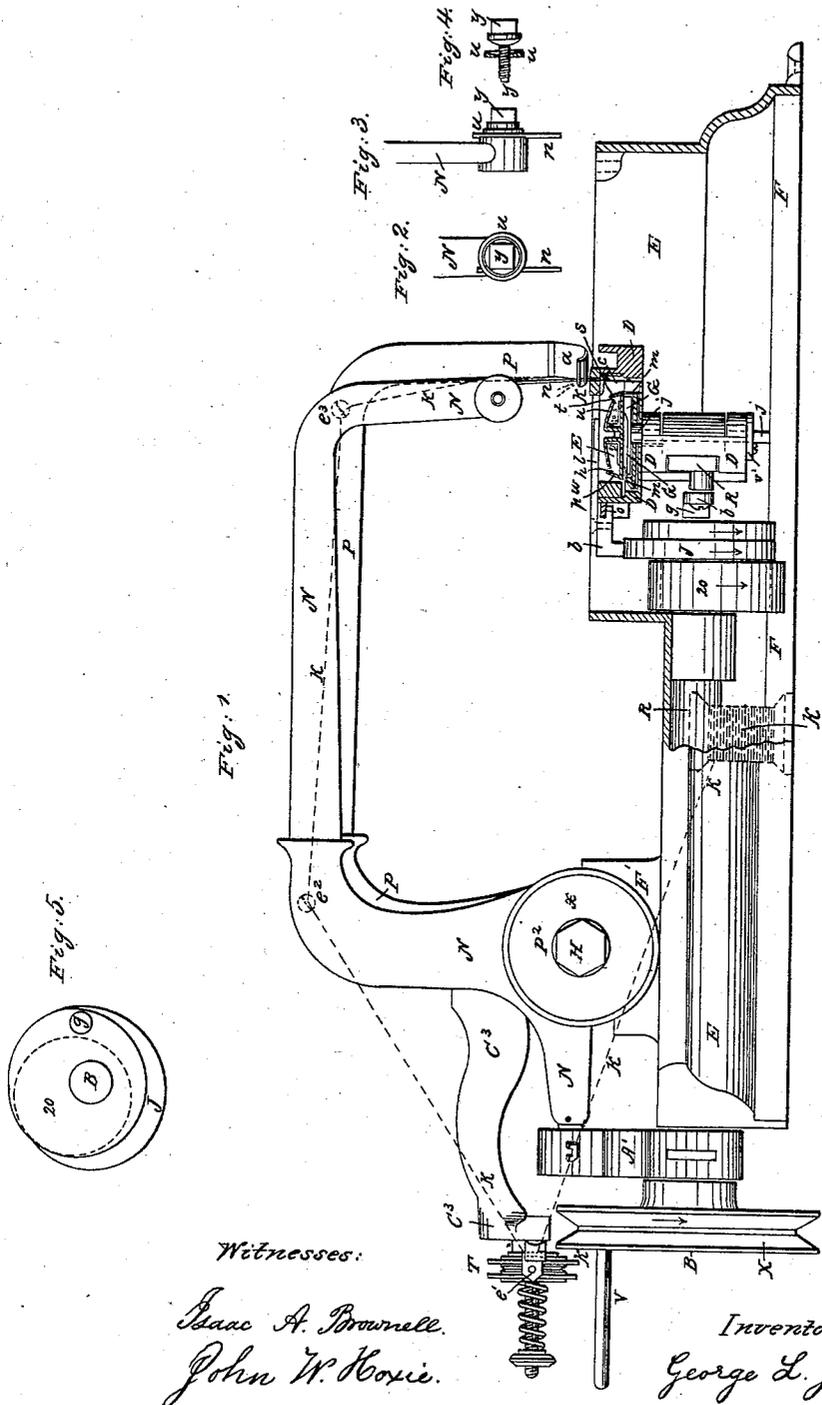


G. L. JENCKS.  
Sewing Machine.

No. 74,694.

