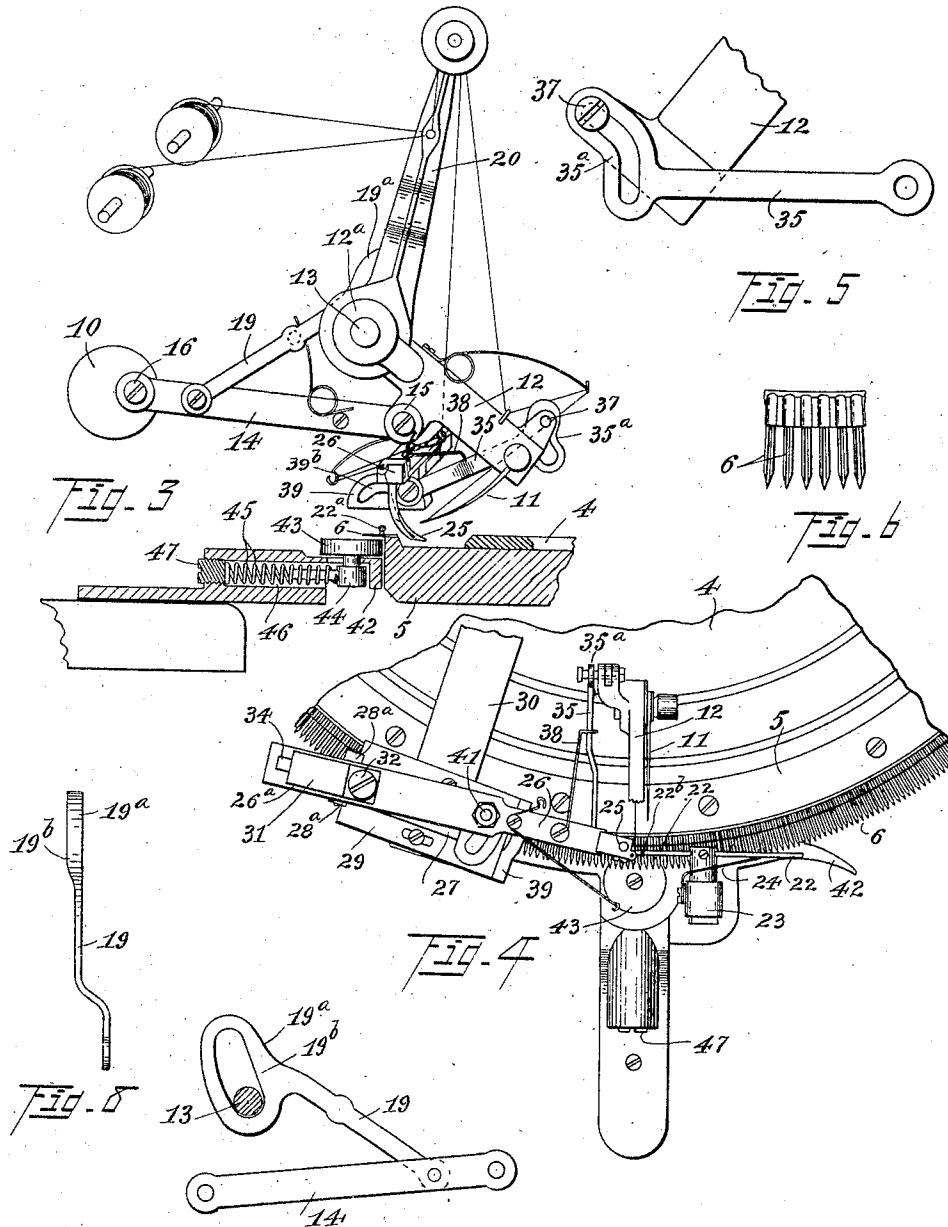


W. C. WRIGHT.
MACHINE FOR UNITING KNIT FABRICS.
APPLICATION FILED APR. 16, 1912.

1,057,106.

Patented Mar. 25, 1913.

