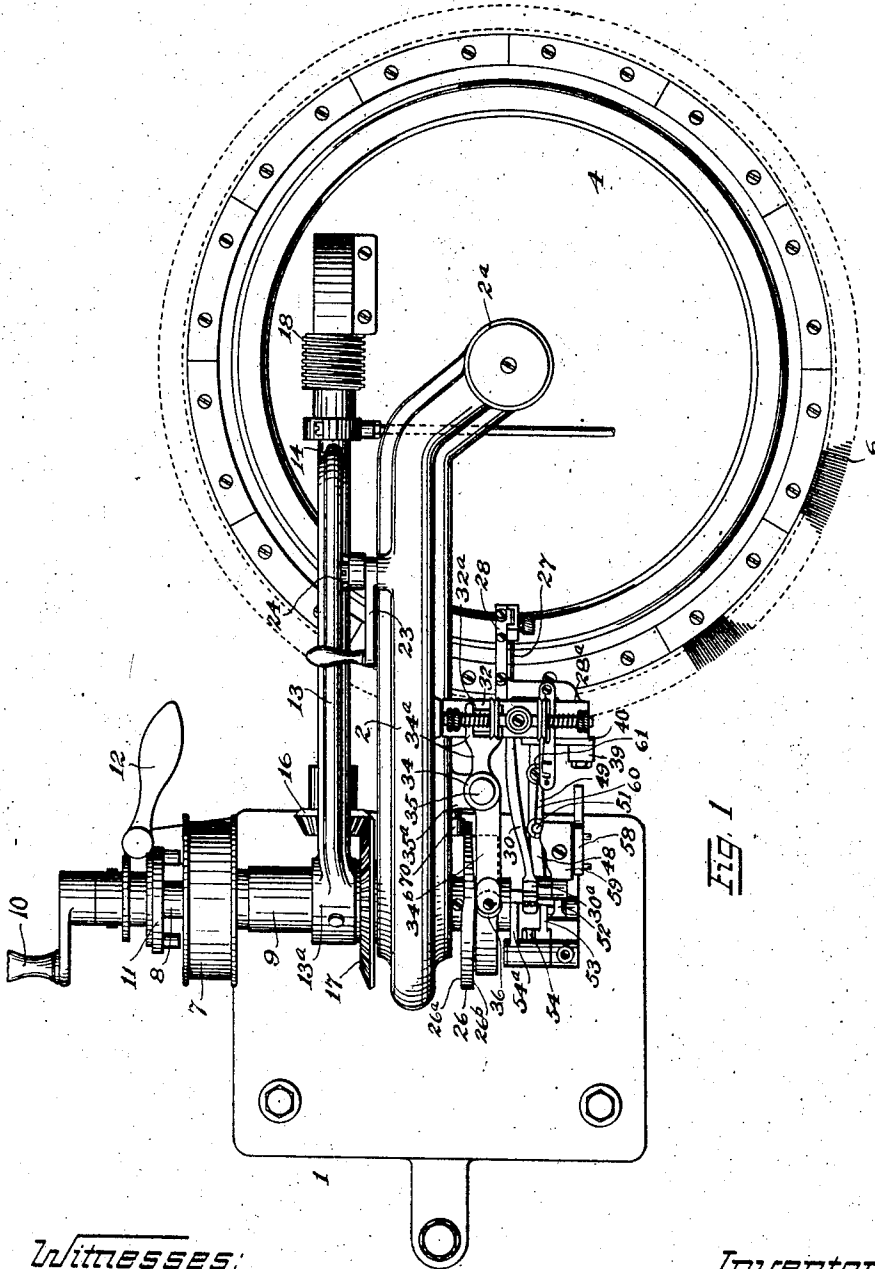


E. O. DAVIS.
MACHINE FOR UNITING KNIT FABRICS.
APPLICATION FILED MAY 14, 1910.

1,050,433.

Patented Jan. 14, 1913.
4 SHEETS—SHEET 1.



