J. R. MOFFATT AND R. S. KELSO.

LOOP RETAINER FOR SEWING MACHINES.

APPLICATION FILED AUG. 22, 1918.

1,350,931.

Patented Aug. 24, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

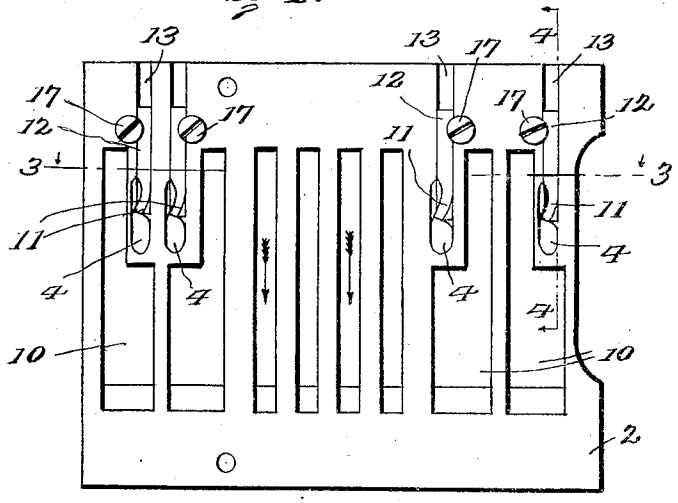


Fig. 2.

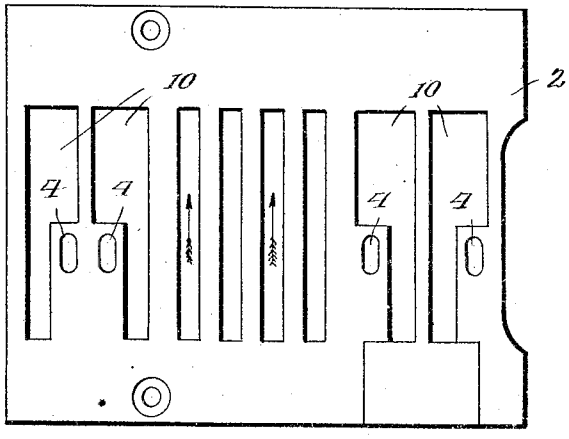


Fig. 5.

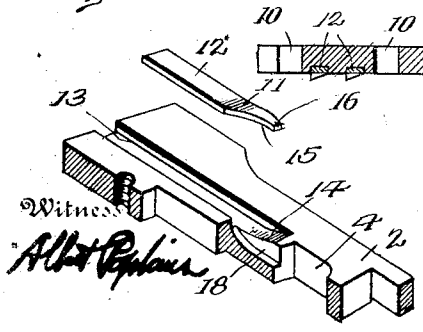


Fig. 3.

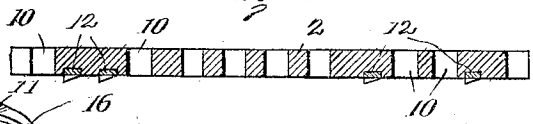
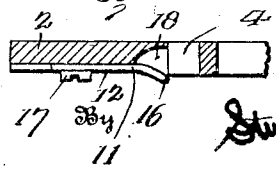


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 6.

