

No. 647,349.

Patented Apr. 10, 1900.

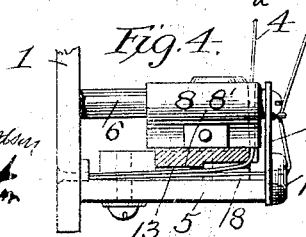
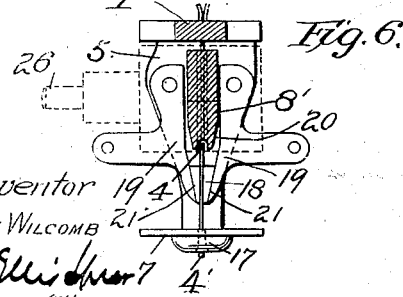
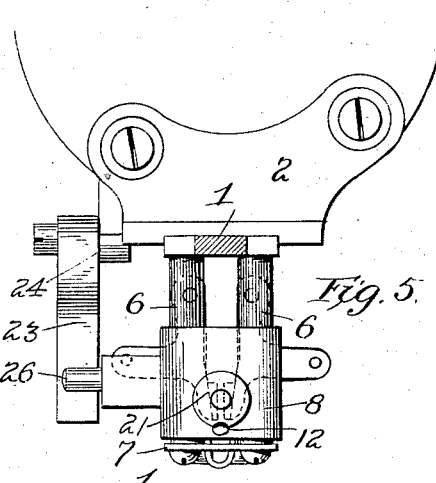
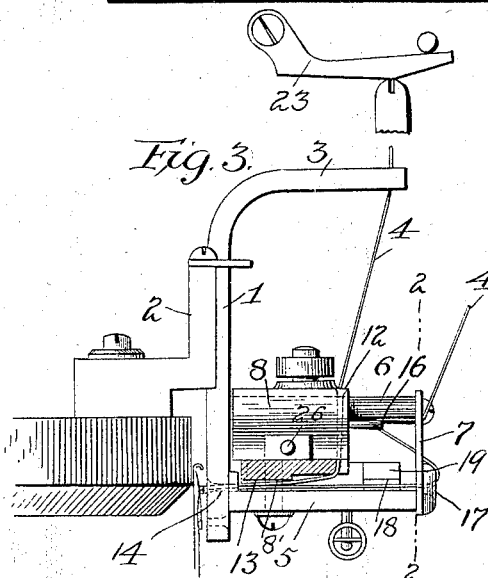
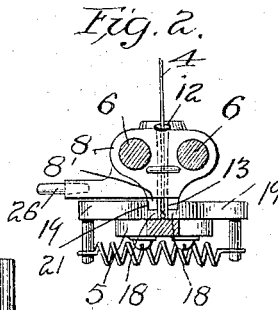
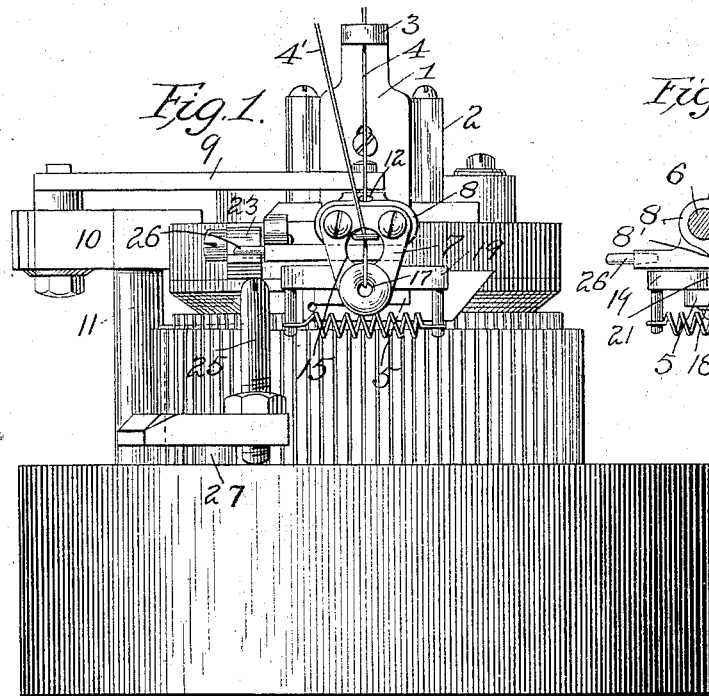
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SPLICING ATTACHMENT FOR KNITTING MACHINES.