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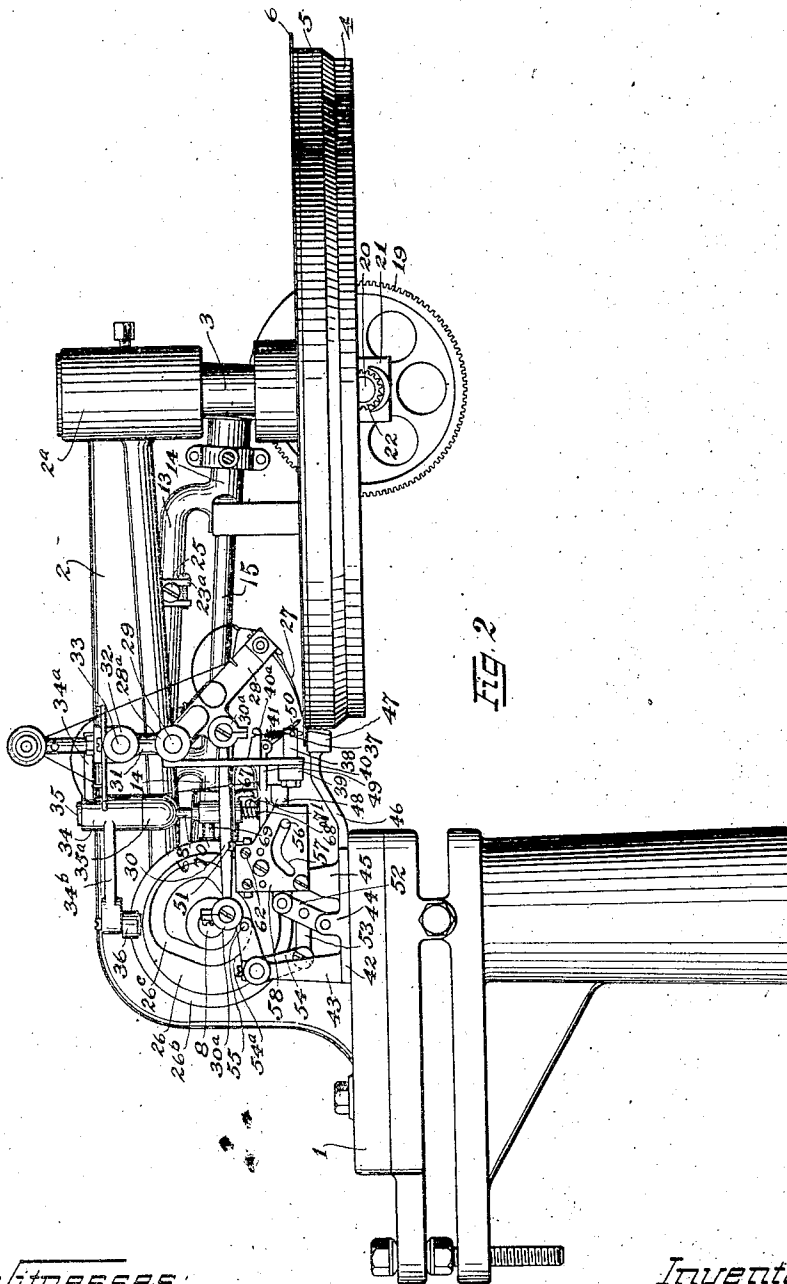


FIG. 2

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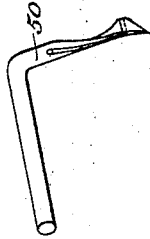