4 SHEETS—SHEET 2.



Witnesses:

H. Griewold
E. P. Schlosser

Fig. 7

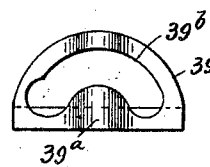
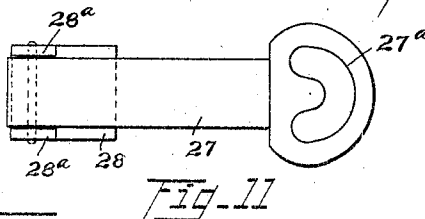
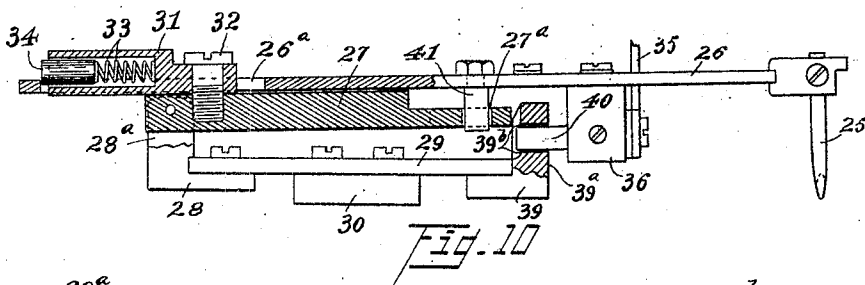
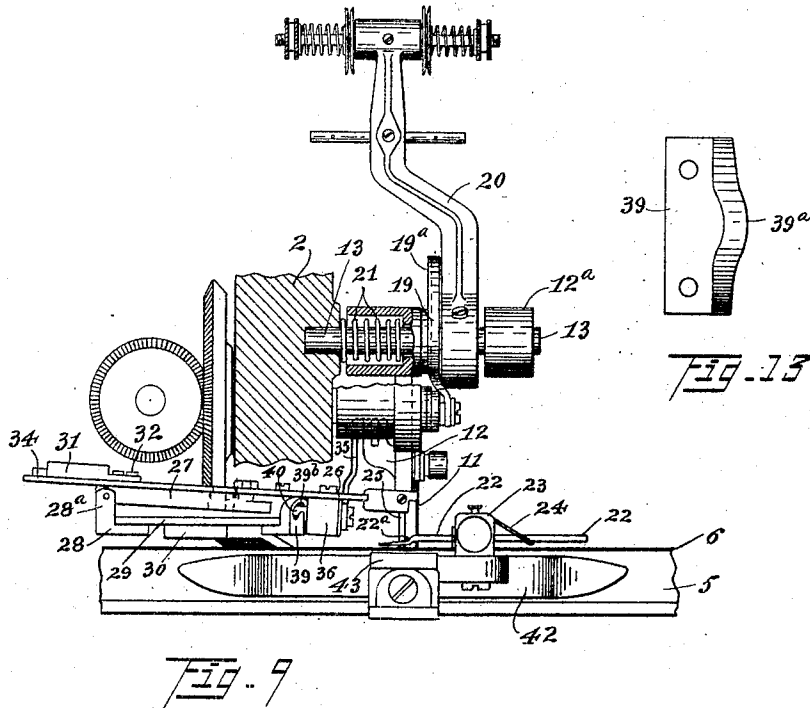
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Witnesses:

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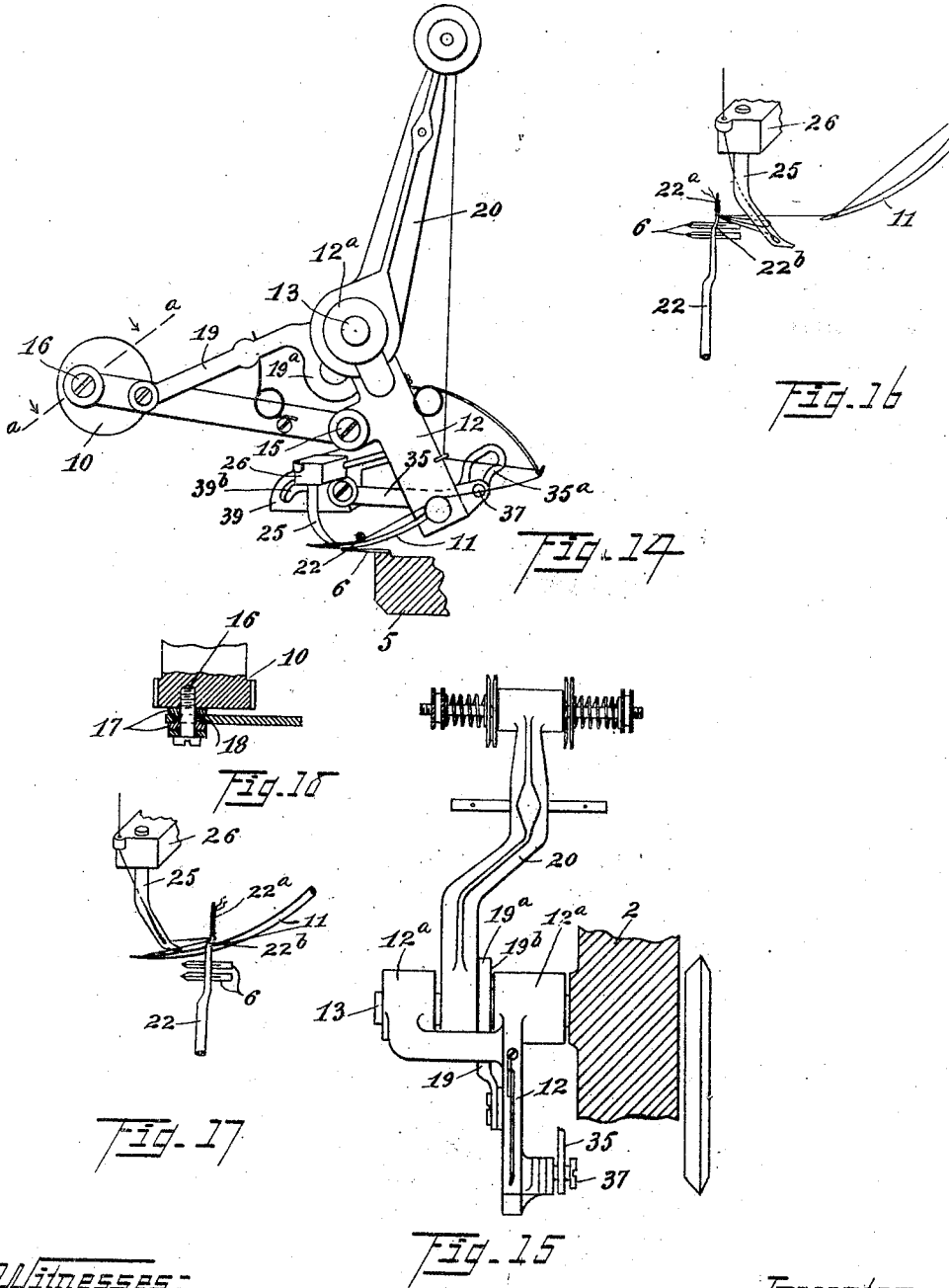
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4 SHEETS-SHEET 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR UNITING KNIT FABRICS.

1,057,106.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed April 16, 1912. Serial No. 691,179.

To all whom it may concern:

Be it known that I, WILLIAM C. WRIGHT, a citizen of the United States, residing at Paducah, in the county of McCracken and State of Kentucky, have invented certain new and useful Improvements in Machines for Uniting Knit Fabrics, of which the following is a specification.

My invention relates to improvements in machines for uniting knit fabrics, the machine being adapted to unite or connect the meeting edges of two pieces or portions of knit fabric by joining the loops of the adjacent edges thereof by means of an elastic seam or chain of stitches as in the production of hosiery, underwear and the like.

