement with the shuttle drive finger, the hook of the engaging element being adapted to travel in the shuttle groove and to release the engaging element from its engagement with the shuttle drive finger.

Signed at Rorschach, in the Canton of St. Gall, Switzerland, this 11th day of May, 1910.

MORRIS SCHOENFELD.

Witnesses:
CAESAR LOEB,
FRIEDR. STEINER.