FIG. 5



FIG. 6

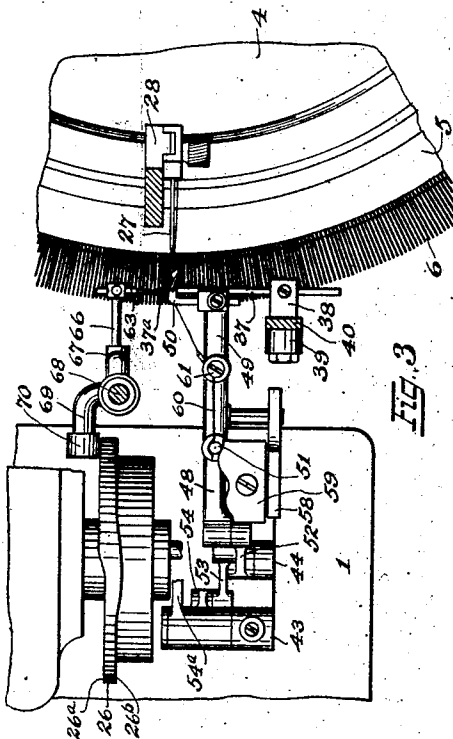


FIG. 3

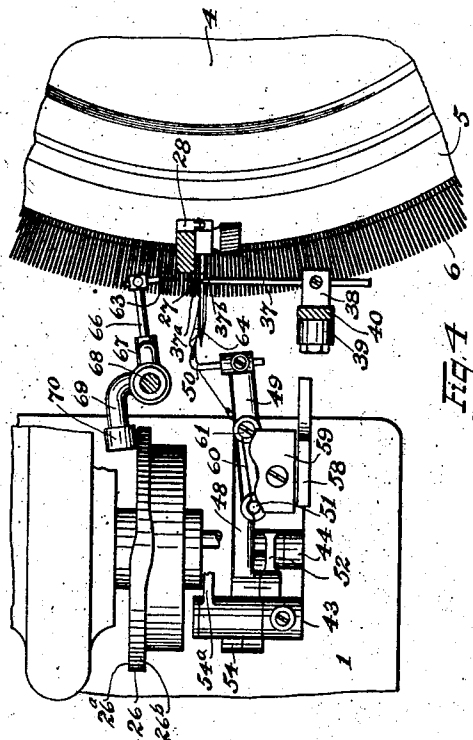


FIG. 4

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4 SHEETS—SHEET 4.

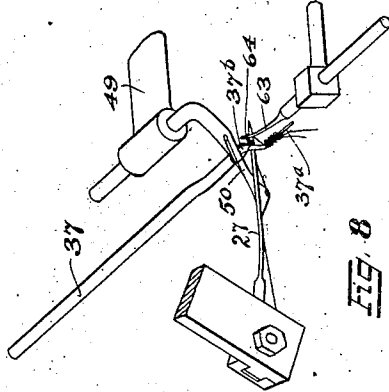


FIG. 8

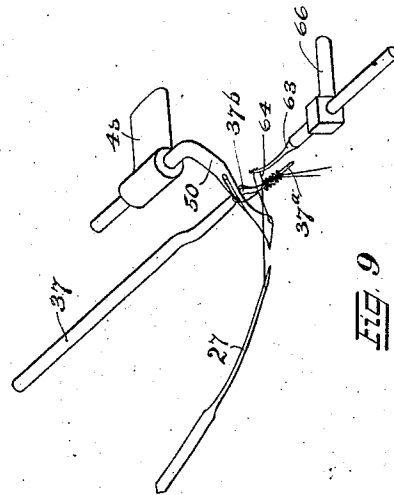


FIG. 9

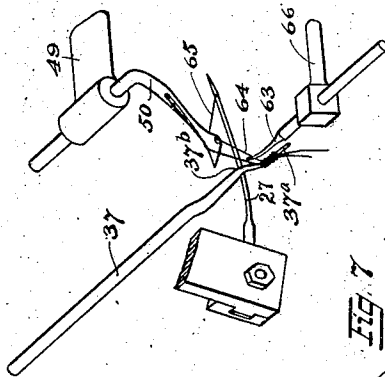


FIG. 7

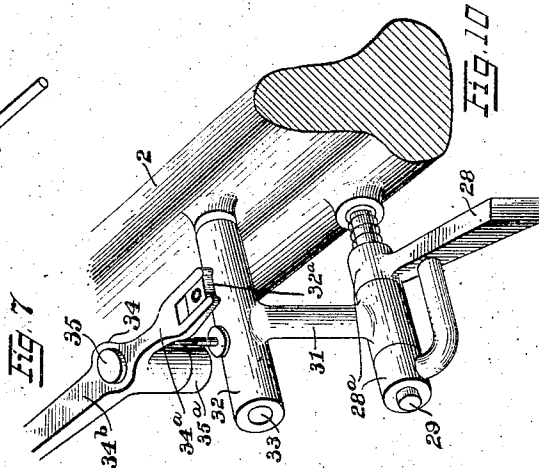


FIG. 10

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UNITED STATES PATENT OFFICE.

EDWIN O. DAVIS, OF PADUCAH, KENTUCKY, ASSIGNOR TO SOUTHERN TEXTILE MACHINERY COMPANY, OF PADUCAH, KENTUCKY, A CORPORATION OF KENTUCKY.