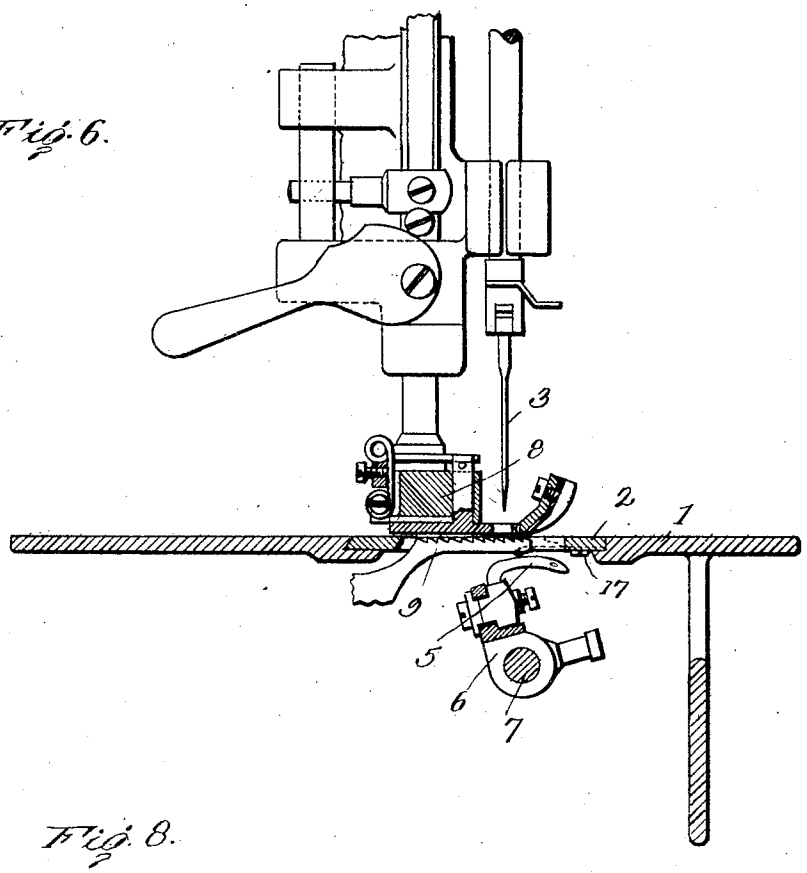
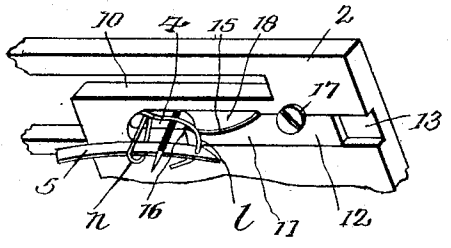


Fig. 8.



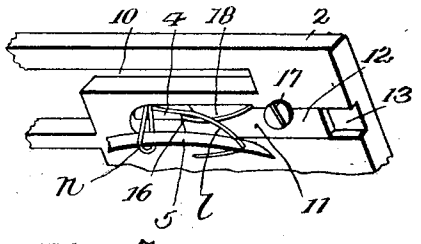


Fig. 7.

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UNITED STATES PATENT OFFICE.

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LOOP-RETAINER FOR SEWING-MACHINES.

1,350,931. Specification of Letters Patent. Patented Aug. 24, 1920.

Application filed August 22, 1918. Serial No. 250,946.

To all whom it may concern:

Be it known that we, JAMES R. MOFFATT and RALPH S. KELSO, citizens of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Loop-Retainers for Sewing-Machines, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

The invention relates to new and useful improvements in sewing machines and more particularly to a sewing machine having a threaded looper moving back and forth in a plane parallel with the feed. In the patent granted to Lansing Onderdonk, January 5, 1915, No. 1,123,576, a sewing machine of the above type is illustrated and associated with each looper is a device for engaging the looper thread for holding said looper thread away from the body of the looper so as to permit the needle to pass with certainty between the looper thread and the body of the looper.

An object of the present invention is to provide a retainer of the above character for holding the looper thread away from the body of the looper, which retainer is supported by a shank extending in the direction of the feed of the machine, so as to give sufficient space for a section of the feed dog at the side of the needle.

A further object of the invention is to provide a multiple needle machine with a detachable and independently supported retainer for each looper.

A still further object of the invention is to provide a retainer having a supporting shank disposed parallel with the line of feed and seated in a groove in the under face of the throat plate, which shank is detachably held in the groove.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show by way of illustration one embodiment of the invention;

Figure 1 is a bottom plan view of the throat plate of a sewing machine having our improved retainer attached thereto;

Fig. 2 is a top plan view of the throat plate;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is an inverted sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a bottom perspective view of a portion of the throat plate and one of the retainers, the parts being separated;

Fig. 6 is a view showing in vertical section and more or less diagrammatically a part of a sewing machine having our improved retainer applied thereto;

Fig. 7 is a perspective view from the under side of the throat plate showing the looper, a portion of the throat plate and the retainer with the looper at the forward end of its stroke and moved laterally in order to avoid the needle; and

Fig. 8 is a view similar to Fig. 7 but showing the needle and also showing the looper as partly retracted, the needle being well into the thread triangle formed by the body of the looper, the looper thread and the needle thread loop extending to the previous needle puncture.