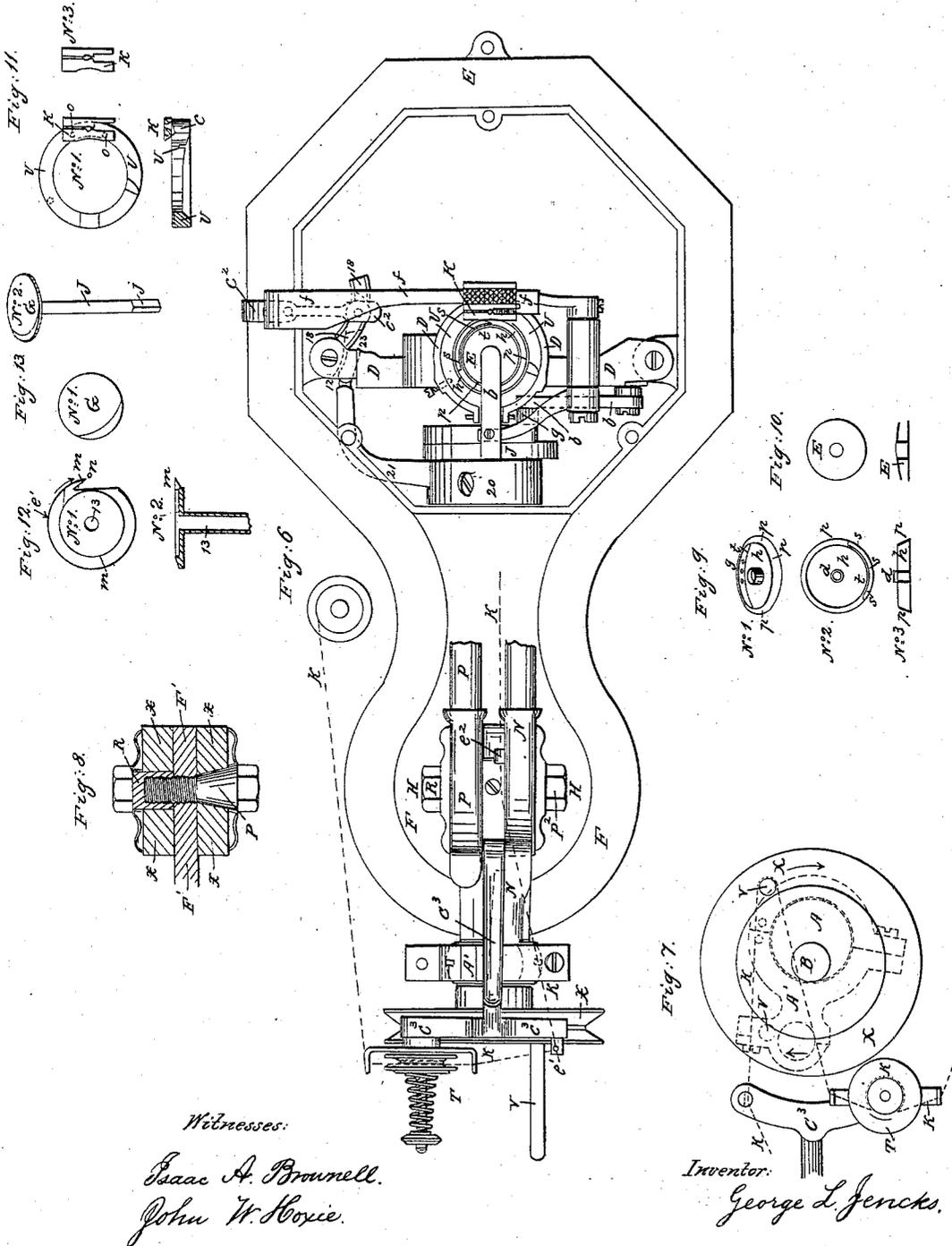
Patented Feb. 18, 1868.



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Witnesses:

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GEORGE L. JENCKS, OF FLORENCE, MASSACHUSETTS, ASSIGNOR TO THE  
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*Letters Patent No. 74,694, dated February 18, 1868.*

## IMPROVEMENT IN SEWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE L. JENCKS, of Florence, in the county of Northampton, and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation and section of the sewing-machine which embodies my said improvements.

Figures 2, 3, and 4 are details of the needle-holding parts of the needle-arm, hereinafter mentioned.