MACHINE FOR UNITING KNIT FABRICS.

1,050,433.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed May 14, 1910. Serial No. 561,277.

To all whom it may concern:

Be it known that I, EDWIN O. DAVIS, 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 or selvage edges of two pieces or portions of knit fabrics 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 invention relates to improvements on machines of this class of the general character described and claimed in my application filed April 22, 1909, Serial No. 491,511, wherein mechanism is provided for imparting a continuously and uniformly revolving movement or motion to the ring of impaling-pins, together with means 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 adjacent impaling-pins.

A still further object of the invention is to provide the necessary or required elasticity in the uniting seam or chain of stitches, this being secured by means of a stitch finger or stitch carrying guide-arm mounted above and extending in the direction of the travel of the ring of impaling-pins and adapted to cooperate with the thread needle and thread carrying looper in the stitch forming operation so as to be included in a chain of uniformly formed stitches, and providing the necessary elasticity when the latter are withdrawn by the subjacent impaling-pins.

A further object of the invention is to provide means for uniformly forming the stitches about said stitch finger notwithstanding variations in the tension of the looper thread by providing the necessary slack in said looper thread at or near the point of the formation of its loops about said stitch finger, and with this end in view I provide in addition to said stitch finger and thread needle and thread carrying

looper shown in my previous application above referred to, an interceptor member or interceptor-finger, said interceptor finger engaging the loop thread of the looper head just after the latter has engaged and is holding up the loop from the thread needle and while the thread needle is being withdrawn from the intervening stitch finger, said interceptor-finger continuing to hold the loop of the looper head while the latter passes forwardly and dropping or releasing it just before the initial retracting movement of the looper head and just after the thread loop of the latter is being engaged by the thread needle.

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 this invention. Fig. 2, a side elevation of the same. Fig. 3, an enlarged plan view of a portion of the ring of impaling-pins showing the relative position of the parts while the reciprocatory interceptor-finger is engaging and holding the thread of the looper and the latter is in engagement with the loop from the needle in its forward position and prior to the initial forward movement of the thread needle. Fig. 4, a similar view of the interceptor-finger and looper in their retracted positions and prior to the initial movement of the looper to take up the loop from the thread needle. Fig. 5, a detail view of the improved looper member detached. Fig. 6, a similar view of the thread needle detached. Fig. 7, a detail perspective view of the stitch forming parts just prior to the initial movement of the reciprocatory interceptor-finger to engage the thread of the looper as the latter is in the act of taking up the thread from the thread needle. Fig. 8, a similar view showing the interceptor-finger moved laterally and in engagement with the looper thread while the looper is being moved toward its extreme forward position and the thread needle is being withdrawn from the off-set portion of the stitch finger. Fig. 9, a similar view showing the position of the parts just prior to the initial forward movement of the

thread needle, the interceptor-finger being adapted to move laterally and drop the looper thread just after the thread needle has entered between the looper and the adjacent looper thread and just prior before the initial movement or retreat of the looper. Fig. 10, a detailed perspective view of the oscillating needle-arm and the operating mechanism and connections for moving said needle-arm laterally during its reciprocary movements.

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 supporting disk 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-pin 6, in a well known and understood manner, and the ring of the impaling pins is given a continuous and uniformly revolving movement by the mechanism hereinafter described.

The machine is adapted to be driven by a belting communicating with a suitable source of power and passing over a driving pulley 7, carried upon a driving-shaft 8, said driving-shaft being mounted in a bearing head 9, of the bed-plate 1, and passing through a suitable bearing opening at the rear portion of the supporting arm 2. The driving shaft 8, is provided with a crank 10, for manual operation and is adapted to be thrown into gear with the driving pulley 7, by means of a slidably mounted clutch member 11, adapted to be operated by means of a clutch operating handle or lever 12, in a well known manner.