In the patent to Onderdonk referred to above, the looper is a threaded looper and moves forwardly in the plane of the feed and opposite to the direction of the feed as it enters the needle thread loop. The looper is then given a lateral or needle avoiding movement. As the looper moves laterally and then begins its backward travel, the looper thread which extends rearwardly from the eye of the looper through the needle thread loop around the looper, is retained against a stationary projection which separates the looper thread from the body of the looper so that the needle will with certainty enter between the looper thread and the body of the looper. The needle must enter the looper thread loop in order to properly concatenate the thread loops and form stitches. Inasmuch as the looper lies in a vertical plane containing the feed, the movement of the fabric during the feed stroke, carries the previously formed aperture in the fabric formed by the needle into which the thread leads, rearwardly over the looper so that the feeding movement of the fabric does not have any effect in the forming of the usual triangle for the needle to enter, as occurs when the looper moves transversely of the line of feed. Some means, other than the feeding mechanism and the movements of the looper, is necessary, therefore, when the looper moves in the line of feed to separate the looper thread

from the body of the looper. This is accomplished in the Onderdonk patent by the retaining finger which is engaged by the looper thread, so that the looper thread will be held out away from the looper and thus permit the needle with certainty to pass between the looper thread and the body of the looper. In the Onderdonk patent these retaining devices are all carried by a bar extending transversely of the line of feed. If one is adjusted, all must be adjusted. If one is replaced, all must be replaced, and, furthermore, the bar extends across the line of feed and, therefore, no feed section of the feed dog can be placed along side of or between the needles, and to extend from a point in front of to a point in rear of said needles. The present invention is directed to improved means of supporting and arranging the retainer for accomplishing the purposes set forth in this patent. In carrying out our present invention, we have provided a separate and independent means of supporting each retainer. The retainer is formed as a part of a shank, which shank is located in the line of feed and each shank is separately secured by a screw in an independent groove in the under face of the throat plate.

Referring more in detail to the drawings, we have shown our invention as applied to a sewing machine having a work support 1, which is provided with a throat plate 2. The stitching mechanism includes a plurality of needles, one of which is indicated in Fig. 6 at 3. The throat plate as illustrated in Figs. 1 and 2, is provided with four needle slots indicated at 4, and there is, of course, a needle for each slot. Coöperating with each needle 3, beneath the work support is a looper 5. This looper is a threaded looper. The looper 5 is mounted on a looper carrier 6, carried by a shaft 7. This shaft 7 is oscillated and moved endwise in any suitable way, the patent to Onderdonk referred to above, showing one way in which the proper movements may be imparted to the looper. The material is held on the work support by a presser foot 8 and is fed across the work support by a feed dog 9. These parts are all of the usual construction. The throat plate, as clearly shown in Figs. 1 and 2, is formed with a series of slots 10 for the sections of the feed dog. It will be noted that these feed slots not only extend directly in rear of the needle slots, but along side of the same and to points well in front of the needle slots. The feed sections are also constructed so as to operate upon the material in rear of the needle, at the side of the needle and to a point well in advance of the needle.