The present embodiment of the invention is particularly designed for closing the usual opening in the toe portion of the knitted stocking, and is designed to form an elastic chain of stitches for joining the adjacent loops of the two portions of the fabric to be united, said elastic chain or seam being formed transversely in the toe portion of the stocking and being adapted to cooperate with the loops of the stocking fabric to provide transverse elasticity in this portion of the stocking.

The present improvements are particularly designed and adapted for use in connection with machines of this class in which a continuous and uniform revolving movement or motion is imparted to the ring of impaling-pins by mechanism of the general character disclosed in the application of Edwin O. Davis, filed April 22, 1909, Serial No. 491,511, the present improvements relating particularly to mechanism for imparting a combined reciprocatory and lateral movement to the curved thread needle as the latter passes through the loops of fabric and above the impaling-pins, said lateral movement of the curved thread needle corresponding to the movement of the subjacent impaling-pins.

In order to provide the necessary or required elasticity in the uniting seam or chain of stitches, a stitch finger is mounted above and extends in the direction of the travel of the ring of impaling-pins in cooperative relation with the thread needle and thread carrying looper in the stitch forming operation, said stitch finger being adapted to be included in a chain of uniformly formed stitches, thus providing the necessary or de-

sired elasticity in the latter as withdrawn or shed off by the progressive movements of the united loops upon the subjacent impaling-pins, the present improvements relating particularly to improved mechanism for operating the thread needle and thread carrying looper, the mechanism for operating the latter being connected to and operated directly from the thread needle arm and being preferably mounted on the dial support opposite the feed side of the sewing mechanism thus affording free or unobstructive access to the latter as in threading the needle and looper, said looper operating mechanism being adapted to work at right angles to the reciprocatory movements of the thread needle.

A further object of the invention is to provide improved and simplified mechanism for operating the thread needle arm as well as moving the thread needle arm and thread needle laterally to correspond with the movement of the subjacent impaling-pin while the curved thread needle is in the loops.

A still further object is to provide an improved feed roll immediately beneath the paths of travel of the reciprocatory thread needle and looper and the cooperating stitch finger whereby the loops of fabric to be united are held and maintained in proper relative position during the sewing operation.

With the above mentioned and other ends in view the invention consists in the novel construction, arrangement, and combination of parts, hereinafter described, illustrated in one of its embodiments in the accompanying drawings and particularly pointed out in the appended claims.

Referring to the drawings, forming a part of this specification, Figure 1, is a top plan view of a machine constructed in accordance with my invention. Fig. 2, a side elevation of the same. Fig. 3, an enlarged side elevation of the sewing mechanism from the feed side thereof, the subjacent dial portion and feed roll mounting being shown in section for the purpose of clearer illustration of the parts of the latter. Fig. 4, a top plan view of the same, the overhanging dial supporting arm and dial actuating driving shaft being removed. Fig. 5, an enlarged side elevation of the connecting arm or link between the thread needle arm and the looper carrying arm. Fig. 6, a fragmentary detailed view

of the impaling-pins. Fig. 7, an enlarged side elevation of the needle arm actuating pitman or connecting link, and the wiper arm having a slotted bearing or cam head adapted to impart the required lateral movement to the needle arm as the latter is reciprocated. Fig. 8, a top plan view of the wiper arm and slotted cam head. Fig. 9, a rear elevation of the sewing and looper mechanism. Fig. 10, an enlarged view, partly in side elevation and partly in longitudinal section, of the looper actuating mechanism. Fig. 11, a top plan view of the supporting cam lever adapted to support the looper carrying arm and give the latter the requisite longitudinal movement during its reciprocatory movement by the action of the thread needle arm. Fig. 12, an end view of the stationary slotted cam head or bracket adapted to cooperate with the supporting cam lever and looper carrying arm in imparting the requisite undulatory and reciprocatory movements to the latter. Fig. 13, a top plan view of the same. Fig. 14, a view of the looper and thread needle mechanism, the looper being about to take up the thread from the thread needle. Fig. 15, a front elevation of the reciprocatory needle arm showing its mountings and connections. Fig. 16, a detailed perspective view of the thread needle, thread carrying looper, and stitch finger, the thread needle being about to take up a loop from the looper hook. Fig. 17, a similar view showing the looper hook about to take up a thread or loop from the thread needle. Fig. 18, a detailed sectional view of the universal bearing joint taken on line *a-a* of Fig. 14.