A vertically movable shaft carrying arm or member 13, extends outwardly at right angles to the driving-shaft 8, and is provided at its rear with a bearing head 13^a, pivotally mounted upon the driving shaft 8. The arm or member 13, is provided at either end with depending bearings 14, carrying a shaft 15, said shaft receiving its motion by means of a bevel gear 16, meshing with a bevel gear 17, on the driving shaft 8. The shaft carrying arm or member 13, is provided at its outer or free end with a worm gear 18, normally meshing with a gear wheel 19. The gear wheel 19, is carried upon one end of a shaft 20, said shaft being mounted in depending bearings 21, beneath the stationary supporting disk or dial-plate 4. The shaft 20, is provided at one end with a pinion 22, meshing with a rack (not shown) on the under side of the ring 5, carrying the im-

paling-pins 6. When the worm gear 18, is in gear or in mesh with the gear wheel 19, it is apparent that the gearing described will impart a continuously and uniformly revolving motion to the ring of impaling-pins. As a means for throwing the worm gear 18, into and out of gear or mesh with the gear wheel 19, a crank lever 23, is pivotally secured to one side of the supporting arm 2, by means of a pivot bolt 24, said crank lever being provided with a depending head or nose portion secured to a second pivot bolt 25, at the side of the arm or member 13. When the crank lever 23, is elevated, the movement of the depending portion 23^a, will elevate the free end of the arm or member 13, and the worm gear 18, on the shaft 15, and vice versa.

As a means for actuating the various parts or members comprised in the stitch forming mechanism, a master cam-wheel 26, is mounted on the driving-shaft 8, said cam-wheel being provided at opposite sides about its periphery with cam faces 26^a, and 26^b, for imparting the requisite reciprocary motion to the interceptor-finger and lateral motion to the thread needle as hereinafter described, and a cam groove or guide-way 26^c, for actuating the thread carrying looper as hereinafter described.

The curved thread needle 27, is carried by and reciprocated over and above each of the impaling-pins by means of an oscillating needle arm 28, carried upon a bearing shaft or pin 29, extending from the side of the supporting-arm 2, of the machine.

The oscillating needle arm 28, is adapted to be reciprocated by means of a pitman or connecting arm 30, said connecting arm being provided at its ends with universal or ball and socket bearings 30^a, connecting one end to the arm 28, and the other to the cam-wheel 26. The needle arm 28, is provided at its upper portion with two bearing heads 28^a, on the bearing shaft 29, and said bearing heads 28^a, on the bearing shaft 29, are adapted to be moved longitudinally on said shaft 29, whereby said needle arm 28, and thread needle 27 are moved laterally during both their to and fro reciprocation by means of a guide-arm 31, interposed between said bearing heads 28^a, and depending from a laterally movable head-block or second bearing member 32, mounted on a second bearing shaft 33, extending from the side of said supporting arm 2.

The bearing member 32, is adapted to be reciprocated on the bearing shaft 33, by means of a laterally oscillating member 34, pivotally-mounted at the side of the supporting-arm 2, by means of the vertical bearing shaft 35, extending from the bracket 35^a, said laterally oscillating member 34, being provided with a bifurcated arm 34^a, taking over a bearing block 32^a, of the bearing mem-

ber 32, and a second arm 34^b, provided with a friction roller 36, adapted to engage the cam face 26^b, of the cam-wheel 26.

By reason of the cam-face 26^b, of the cam-wheel 26, the oscillating member 34, is operated whereby the head block 32, will be moved upon the bearing shaft 33, and to and from the resistance of a coil-spring surrounding the bearing shaft 33, and interposed between the inner side of the head block 32, and the side of the supporting arm 2. By reason of this movement it is evident that a similar movement will be imparted to the bearing heads 28^a, on the bearing shaft 29, so that as the needle arm 28, 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 the fabric to correspond with the movement of the impaling-pins carried by the continuously rotating ring.

A stitch carrying guide-member or stitch-finger 37, is pivotally mounted above the path of travel of the ring of impaling-pins by being mounted in a supporting member 38, movably mounted in a bearing head 39, of a depending bracket 40, carried upon the guide-arm 31, interposed between the bearing heads 28^a, of the laterally movable needle arm 28. The free end of the stitch-finger is provided with a slightly depressed pointed or tapered tongue portion 37^a, impinging upon a plurality of impaling-pins and adapted to be carried just above and in alignment with 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 37^a, of the stitch-finger is held down by the action of a coil-spring 41, secured upon the rear projecting portion of the stitch finger and carried upon a laterally extending bracket-arm 40^a, of the depending bracket 40. The depressed tongue portion 37^a, of the stitch-finger terminates at its rear in an offset portion 37^b, at the rear of which the thread needle passes during its reciprocatory movements through the loops of the fabric to be united and over and above each of the impaling-pins in the-loop and stitch forming operation as hereinafter described.