Associated with each looper is a retainer 11. This retainer is formed with a shank 12 and the throat plate is formed in its under face with grooves 13 for the shanks of the respective retainers. These grooves are preferably milled in the throat plate and the rear end of each groove is therefore curved, as indicated at 14. The shank of the retainer is tapered and swaged to one side, so as to form an inclined thread retaining surface 15. The throat plate at one side of the groove for the shank is further grooved to form a clearance space for the looper thread, as indicated at 18 in the drawings. This clearance groove is located directly above the looper when said looper is on its forward travel, so as to readily receive the looper thread extending rearwardly from the eye of the looper. The tapered end of the shank having the inclined thread retaining surface partially overlaps this thread groove, as clearly shown in the drawings. When the retainer 11 is placed in its respective groove, the curved surface 14 of the groove positively holds the end of the retainer, indicated at 16, so that it is slightly above the plane of the lower surface of the throat plate and partially overhangs the thread clearance slot, as above noted. The retainer shank is held in its respective groove by a screw 17. This screw 17 has its head overlapping the shank of the retainer, so as to securely hold the same in place. By loosening the screw, the retainer may be adjusted endwise in the groove.

It will not only be seen that the retainer for each looper is independently mounted and independently adjustable, but as the shank extends substantially in the direction of the feed, it does not in any way interfere with the operation of a section of the feed dog at the side of the needle at a point well in advance of the needle.

In operation, let us assume that the needle is all the way down and the looper at the rear end of its stroke. As the needle rises it casts out the needle thread loop and simultaneously with the rise of the needle, the looper moves forwardly into the needle thread loop. As the looper continues its forward movement, the looper thread extending rearwardly from the eye of the looper to the last formed thread concatenation is positioned within the clearance groove 18 and on the left hand side of the retainer. The looper then avoids to the right and at this time the needle is beginning its descent. Also at this time the looper thread extending rearwardly from the eye of the looper is in a slack condition and is against the retainer on account of the reduced or tapered end of said retainer projecting partially across the thread clearance groove. As the looper starts on its retracting or backward movement, and before the needle even reaches the fabric, the looper thread is caused to form a loop and this loop extending around the retainer is held by said retainer in its open re-

lation until the needle point has descended into said loop. As soon as the needle point has descended well into the loop, the looper during its continued backward movement draws the loop from off the point of the retainer. If it were not for the retainer, this strand of looper thread which extends rearwardly from the eye of the looper might do any one of the following three things—(1) It might bow out quickly in the proper direction and remain in that condition until the needle has entered the loop; or (2) it might feed through the eye of the looper and thereby bow outwardly away from the looper but on the wrong side thereof, thereby preventing the needle from entering the loop; or (3) it might partake of a sinuous twist like a compound curve and thereby be positioned on the wrong side of the needle. It is obvious that minor changes in the details of construction may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus fully described our invention, what we claim as new and desire to cure by Letters Patent, is:

1. The combination of a needle, a feeding mechanism, a threaded looper moving into and out of the needle loop in a line substantially parallel with the line of feed, said looper having a lateral needle avoiding movement while in the needle loop, a throat plate having a needle opening therein, said throat plate having a thread clearance groove formed in its underface leading forwardly from the needle opening, and a retainer detachably secured to the under surface of the throat plate and having its rear end partially overlapping said groove for retaining the looper thread during the lateral movement of the looper and during the first part of its backward movement so as to insure the needle passing between the looper thread and the body of the looper.

2. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper coöperating with each needle, each looper moving in a line substantially parallel with the line of feed while entering and withdrawing from the needle loop and having its loop taking movement opposite to the direction of feed, each looper being moved transversely of the line of feed to avoid the needle while in the needle loop, a throat plate having an opening for each needle and a thread clearance groove extending forwardly from each needle opening, and an independently mounted retainer for each looper, said retainer having a thread retaining shoulder partially overlapping the thread clearance groove for retaining the looper thread and holding the same away from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper.

3. The combination of a feeding mechanism, a throat plate having a needle opening, a needle, a threaded looper movable in a line substantially parallel to the line of feed while entering and withdrawing from the needle loop and movable transversely to avoid the needle while in the needle loop, said throat plate having a groove formed in its underface directly in front of the needle opening and parallel with the line of feed, a retainer having a shank mounted in said groove, said retainer operating to engage the looper thread for holding the same away from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper, and means for holding the retainer in the groove.