(Application filed Oct. 27, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 7.

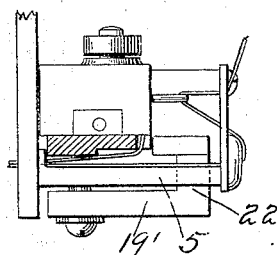


Fig. 8.

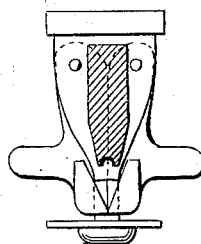
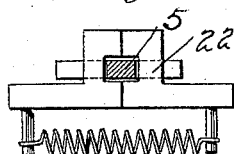


Fig. 9.



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# UNITED STATES PATENT OFFICE.

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## SPLICING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 647,349, dated April 10, 1900.

Application filed October 27, 1899. Serial No. 734,961. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK WILCOMB, a citizen of the United States, residing at Norristown, Montgomery county, Pennsylvania, have invented certain new and useful Improvements in Splicing Attachments for Knitting-Machines, of which the following is a specification.

In making spliced work it has been customary to introduce the loose end of the splicing-thread into the fabric by moving it into contact with or holding it adjacent to the rapidly-moving main yarn, and when the splicing action is to cease the splicing-thread has been clamped at a point adjacent to the main yarn, so that it would break off at a point between the clamp and the needles, the loose broken end remaining adjacent to the main thread. It has been found that the frictional contact of the main yarn with the splicing-yarn is not always sufficient to draw the splicing-yarn into the needles when the clamp releases it, and sometimes the main yarn fails to draw the splicing-yarn in for several rounds of knitting. At other times the splicing-yarn end may be worn off close to the thread-eye by the main yarn while knitting that portion which is not intended to be spliced, and when the clamp is released there is practically no frictional contact between the two threads and no splicing effect is produced. In another form of splicer, where the splicing-thread end is carried into contact with the main thread, the objections to the above-named method are partly overcome, as the splicing-thread end is generally a long one, which will enable the main thread to have more frictional contact; but as the carrier device or devices grasp the thread at a considerable distance from the extreme end said end may not be the first to come in contact with the main thread, and the splicing-thread may go into the fabric in a loop or bunch, or it may fail to pass through the main feeding-eye for one or two rounds of knitting, and, again, the splicing-thread may render backward through the movable device for holding the splicing end, in which case no splicing-thread end would be brought in contact with the main thread and no splicing would take place. I

aim to overcome these objections to the prior forms of splicing mechanisms by moving the main thread, which is always traveling rapidly to the needles, to and from the splicing-thread, which is held stationary. By this means the splicing-thread end lies in an operative position at all times, and even when broken the broken end is not disturbed and is always in position to be attracted or moved by the velocity and friction of the main thread. By my invention the splicing-thread is not subjected to the usual wear while the fabric which is not to be spliced is being knitted, and even should the splicing-thread be worn away to the thread-delivery point or feeding-eye it would be immediately picked up as the main thread-carrier travels back over the splicing end, thus always insuring the splicing-thread getting to the needles at the proper time without skipping any rounds and without buckling or doubling up in the form of a loop or bunch.