By reason of the above construction it will be understood that the depressed tongue portion 37^a, rides upon a series or plurality of the subjacent united loops and within the uniting stitches of the latter and that the needle and looper move in paths on opposite sides, respectively, of the offset or shoulder portion 37^b, the initial stitches being formed over and about said shoulder whereby said shoulder forms the zone of formation and said tapered tongue portion forms the zone of retreat for the stitches.

As a means for giving the thread carrying

looper the necessary movements in the loop and stitch forming operation the looper carriage and its actuating mechanism are mounted upon the bed-plate 1, preferably, by means of a supplementary bed-plate 42, provided with bearing standards 43, 44, and 45, and carrying a bracket 46, terminating in a work guide-member 47. The looper carriage member 48, is provided at one end with a pivotally mounted laterally movable looper carrying member 49, said looper carrying member being provided at its outer end with a thread carrying looper 50, and at its other or rear end with an upwardly extending and projecting friction bearing-pin 51. The looper carriage member 48, is adapted to be reciprocated by means of a pivotally mounted oscillating member 52, mounted on the bearing standard 44, said oscillating member 52, being connected to a connecting link 53, said connecting link 53, being connected to a depending arm 54, of a bell crank member pivotally mounted and connected to the bearing standard 43. As a means for oscillating the bell crank member the latter has its arm 54^a provided with a friction roller 55, taking into and adapted to travel within the cam-groove or guide-way 26^c, of the cam-wheel 26, as the latter is revolved.

As a means for giving the thread carrying looper the necessary undulatory movement during its reciprocation in the stitch forming operation by the looper carriage member 48, said carriage member 48, is provided with a laterally extending friction roller 56, extending into and adapted to travel within a guide-slot 57, of a supporting bracket 58, mounted upon the bearing standard 45. As a means for giving the looper the necessary lateral movements during its reciprocation by the carriage member 48, the upwardly extending bearing pin 51, at the rear end of the laterally movable looper carrying member 49, is held into frictional engagement with a cam-faced cam-block 59, by means of a spring 60, fastened at one end to the pivotal bolt 61, of the laterally movable looper carrying member 49, said spring 60, bearing against the friction bearing pin 51, for the purpose of maintaining the latter in contact with the irregular faces of the cam-block as the looper carriage member 48, is reciprocated. The position of the cam-block 59, may be adjusted by means of adjusting screws 62, in the supporting bracket 58.

As a means for providing for uniformity in the formation of the stitches about the stitch-finger 37, notwithstanding variations in the tension of the looper thread, I provide a reciprocatory interceptor-finger 63, adapted to intercept or engage and hold the looper thread 64, near the point of formation about the offset portion 37^b, of the stitch-finger while the looper is in engage-

ment with the thread loop 65, from the needle as illustrated in Fig. 7, of the drawings, said interceptor-finger being adapted to continue in engagement with the looper thread as the looper is moving forwardly to its extreme forward position as illustrated in Fig. 8, and also continuing to hold it while the looper is in its extreme forward position and the thread needle is in its extreme rearward position as indicated in Fig. 9, said interceptor-finger moving laterally and dropping looper thread just before the initial retracting or receding movement of the looper head and just after the needle has moved forwardly between the looper and the adjacent looper thread and is about to pass through the loop of the fabric on the subjacent impaling-pin.

As a means for giving the interceptor-finger the necessary reciprocatory movements the interceptor-finger is adjustably mounted in the end of a supporting-bar 66, carried on a depending arm 67, of an oscillatory member, said oscillating member being pivotally mounted upon a vertical bearing shaft 68, extending downwardly from the bracket 35^a, supporting the upwardly extending bearing shaft 35. The oscillatory member carrying the depending arm 67, is provided with a second arm 69, carrying a friction roller 70, adapted to bear against the cam face 26^a, of the cam-wheel whereby the necessary oscillatory movement will be imparted to the oscillatory member and the supporting bar 66, will carry the interceptor-finger into and out of engagement with the thread of the looper at proper times as above described. The friction roller 70, of the arm 69, the oscillatory member is held in frictional contact with the cam-face 26^a, by means of a coil-spring 71, surrounding the bearing shaft 68, said spring being secured at one end to the shoulder 68^a, of the bearing shaft and at the other to the oscillatory member to operate the latter in a well understood manner.