Figure 5 is a face view of the cams that operate the sewing parts, also hereinafter mentioned.

Figure 6 is a plan and section of the said sewing-machine, with the needle-arm and the presser-arm broken away, and the plate or cover over the sewing parts removed, to afford an unobstructed view of the said parts.

Figure 7 is a face view of the tension-device and "take-up" device, hereinafter mentioned, detached.

Figure 8 is a section of the hubs of the said needle-arm and the presser-arm, showing the mode of hanging the same, hereinafter described.

Figure 9, No. 1, is a perspective view of the circular shuttle, No. 2 is a plan, and No. 3 a section, vertically, of the same.

Figure 10 is a plan and a vertical section of the bobbin that operates in said shuttle.

Figure 11, No. 1, is a plan of the "cloth-bridge" and "bridge-ring" detached; No. 2 is a section, vertically, of the same; and No. 3 is a plan of the said "bridge," detached from the said ring.

Figure 12, No. 1, is a plan of the "semi-rotating interlacing-hook," hereinafter mentioned, and No. 2 is a vertical section of the said "hook" and its stem.

Figure 13, No. 1, is a plan, and No. 2 is a perspective view of the pedestal or shuttle-holder, as hereinafter described.

All the parts as exhibited in the drawings are of the full working size, and similar letters and numbers marked thereon denote like parts in all the figures.

My said invention pertains more particularly to that class of sewing-machines in which the stitch is formed with two interlocking threads, by means of an eye-pointed needle and a shuttle, and an interlocking hook, and in which the shuttle is held in one position, while the loop of needle-thread is carried around it by the said hook, in contradistinction with shooting a flying shuttle through the said loop, for the purpose of interlocking the two threads to form the stitch, and is calculated to overcome certain difficulties, which I will mention.

In the mode described and as hitherto practised, of interlocking the needle-thread with the shuttle-thread, by means of the interlacing-hook, the loop of needle-thread, after being carried around the shuttle, is cast off by the hook, and held by a "pad," so called, at a certain position, until the said hook, by its succeeding movement, catches the succeeding loop of needle-thread, and by the continuation of said movement, which carries the last loop around the shuttle, it "takes up" the first loop, and draws it into a stitch against the cloth. By this method of taking up the preceding loop of needle-thread by the same means and movement which carry the succeeding loop around the shuttle, two consecutive movements of the hook are required to form such stitch; or, in other words, the stitch, instead of being completed by one cycle of operations of the machine, is left incomplete in the form of a loop that is held by the said pad, and is only completed by a repetition of the hook's movement during the succeeding cycle of operations, so that at a certain stage of the operation these two incomplete loops of needle-thread, one that is held by the said pad, and one other in the custody of the hook, by the joint action of which two instruments that loop, held by the pad, is made to form a stitch; and if either the pad fails to hold the first loop during the proper interval for the hook to catch and carry the succeeding loop around the shuttle, the stitch is left unfinished, and the hook, by its subsequent movement, is liable to catch and wrest the first loop from the custody of the pad, and subsequently to catch the succeeding loop of needle-thread, and carry both around the shuttle, and by so doing entangle the thread beneath the cloth, and stop the operation of the machine; and it will appear, therefore, that the pad performs an important function in the formation of the stitch, and also that the tension of the two threads must be nicely adjusted with reference to the joint action of the pad and the hook, to avoid the occurrence of these difficulties.

By my said invention, however, I have so combined the joint operations of the hook and shuttle and the needle, as to insure the greatest certainty of catching and carrying the loop of needle-thread around the shuttle, and I have, by dispensing with the said pad, or an equivalent, altogether, and combining with the said sewing parts an independent "take-up" mechanism, been enabled to form the loop and complete each stitch in one and the same cycle of operations of the machine, without depending upon a succeeding operation.

The first part of my invention, therefore, relates to the mode of combining the hook and shuttle with the

eye-pointed needle, and consists in arranging the hook to rotate horizontally next to the inner curvature of the needle which vibrates vertically at right angles to the plane of the said hook, through the cloth, so that the loop which is formed in the bend of the needle will, by reason of the said curvature or shape of the needle, be held apart therefrom and across the track of the rotating hook, when it will be surely caught by the hook and carried around the shuttle, which is also arranged horizontally above the said hook, with its thread-delivery next to the needle.