Another feature of my invention is the clamping device arranged at a considerable distance from the needles, allowing a long end between the clamp and the needles, it being understood that by all the methods of splicing the breaking-point is at the top of the needle-cylinder; but if the construction is such that a quick blow is delivered to the splicing-thread during the clamping operation the splicing-thread will be severed between the jaws of the clamp. It is therefore desirable that the closing of the clamps should be done gradually, so as to avoid any severing of the thread at this point. By my construction the sliding main-thread-carrier block operates against low inclined faces on the clamping-jaws farthest removed from the pivotal point of the clamps, thus securing an easy clamping action on the thread.

By my invention the frictional contact with the thread is least when the splicing-thread is clamped, and when it is desired to introduce the splicing-thread again the rapidly-moving main thread is moved along parallel with the splicing-thread and very close to it, and the successive stages of movement from the starting-point serve to straighten the splicing-thread, preventing it from finally

going to the needles in the form of a loop, also causing the main thread to cover a long section of the splicing-thread before the clamps release it, and when the clamps do so release it the main and splicing threads have so much frictional contact that the splicing-thread is carried to the needles positively and instantly on the opening of the clamps, thus producing a definite line of demarcation in the fabric where the splicing-thread is introduced.

In the case of very fine splicing numbers of yarn the old method was unreliable and the splicing-thread end could not be controlled with absolute certainty. By my method the fine numbers can safely be used, as the splicing-thread in this case simply lies in a position to be attracted by the main thread, and the main thread may be moved to and from the broken end with absolute certainty. In the old way the broken splicing-thread has been moved to and from contact with the main thread, which has had no other movement than that given by the needles drawing it into the fabric.

The main difference between my invention and the old method is in moving the main thread to and from the stationary splicing-thread. By the old way the broken splicing-thread was moved to and from the stationary main thread. When I say "stationary main thread" I mean that it had no other movement than that derived from the needles drawing it into the fabric.

In connection with my splicing attachment I have provided a construction which allows of slackening the stitches where the splicing-thread thickens the fabric.

In the accompanying drawings, Figure 1 is a front view showing the splicer attachment on an ordinary circular-needle machine. Fig. 2 is a detail sectional view on line 2 2 of Fig. 3. Fig. 3 is a side view of the attachment with part of the carrier-block for the main thread in section. Fig. 4 is a detail view similar to Fig. 3 with the carrier-block in a different position. Fig. 5 is a plan view of the attachment. Fig. 6 is a view similar to Fig. 5 with parts removed and parts in section. Fig. 7 is a view similar to Fig. 3 of a modification. Fig. 8 is a view of said modification similar to Fig. 6. Fig. 9 is a detail front view of the modification, some of the parts being omitted.

The attachment comprises an upright plate 1, attached to the machine by a bracket 2. The upright plate is provided with an arm 3, forming a guide for the main thread 4, the lower part of said upright plate having secured thereto a horizontal plate 5. Above this plate and parallel with its upper surface guide-rods 6 extend from the upright plate 1, and at their outer ends these are connected with the horizontal plate 5 by a face-plate 7. The carrier-block 8 slides on the guide-rods 6 and is operated by any suitable connection—as, for instance, the rod 9, the arm 10, and

the rock-shaft 11, the latter being rocked in any well-known manner. The carrier-block has a vertical guide opening or eye 12 for the passage of the main thread, and after passing through this opening the main thread is directed toward the needles through a horizontal passage 13, formed in the lower part of the carrier-block, and thence through a main guide or feed eye 14, which is arranged to direct the thread to the needles, as shown in Fig. 3. This guide-eye is formed through the upright plate 1 and is about on a level with the upper surface of the plate 5, the splicing-yarn 4' passing through an opening 15 in the face-plate 7, thence inwardly and through a loop or eye 16, carried by the main-thread carrier-block, from which it passes outwardly again and then inwardly through a guide-eye 17 on the face-plate and then over the surface of the plate 5 between clamping-jaws 18 of levers 19, which are pivoted to the plate 5. The splicing-thread finally passes through the guide-eye 14 to the needles.