Similar numerals of reference designate like parts throughout all the figures of the drawings.

The improved machine comprises a stationary bed plate 1, provided with an upwardly and outwardly projecting supporting arm 2. The arm 2, terminates in a bearing head 2^a, carrying a vertical shaft 3, and a stationary supporting disk or dial plate 4. The stationary support or dial plate 4, may be provided with the usual ring 5, carrying a peripheral series of outwardly extending impaling-pins 6. The loops of the fabric to be united are placed over the impaling-pins 6, in a well known and understood manner, and the ring of impaling-pins is given a continuous and uniformly revolving movement by means of suitable driving mechanism, comprising a driving shaft A mounted in a movable shaft carrying arm B, said shaft A, receiving its motion by means of a bevel gear C, meshing with a bevel gear D, on the main driving shaft 7, the outer or free end of the driving shaft A, being provided with a worm gear E, normally meshing with a gear wheel F, (see Fig. 2,) carried upon a shaft G, mounted

beneath the dial plate 4, said shaft G, being provided at one end with a pinion H, meshing with a rack on the under side of the ring 5, carrying the impaling pins 6. The driving shaft 7, is adapted to receive its motion by means of a suitable pulley 8, adapted to carry a suitable belting communicating with a suitable source of power, and pulley clutch mechanism 9.

As a means for actuating the various parts or members comprised in the stitch forming mechanism, the driving shaft 7, may be provided with a crank disk or head 10, and the curved thread needle 11, is carried by and reciprocated over and above each of the impaling-pins by means of an oscillating needle arm 12, carried upon a bearing shaft or stem 13, extending from the side of the supporting arm 2, of the machine.

The oscillating needle arm 12, is adapted to be reciprocated by means of a pitman or connecting arm 14, connected at one end by means of a suitable coupling or connection 15, and at the other by means of a suitable universal coupling or connection 16, the latter preferably comprising a suitable bearing screw 16, mounted in the crank disk or head 10, of the driving shaft 7, said bearing screw passing through a pair of semi-spherical shaped members 17, loosely fitted on the bearing member 16, and having their convex sides extending toward each other and set in a bearing opening 18, as shown most clearly in Fig. 18, of the drawings.

The needle arm 12, is provided at its upper portion with two bearing heads 12^a, on the bearing shaft or stem 13, and said bearing heads 12^a, are adapted to be moved longitudinally on said shaft or stem 13, whereby said needle arm 12, and thread needle 11, are moved laterally during both their to and fro reciprocation, by means of a wiper arm 19, pivotally connected at one end to the pitman or link member 14, and provided with a slotted bearing head 19^a, mounted on the shaft or stem 13, and interposed between the stationary standard 20, and the adjacent bearing head 12^a, the side of said bearing head 19, adjacent to the bearing head 12^a, having an inclined bearing portion or cam face 19^b, said inclined bearing portion 19^b, being adapted to move the needle arm 12, laterally against the resistance of a spring 21, (see Fig. 9) as the curved thread needle 11, is reciprocated forwardly and through the loops of fabric to be united in the stitch forming operation, and it will be observed that as said needle arm 12, and curved thread needle 11, are moved rearwardly, the bearing heads 12^a, of the needle arm will be returned to their former position as the bearing head 19^a, is returned to its initial position, as particularly illustrated in Figs. 3, and 7. of the

drawings. By reason of this movement it is obvious that as the needle arm 12, is reciprocated it will be moved laterally in its to and fro movements and thus carry the thread needle laterally while in the loops of fabric to correspond with the movement of the impaling-pins carried by the continuously rotating ring.