The second part of my invention relates to the means employed to complete each stitch in succession, and before the formation of a subsequent loop of needle-thread within one cycle of operations of the machine, and consists in combining with the hook and shuttle and eye-pointed needle, arranged substantially as described, an independent "take-up" mechanism for taking up the loop of needle-thread after it is carried around the shuttle and cast off the hook, and during the interval of time occupied by the return of the hook to the position whence it started to catch said loop.

The third part of my invention relates to the means employed to take up the slackness of the loop of needle-thread, as described, in combination with the sewing mechanism constructed and operating as herein described, and consists of a plain stud or rod, in a revolving face-plate, arranged (if convenient) on the driving-shaft, and between the device employed to regulate the tension of the needle-thread, and a guide-eye, from which the thread passes to the needle, so that when the needle-thread would become slack from passing from around the shuttle, the said stud, by revolving against the thread between the two points of confinement above mentioned, will form a loop by the thread passing around it, and by so doing draw the thread through the needle's eye and the intermediate guides sufficiently to produce the stitch in the cloth.

The fourth part of my invention relates to the mode of constructing the shuttle and its appendages, which carries and delivers the shuttle-thread, and consists in making the said shuttle in a circular or elliptical form, and with a bevelled edge to facilitate the passage of the same through the loop of needle-thread, and with a circular recess, that is concentric with the bevelled edge, for the reception of the said bobbin, and in combination with such shuttle, a notch in the bevelled edge for the delivery of the thread from the bobbin, and a spring-presser on the bevelled edge, formed with a delivery-eye at its free end, and in a position at one side of the notch in the bevelled edge for the purpose of producing the requisite tension of the shuttle-thread as it is delivered.

The fifth part of my invention relates to the mode of holding and controlling the action of the said shuttle, and consists in holding or supporting the shuttle upon a stationary plate or pedestal within the circle that is traversed by the rotating interlacing-hook, and just above the latter, for the purpose of holding the shuttle in one position, with its thread-delivery next to the needle, and in maintaining said shuttle in its central position against the face of the loop of needle-thread, in passing around the extreme point of its diameter, by means of a tilting-bar, or its equivalent, with a conical protuberance or centre near its end, which enters the female centre in the middle of the shuttle, when the bar, which is pivoted to one side of the shuttle-frame, is tilted down by suitable means applied to the opposite end, for the purpose of holding the shuttle down in its place, as specified, during the passage of the loop of needle-thread around the shuttle, and except when the bar is required to lift from contact with the shuttle, and permit the loop to pass and be drawn up to form the stitch.

My invention also further relates to the mode of hanging and adjusting the "needle-arm" and the "presser-arm," so called, and to the construction and arrangement of the "cloth-bridge" and its appendages with the aforementioned sewing parts, and to the mode of securing the needle to the needle-arm, all which is hereinafter more particularly described.

To enable others skilled in the art to make and use my said invention, I will proceed to describe the same.

In the said drawings, F is the cast-iron framework or bed, on which the several devices constituting my improved machine are arranged, and motion is communicated to the several parts from the driving-shaft B, figs. 1 and 6, extending lengthwise through the centre of the frame, and driven by a band passing over the groove-pulley X at the rear. N is the needle-arm, carrying the curved eye-pointed needle *n* at its free end, and P is the presser-arm, carrying the presser Q at its free end, both of said arms being pivoted at H to the frame, in a manner more particularly described hereafter, the needle-arm N receiving a vibrating movement vertically by means of an eccentric, A, figs. 1, 6, and 7, on the shaft B, connected, by its strap A<sup>1</sup>, in a ball-and-socket joint, to the end of the short arm that extends from the hub of the needle-arm. T is the device which regulates the tension of the needle-thread, and *e*<sup>1</sup> *e*<sup>2</sup> *e*<sup>3</sup> are the guide-eyes, through which the thread is conducted to the eye of the needle *n*. *f* is the "feed-bar," which is arranged to feed the cloth in either direction to the needle. This feed-bar is operated by the reversible rocker-arm 18, in the curved groove of which a stud on the swinging arm C<sup>2</sup> is made to communicate motion to the feed-bar, such motion being derived from the eccentric, 20, figs. 1, 6, and 5, and imparted to the rocker-shaft through the strap 21 and its curved rod, and suitable connections 22, and the arm 23 on the lower end of said rocker-shaft.