4. The combination of a feeding mechanism, a throat plate having a needle opening, a needle, a threaded looper movable in a line substantially parallel to the line of feed while entering and withdrawing from the needle loop and movable transversely to avoid the needle while in the needle loop, said throat plate having a groove formed in its underface directly in front of the needle opening and parallel with the line of feed, a retainer having a shank mounted in said groove, said retainer operating to engage the looper thread for holding the same away from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper, and means for holding the retainer in the groove, said throat plate having a feed slot formed therein extending from a point in rear of the needle opening and along side of the shank to a point in advance of the needle opening.

5. The combination of a feeding mechanism, a throat plate having a plurality of needle openings, a needle for each opening, a threaded looper coöperating with each needle movable in a line parallel with the line of feed and movable transversely to avoid the needle while in the needle loop, said throat plate having a groove formed therein directly in front of each needle opening, an independent retainer for engaging the looper thread of each looper for holding the looper thread away from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper, said retainer for each looper having a shank seated in its respective groove in the throat plate, means for holding the shank in said groove, said retainer being shaped adjacent the needle opening to form an inclined thread retaining shoulder.

6. The combination of a feeding mechanism, a throat plate having a plurality of needle openings, a needle for each opening,

a threaded looper coöperating with each needle movable in a line parallel with the line of feed and movable transversely to avoid the needle while in the needle loop, said throat plate having a groove formed therein directly in front of each needle opening, an independent retainer for engaging the looper thread of each looper for holding the looper thread away from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper, said retainer for each looper having a shank seated in its respective groove in the throat plate, means for holding the shank in said groove, said retainer shank being shaped adjacent the needle opening to form an inclined thread retaining shoulder, said throat plate having a clearance groove formed therein adjacent each inclined shoulder on the shank and above its respective looper when said looper is on its forward travel, so as to receive the looper thread extending rearwardly from the eye of its associated looper.

7. The combination of a feeding mechanism, a throat plate having a plurality of needle openings, a needle for each opening, a threaded looper coöperating with each needle movable in a line parallel with the line of feed and movable transversely to avoid the needle while in the needle loop, said throat plate having a groove formed therein directly in front of each needle opening, an independent retainer for engaging the looper thread of each looper for holding the looper thread from the body of the looper until the needle in its descent has entered between the looper thread and the body of the looper, said retainer for each looper having a shank seated in its respective groove in the throat plate, means for holding the shank in said groove, said retainer shank being shaped adjacent the needle opening to form an inclined thread retaining shoulder, said throat plate having a clearance groove formed therein adjacent each inclined shoulder on the shank and above its respective looper when said looper is on its forward travel, so as to receive the looper thread extending rearwardly from the eye of its associated looper, said throat plate having a feed slot in rear of each needle opening and at one side of each needle opening.

8. The combination of a feeding mechanism, a plurality of needles arranged in a line substantially at right angles to the line of feed, a thread carrying looper coöperating with each needle, each looper moving in a line substantially parallel with the line of feed while entering and withdrawing from the needle loop, each looper being moved transversely of the line of feed to avoid the needle while in the needle loop, a throat plate having an opening for each needle, an independently mounted retainer for each looper for holding the looper thread away from the body of the looper, the retainer for each looper having a shank extending parallel with the line of feed, said throat plate having a feed slot formed therein in rear of each needle opening and extending along side of the needle opening to a point in advance thereof.

9. A throat plate having a plurality of needle openings, each of which is adapted to receive a needle, said throat plate having a groove formed therein directly in front of each needle opening, an independent retainer associated with each needle opening and adapted to hold the looper thread away from the body of the looper, each retainer having a shank seated in its respective groove in the throat plate, means for holding the shank in said groove, each retainer being shaped adjacent the needle opening to form an inclined thread retaining shoulder, said throat plate having a clearance groove formed therein adjacent each inclined shoulder and disposed so as to receive the looper thread extending rearwardly from the eye of its associated looper.

In testimony whereof we affix our signatures in the presence of two witnesses.

JAMES R. MOFFATT.
RALPH S. KELSO.

Witnesses:
S. GEORGE TATE,
OTTO G. DOHSE.