It will be seen from Fig. 3 that the carrier-block operates at a point between the clamping-jaws and the needles. Its lower portion or rib 8', Figs. 3 and 6, is formed with inclines 20, which are adapted to engage inclined shoulders 21 of the levers 19, which carry the clamping-jaws. These parts contact as the carrier-block moves outwardly, and the main thread is made to contact with the splicing-thread, so that as the carrier arrives at the outer end of its stroke, as shown in Fig. 4, and the extent of engagement between the rapidly-moving main thread with the splicing-thread is at its maximum the clamping-jaws are open, and the main thread at once carries the splicing-thread to the needles. It would be seen from a comparison of Figs. 3 and 4 that as the carrier-block for the main thread moves back over the loose end of the splicing-thread it causes the main thread to make contact first with the end of the splicing-thread and then gradually increases this contact to the extent shown in Fig. 4, at which time the clamps are open and the splicing-thread is rapidly carried into the fabric with its loose end in a perfectly-straight condition, being free from loops or bunches, and thus the splicing-thread is introduced with certainty and accuracy at the same point in relation to the revolution of the machine, so as to insure a clear line of demarcation between the spliced and the plain work.

In Figs. 7, 8, and 9 I show a modification in which the clamping-levers 19', instead of being pivoted above the plate 5, are pivoted below said plate, and their clamping-jaws, as shown in Fig. 9, are arranged above the plate, being connected with the levers by the portions 22. This arrangement facilitates threading.

In order to provide for the knitting of slack stitches where the splicing-thread is thrown into the work, I provide a pivoted arm 23, supported at 24 on the bracket 1, said arm

bearing upon an adjustable pin 25, which is connected with a rod 27, extending to the stitch-cam. The lever 23 has an incline on its upper face engaged by a pin 26, carried by the carrier-block. When the carrier-block moves outwardly to effect the introduction of the splicing-thread, this pin riding on the incline of the arm 23 depresses the same, and then through the pin 25 the rod 27 depresses the stitch-cam.

In the operation of the invention, supposing the splicing-thread is held by the clamps with the loose end extending therefrom to the needles, the main thread-carrier is at the inward limit of its stroke near the feeding-eye, as shown in Fig. 3, and there is very little contact between the rapidly-moving main thread and the splicing-thread at this point and not any contact between the threads if the splicing-thread has become worn off up to this point or feeding-eye, as is sometimes the case. The main-thread carrier is now moved away from its inward position back over the splicing-thread, this movement being continued until the splicing-thread is covered by the rapidly-moving main thread, and at nearly the limit of the backward movement the clamps begin to open by the lug or rib on the under side of the main-thread carrier coming in contact with the low inclines on the clamp-jaws, and then the splicing-thread is carried to the needles by the frictional contact with the main thread.

When the splicing-thread is to be broken out, the inward motion of the sliding block will release the clamps gently, which will clamp the splicing-thread, causing it to break at a point at or about the top of the needle-cylinder. The continued motion of the thread-carrier block inwardly will be relieving the splicing-thread from the now unnecessary frictional contact with the main thread from the clamps nearly to the thread-delivering point, and the motion of the sliding block from the time the splicing-thread is clamped to the limit of its inward motion, as shown in Fig. 3, is sufficient to draw a supply of splicing-thread from the bobbin to allow the splicing-thread to be started in toward the needles again on the next course with the least possible resistance from the bobbin. The action of the low inclines, in connection with the clamping-jaws and the carrier, is to cause the jaws to grip the thread gently and by a gradual action, thus avoiding all hammering or severing of the splicing-thread in the clamps.

The carrier may be designated as a movable guide for the main thread. This operates, together with the clamp, at a point between fixed guides for the splicing-thread.

I claim as my invention—

1. In combination, in a splicing attachment for knitting-machines, means for clamping the splicing-thread and means for moving the main thread into contact with the splicing-thread and increasing the contact-surface between the threads, said clamping means hold-

ing the splicing-thread during movement of the means for moving the main thread, substantially as described.