All the parts thus far mentioned are common and well known to those who are acquainted with sewing-machinery, and, except what may be so specified to the contrary hereafter, form no part of my said invention.

The sewing parts and their peculiar arrangement, which constitute the first part of my invention, are exhibited in figs. 1, 6, 9, 10, 12, and 13, in which *m* is the interlacing-hook, on a hollow vertical stem, 13, having a suitable bearing, in which the stem rotates, in the framework D, by means of the pinion-gear S on the stem, and a rack, R<sup>1</sup>, meshing with said pinion, and sliding in the said frame by motion communicated through the connection *b* from the crank-pin *g* on the end of the driving-shaft B, whereby sufficient movement is obtained to impart, by means of the said rack and pinion, about seven-eighths ( $\frac{7}{8}$ ) of a revolution to the interlacing-hook in a forward direction, and to return the same during one complete revolution of the driving-shaft B.

The arrangement of the hook and shuttle with the curved eye-pointed needle is shown in figs. 1 and 6, the needle *n* being held in its arm in a similar position to that of curved needles in other machines, the eye of the needle, however, opening from the front of the machine, or in the direction of the length of the needle-arm, instead of laterally or crosswise, as when the hook and shuttle are arranged on one side of the said needle, and the hook *m* and shuttle *h* are arranged horizontally with the movement of the needle *n*, next to it, and at the rear of the needle, the axis of the hook and shuttle being directly opposite the needle in a radial line with the axis of the needle-arm, so that the loop of thread which forms in the inner curvature or side of the needle on which said hook operates has a tendency to stand out and apart from the needle, in consequence of the needle's concavity on this side, and by arranging and operating the hook with the said concavity of the needle, the loop of needle-thread is more certain of being caught by the action of the hook, and its operation and subsequent operations depending thereon are rendered more nearly positive than heretofore. The hook *m* rotates on its stem *l* in vertical bearings formed in the frame *D* from the position, with reference to the needle *n*, as shown in fig. 12, past the needle, from which it catches the loop of needle-thread presented to it on the inner curve of the needle, as seen in fig. 1, which it carries around the shuttle to the position shown by red lines, fig. 1, and until it has reached the point marked *e'*, fig. 12, when the loop of needle-thread is cast off, and the hook returns preparatory to repeating its said movement of catching the succeeding loop, during which time of returning, the cast-off loop is taken up and drawn with the requisite tension into the cloth by means of a separate and independent mechanism, which draws the thread quickly through the needle's eye when the loop is cast off, and thus completes the stitch during one cycle of operations of the machine.

The said mechanism for taking up the loop of needle-thread to complete the stitch is shown in figs. 1, 6, and 7, in which the thread *K* is shown passing from the spool through the guide-eyes, and around the friction-bobbin *T* of the tension-mechanism, thence under and around the stud *V* in the face of the driving-pulley *X*, and through the guide-eye *e'* on the opposite arm of the stand *e''* from the tension-device, and thence it passes through the guides *e'' e'''* on the needle-arm to the point of the needle in the usual way. By means of this arrangement of parts, when the loop is cast off, the needle has lifted out of the cloth, and the stud *V*, which is to take up the loop, is in the position shown by dotted lines in fig. 7, and in full lines, fig. 1, and, by continuing the movement of the machine, the stud *V* is carried round to the position shown in full lines in fig. 7, drawing the thread around it in the form of a loop, and thereby taking up the slackness created by the passage of a loop of the thread around the shuttle, as described.