A stitch carrying guide member or stitch finger 22, is pivotally mounted in a supporting bracket 23, at one side of the ring of impaling-pins, the free end of said stitch finger being provided with a slightly depressed pointed or tapered tongue portion 22^a, said tapered tongue portion 22^a, being adapted to ride upon a plurality of the subjacent pins when the latter are empty and to ride or travel upon a plurality of the adjacent loops of the fabric to be united as the latter are carried under the tongue portion of the stitch finger by the impaling-pins. The depressed tongue portion 22^a, of the stitch finger is held down by the action of a spring 24, extending from the supporting bracket 23, the depressed tongue portion 22, of the stitch finger terminating in an offset portion 22^b, the curved thread needle 11, being adapted to pass at the rear of and in close proximity to the offset portion 22^b, during its reciprocatory movements through the loops of fabric to be united and over and above the subjacent impaling-pins carrying the loops to be united by the stitch forming operation.

As a means for supporting and giving the thread carrying looper 25, the necessary movements in the loop and stitch forming operation, a looper carrying arm 26, is provided, said looper carrying arm 26, being slidably mounted upon a supporting cam lever 27, carried in bearing lugs 28^a, of a supporting bracket 28, carried upon a supporting bar 29, the latter being carried above the path of travel of the subjacent impaling-pins and opposite the fixed side of the sewing mechanism through the medium of an overhanging supporting arm or bracket 30, secured to the dial plate 4.

The rear of the looper carrying arm 26, is slidably connected to the supporting lever 27, by means of a slot 26^a, taking over a guide block 31, secured to the supporting lever 27, by means of a screw 32, said guide block 31, containing a coiled spring 33 (see Fig. 10) operating against a plunger member 34, which latter engages within the rear portion of the slot 26^a, to reciprocate the looper carrying arm 26, longitudinally as acted upon by the cam and other actuating mechanism hereinafter described.

As a means for actuating the looper 25, and looper carrying arm 26, by and in unison with the needle arm 12, the latter is connected to the free end of the looper carrying arm 26, by means of a connecting link

member 35, the opposite end of the link member 35, being connected to a depending bearing block 36, carried by the looper arm 26, the connection between the link member 35, and the needle arm 12, being made by means of a slotted head 35^a, operating on a bearing bolt or pin 37, and as a means for insuring the proper actuation of said slotted head with respect to the needle arm 12, when the latter is at or near its rearward or most retracted position as illustrated in Figs. 1 to 4 inclusive of the drawings, the looper carrying arm 26, may be provided with a wiper spring 38, adapted to engage with the connecting link member 35, at a proper time during the reciprocatory movements of the parts.

As a means for giving the looper carrying arm 26, the proper compound or combined longitudinal and undulatory movements whereby the looper 25, is given the proper movement with respect to the reciprocatory thread needle and over and about the offset portion 22^b, of the stitch finger 22, in the stitch forming operation, a cam head or bracket 39, is connected to the supporting bar 29, said bracket 39, being provided with a cam face 39^a, adapted to bear against the bearing block 36, for moving the looper carrying arm 26, longitudinally, and as a means for giving the free end of the looper arm 26, an oscillating or undulatory movement, said cam head or bracket 39, is provided with a guide slot 39^b, adapted to receive and contain a guide pin or member 40 extending from the bearing block 36. As a further means of holding and guiding the parts in proper position, the looper carrying arm 26, may be provided with a depending guide pin or member 41, extending into and adapted to travel within a curved guide slot 27^a, at the end of the supporting lever 27. As a further means of assisting the work guide member 42, in directing and holding the work or loops of fabric to be united in proper position upon the impaling-pins during the sewing operation, a horizontally mounted feed roll or disk 43, is provided, said disk or roll 43, being adapted to bear against and travel upon the outer periphery of the ring 5, immediately beneath the impaling-pins and the paths of travel of the reciprocatory thread needle and looper (see Fig. 3,) and being movably and resiliently held in position by means of a movable bearing 44, operating against the resistance of a spring 45, said spring 45, being mounted in a guide opening 46, in the bracket portion, the spring being removably retained by means of a threaded plug 47.