2. In combination in a splicing attachment, means for clamping the splicing-thread while the same is not being fed, and means arranged independent of the clamp and moving substantially parallel with the splicing-thread to lay the main thread in contact therewith, substantially as described.

3. In combination in a splicing attachment for knitting-machines, a carrier for the main thread, an independent clamp for the splicing-thread, and means for operating the carrier to move the main thread into contact with the splicing-thread, substantially as described.

4. In combination, the carrier for the main yarn a clamp for the splicing-thread, and means for moving the carrier at a point between the needles and the clamp to cause the main yarn to contact with the splicing-yarn, substantially as described.

5. In combination, the fixed feeding-eye for the two threads, a movable guide for the main thread, a fixed guide for the splicing-thread, a clamp for the splicing-thread supported independently of the movable guide, said movable main-thread guide being interposed between the two fixed guides, substantially as described.

6. In combination, the fixed feeding-eye for the two threads, a movable guide for the main thread, a fixed guide for the splicing-thread, a clamp supported independently of the movable guide for the splicing-thread, said clamp and movable guide being interposed between the two fixed guides, substantially as described.

7. In combination, the fixed feeding-eye for the two threads, a movable guide for the main thread, a fixed guide for the splicing-thread, a clamp for the splicing-thread, said clamp being adjacent to the fixed splicing-thread guide and said movable guide being interposed between the clamp and the fixed feeding-eye, substantially as described.

8. In combination, the movable carrier for the main thread, a clamp for the splicing-thread arranged independent of the carrier, and means for operating said parts, substantially as described.

9. In combination, the movable carrier for the main yarn, a clamp for the splicing-yarn, and means for operating the parts, said main-thread carrier serving to draw slack in the splicing-thread, substantially as described.

10. In combination, the carrier for the main yarn, a clamp for the splicing-yarn, means for moving the carrier toward and from the clamp, said clamp being closed on the splicing-thread when the carrier moves away, and a guide on the carrier for the splicing-thread to draw slack therein when the clamp is closed, substantially as described.

11. In combination the clamp for the splicing-thread, to hold the same without cutting it a movable carrier for the main yarn, and

means for operating the carrier to place the main thread in contact with the splicing-thread, the said clamp acting to hold the splicing-thread during movement of the carrier, substantially as described.

12. In combination, the clamp for the splicing-thread, a movable carrier for the main thread, means for operating the carrier to place the main thread in contact with the splicing-thread in advance of the opening of the clamps, substantially as described.

13. In combination, the main-yarn carrier, means for operating the same, a clamp controlled by the main-yarn carrier a stitch-cam-operating rod and means whereby said rod is operated from the main-yarn carrier, substantially as described.

14. In combination, the clamp for the splicing-thread, a carrier for the main thread arranged independent of the clamp, and means for moving the carrier to open the clamp, substantially as described.

15. In combination the clamp for the splicing-thread and means for causing the main thread to contact therewith, and increasing the contact-surface between the two threads in advance of the opening of the clamp, substantially as described.

16. In combination, the clamp for the splicing-thread, and means for causing the main thread to contact with the splicing-thread,

the contact-surface between the two threads increasing gradually in advance of and during the opening of the clamp, substantially as described.

17. In combination, the clamp, the main-thread carrier operating between the clamp and the needles, said carrier operating the clamp, substantially as described.

18. In combination, the clamp-levers for the splicing-thread pivoted near the needle-cylinder and extending away therefrom, the said levers having clamping-jaws at their outer ends, and having also low inclines, a carrier for the main thread operating between the clamping-jaws and the needles and adapted to operate the clamping-levers by engaging said low inclines, substantially as described.

19. In combination, the plate 5 the clamping-jaws above said plate, the clamping-levers pivoted below said plate and connected with the clamping-jaws and a carrier for the main thread moving over the plate and operating at a point between the needles and the clamping-jaws, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK WILCOMB.

Witnesses:

H. A. THOMAS,  
E. F. SLOUGH.