The shuttle and its appendages for producing tension for carrying and delivering the under or shuttle-thread are constructed, as shown in fig. 9, in the form of a circular piece, with a bevelled edge, *p*, and a circular recess in the upper face for the reception of the bobbin *E*, fig. 10, which turns on the hollow centre-pin *d* of the shuttle. The shuttle's edge is bevelled inward or towards its centre from the bottom or under side upon which it rests, for the purpose of enabling the uppermost of two threads of the loop, when it meets the edge of the shuttle in being carried around it, as before explained, to pass upward over the shuttle, while the under or other thread of the loop is carried in a direct line from the position of the needle's eye, when it is caught therefrom beneath the shuttle; this bevelled edge of the shuttle, and a similar edge on the hook-disk, considering the arrangement of the sewing parts, greatly facilitating the proper disposition of the loop of needle-thread around the shuttle, and the final completion of the stitch in the period of time allotted therefor. The thread passes from the bobbin in the shuttle through a small notch, *t*, cut in the bevelled edge, as shown clearly in fig. 9, No. 1, and the tension of this thread is regulated as it is delivered by means of the slight spring-presser *s*, one end of which is riveted to the outer surface of the bevelled edge, and the free end of said spring extends over and past the delivery-notch *t*, and is provided with a similar notch or delivery-guide, from which the thread passes immediately to the cloth. By this arrangement of a spring-presser and delivery-notch in the shuttle, the thread is made to deviate from its direct course, and two bights or turns are formed in the thread, which produces a tension which is tempered and regulated by the yielding action of the free end of the spring, from which the thread is finally delivered.

The said shuttle is held, and its action controlled to a certain extent by means of the stationary disk or pedestal *G*, on which it rests, and the tilting-bar or finger *l*, which keeps it in its central position. This pedestal consists of a circular plate, with a long stem, *j*, extending from its centre on one side, which is inserted and held within the stem of the interlacing-hook, beneath which is arranged a square socket in the plate *V''*, fig. 1, into which the squared end of the pedestal-stem *j* is fitted, and by that means kept from contact and prevented from turning by the movements of the hook. The tilting-bar or finger *l* is pivoted near its middle to one side of the circular part of the framework that surrounds the shuttle and hook, and it extends in one direction with its end over the centre-pin of the shuttle, which is made hollow to receive a small conical protuberance or centre, *r*, on the under side of this end of said bar. The opposite end of this bar or finger is weighted or made heavier, and rests on the cam *J*, on the driving-shaft, by the revolution of which this end of the bar is lifted and the opposite end depressed, so that the protuberance *r* will enter the centre of the shuttle and hold it in its place in the centre of the hook, and from being carried against the needle while the loop is being carried around it, and also prevents the shuttle from lifting from the pedestal, and by so doing prevent the uppermost thread of the loop from passing under it, (the shuttle.) After the loop has been carried partly around the shuttle, the protuberance *r* is permitted to rise from the shuttle, so that the thread over the shuttle may pass by the protuberance entirely over the shuttle, and be taken up, as before explained. If the weight of the end of the tilting-bar should prove insufficient to insure its prompt action, when the machine is operated with rapidity, or from other causes, a slight spring, *w*, may be interposed between the bar and the side of the framework, as shown at *w* in fig. 1, so as to lift the protuberance from the shuttle as quickly as may be necessary.

The construction and arrangement of the cloth-bridge which supports the cloth beneath the needle, and

the parts which are immediately connected therewith for the adaptation of the action of the needle to the formation of the stitch, by the arrangement of the shuttle and interlacing-hook therewith, as above described, have been mentioned as forming part of my said invention. The said cloth-bridge and the parts alluded to are shown separately in fig. 11, and in connection with the sewing parts in figs. 1 and 6. In fig. 11 the cloth-bridge K may be formed in a separate piece, or it may be formed of the same piece as the bridge-ring U, to which it is otherwise attached by means of two dowel-pins, *o o*, in the bridge, which enter two holes in the ring, the bridge alone, or the bridge and ring, requiring to be removable for the substitution of other bridges adapted to different sizes of needles. Beneath the cloth-bridge, in the ring, is formed a vertical recess or needle-way, *c*, in which the needle vibrates, to form the loop, and present it in the proper position to be caught by the interlacing-hook. This bridge-ring is confined in the circular portion of the framework, which holds the hook and shuttle. And when the needle passes through the cloth into the recess in the bridge-ring, and carries the loop of needle-thread, the interlacing-hook catches the loop just above the needle's eye, and trails the lowermost thread of the loop, which is delivered from said eye against and around the lower corner or edge of the recess or needle-way in the ring, and thence in a direct line beneath the shuttle, while the uppermost thread of the loop passes over the shuttle, in the manner before explained; the arrangement of the recess or needle-way in the bridge-ring, with the needle, and the hook and shuttle, contributing to the proper formation of the stitch.