By reason of the above construction it will be seen that the looper hook is operated by simple mechanism directly from the needle arm and that the needle and looper move in paths on opposite sides respectively of the

offset or shoulder portion 22^b, of the stitch finger, the initial stitch being formed over and about said shoulder whereby said shoulder forms the zone of formation, and said tapered tongue portion 22^a, forms the zone of retreat for the stitches.

From the foregoing description, taken in connection with the accompanying drawings, the operation and advantages of my invention will be readily understood.

Having thus described one of the embodiments of my invention, what I claim and desire to secure by Letters Patent is,—

1. In a machine for uniting knit fabrics, the combination with a reciprocatory needle arm, a ring of impaling-pins, and suitable actuating mechanism; of a looper carrying arm, means for connecting the latter to and reciprocating the same from said needle arm a supporting lever, a support for said supporting lever, and cam and slot members for cooperating with said looper carrying arm as the latter is reciprocated by said needle arm.

2. In a machine for uniting knit fabrics, the combination with a ring of impaling-pins, means for continuously and uniformly revolving the same, an overhanging supporting arm for said ring of impaling-pins provided with a bearing stem, a needle arm mounted on said bearing stem, means including a pitman arm for reciprocating said needle arm, and a movable arm carried by said pitman arm and provided with a cam head adapted to move said needle arm laterally on said bearing stem during its reciprocatory movements.

3. In a machine for uniting knit fabrics, a ring of impaling-pins, a driving shaft, means for actuating said ring of impaling-pins from said driving shaft, a reciprocatory needle arm operatively connected to said driving shaft, a looper carrying arm, a connecting link member connected to said needle arm and said looper carrying arm, a support for said looper carrying arm, and cam mechanism for giving said looper carrying arm a combined reciprocatory and undulatory movement.

4. In a machine for uniting knit fabrics, a supporting bar provided with bracket members, a pivotally mounted supporting lever carried by one of said bracket members and provided at its free end with a curved slot, a looper carrying arm slidably mounted on said supporting lever and provided with a guide pin extending into said slot, a looper hook carried on the free end of said looper carrying arm, a reciprocatory needle

arm, and a connecting link member extending between said needle arm and the free end of said looper carrying arm.

5. In a machine for uniting knit fabrics, a continuously revolving ring of impaling-pins, a driving shaft, a laterally movable reciprocatory needle arm carrying a curved thread needle, a connecting arm connected to said needle arm and said driving shaft, and a wiper arm connected to said connecting arm and provided with a slotted cam head adapted to move said needle arm and curved thread needle laterally during its reciprocatory movements in the loops to correspond with the movements of the latter as carried by the subjacent impaling-pins.

6. In a machine for uniting knit fabrics, a driving shaft, a ring of impaling-pins, means for continuously revolving the latter from said driving shaft, a supporting arm for said ring of impaling-pins, a bearing stem carried by said arm, a needle arm carried by said bearing stem and movable laterally thereon, a laterally movable pitman or connecting arm connecting said needle arm to said driving shaft, and a wiper arm having a slotted cam head taking over said bearing stem and adapted to move said needle arm laterally thereon during its reciprocatory movements.

7. In a machine for uniting knit fabrics, the combination with a ring of impaling-pins, means for continuously revolving the latter, a driving shaft, a needle arm provided with a curved thread needle, means for reciprocating said needle arm from said driving shaft, means for moving said needle arm laterally during its reciprocatory movements whereby said thread needle is carried laterally while in the loops to correspond with the movement of the subjacent impaling-pin, a stitch finger provided with a tapered tongue portion adapted to ride upon a plurality of the loops to be united and having an offset portion in close proximity to the path of said thread needle, a looper carriage mounted at the rear of the sewing mechanism including a looper carrying arm and cam mechanism for operating the latter, and a connecting link extending between the free end of said looper carrying arm and said needle arm.

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

WILLIAM CARPENTER WRIGHT.

Witnesses:

M. D. LEE,

L. M. HELWIG.