The mode of hanging and adjusting the needle-arm and the presser-arm, above alluded to as forming part of my said invention, is shown clearly in fig. 8 of the drawings, and consists in forming the said arms with a broad, flat, circular hub, *x*, around their axis, and confined on opposite sides of a stout rib, *F'*, on the rear end of the frame, by means of a tapering screw-stud, *P<sup>1</sup>*, passing through the hub of the needle-arm, and screwed into the said rib; and a screw-sleeve, *R*, passing through the hub of the presser-arm, and screwing on the end of the stud *P<sup>2</sup>*, with its (the sleeve's) end bearing against that side of the said rib, so that by screwing up the said stud the needle-arm will be tightened in its bearing, and by screwing up the sleeve the presser-arm will be tightened in the bearing, and also that the sleeve will bind the stud between the threads of the stud and the rib, and so check and prevent the accidental unscrewing of either part.

The improved mode of securing the needle *n* in the end of the needle-arm *N*, is shown in figs. 2, 3, and 4. The needle is held in a groove, formed in one side of the end of the needle-arm, by means of a screw-bolt, *y*, with a convexity under the head, and washer *z*, formed with a concavity upon one side, to fit the under side of the said bolt-head, so that the washer may incline or tip to one side, and at the same time fit nicely against the under side of the bolt-head, when it is screwed against the needle in the groove of the arm which is on one side of the bolt, by which arrangement the needle is the more readily placed and adjusted in the end of the arm, and gripped more firmly than by means of the "needle-yoke," so called, heretofore generally used.

Having now described the nature of these several improvements, and the manner of carrying the same into effect, I wish it to be understood that what I claim, and desire to have secured to me by Letters Patent, is—

1. The manner of combining and arranging both the interlacing-hook and shuttle, constructed as described, upon the concave side of the curved needle, so that the loop of the needle-thread will be presented to the hook and shuttle from the curved side of the needle, and carried thence directly to the rear of the needle, and around the shuttle, substantially as shown and described.
2. I claim so combining and arranging the said hook and shuttle, and the eye-pointed needle, as described, with the independent mechanism set forth for taking up the loop of the needle-thread after it has been carried around the shuttle, as described, that the said loop may be taken up and the stitch completed at one and the same cycle of operation of the machine, substantially as described.
3. I claim the take-up mechanism, substantially as described, in combination with the sewing-mechanism, constructed and operating substantially as set forth.
4. I claim the circular shuttle, constructed substantially as described, with a bevelled edge, and in combination therewith a delivery-notch and a spring presser, arranged substantially as described, for the purpose of producing the requisite tension of the shuttle-thread as it is delivered, substantially as described.
5. I claim mounting or holding the shuttle upon a stationary pedestal or its equivalent, as described, and controlling the operation of the shuttle by means of a tilting-bar or finger, or its equivalent, arranged to operate therewith, substantially as and for the purpose specified.
6. I claim the interlacing-hook, in combination with the bevelled-edged shuttle, constructed and operating as described, to catch and carry the loop of needle-thread around said shuttle, substantially in the manner described.
7. I claim so combining the recess *c*, in which the needle vibrates, and the bridge-ring, and the interlacing-hook, and shuttle, constructed and arranged substantially as described, that the lower thread of the loop will be caught by the hook and carried in a direct line beneath the shuttle, while the upper thread of said loop is carried against the bevelled shuttle-edge, and over the shuttle, substantially in the manner and for the purpose specified.
8. I claim the construction and mode of hanging and adjusting the needle-arm and the presser-arm, by means of the screw-stud and screw-sleeve, in combination substantially as described.
9. I claim the mode of securing the needle *n*, at the end of the needle-arm, by means of the screw-bolt and washer, constructed substantially as described.

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