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 an embodiment of my invention, what I claim and desire to secure by Letters Patent is,—

1. In a machine for uniting knit fabrics, a ring of impaling-pins, a stitch finger, a thread needle and thread carrying looper, an interceptor, means for moving said stitch finger longitudinally while the needle is in the fabric to correspond with the movement of said impaling pins and means for moving said interceptor into and out of engagement with the thread of said looper.

2. In a machine for uniting knit fabrics, the combination of a support, the needle arm and its actuating mechanism, the needle

carried by said arm, the thread-carrying looper and its actuating mechanism, the impaling-pins and their actuating mechanism, the movable stitch finger and its actuating mechanism, and the interceptor-finger and its actuating mechanism.

3. In a machine for uniting knit fabrics, the combination with a ring of impaling-pins, stitch forming mechanism including a needle and looper, and operating means; of a stitch finger provided with an off-set tapered tongue extending in the direction of travel of said impaling-pins and adapted to receive and carry a plurality of stitches from said stitch forming mechanism, an interceptor in coöperative relationship with said stitch forming mechanism and the off-set portion of said stitch finger, means for moving said stitch finger longitudinally to correspond with the movement of said impaling pins while the needle is in the loops and means for actuating said interceptor.

4. In a machine for uniting knit fabrics, the combination with a ring of impaling-pins, a stitch finger provided with an off-set portion, a reciprocatory needle and thread carrying looper, means for moving said stitch finger longitudinally and said needle laterally while the latter is in the loops and means for actuating said needle and looper; of a reciprocatory interceptor adapted to intercept the thread of the looper between the latter and said stitch finger and to release the same prior to the retraction of said looper.

5. In a machine for uniting knit fabrics, a ring of impaling-pins and its actuating mechanism, a reciprocatory needle and thread carrying looper, means for actuating said needle and looper, a stitch finger provided with an off-set portion adapted to coöperate with said needle and looper and to receive the loops therefrom, an interceptor adapted to coöperate with said needle, looper and stitch finger, and means for actuating said interceptor.

6. In a machine for uniting knit fabrics, a ring of impaling-pins, a stitch finger provided with an off-set portion, a reciprocatory thread needle and looper passing at the rear and over said offset portion, respectively, to form the loops over said offset portion, a reciprocatory interceptor-finger adapted to move into and out of engagement with the thread of said looper as the latter takes up the loop from the needle and said needle enters the loop of said looper, respectively, and means for so actuating said interceptor finger with respect to said needle and looper.

7. In a machine for uniting knit fabrics, the combination with a ring of impaling-pins, and a stitch carrying guide finger mounted above and extending in the direction of the travel of said ring of impaling-

pins; of stitch forming mechanism comprising a reciprocatory needle and thread carrying looper, and a reciprocatory interceptor-finger engaging and holding the thread of said looper while the latter is in engagement with the loop from the needle and moving out of engagement therewith when the latter is in engagement with the thread of said looper.

8. In a machine for uniting knit fabrics, a ring of impaling-pins, a stitch finger provided with a pointed off-set portion extending above a plurality of said impaling-pins, a reciprocatory thread needle adapted to pass under said off-set portion, and a reciprocatory thread carrying looper cooperating with said thread needle and stitch finger, means for reciprocating said thread needle and looper, a reciprocatory interceptor-finger adapted to be moved laterally into engagement with the thread of said looper while the latter is being moved forwardly in engagement with the loop from the needle, and means for reciprocating said interceptor-finger.

9. In a machine for uniting knit fabrics, the combination with a plurality of impaling pins, and a reciprocating thread needle and looper; of a stitch carrying guide arm provided with a shoulder in close proximity to the paths of said needle and looper and terminating in a vertically movable tongue portion adapted to ride upon a plurality of said impaling pins, the needle and looper moving in paths on opposite sides, respectively, of said shoulder and said shoulder constituting the zone of formation and said movable tongue forming the zone of retreat for the stitches as formed by said reciprocating thread needle and looper.

10. In a machine for uniting knit fabrics, a plurality of impaling pins, a stitch finger pivotally mounted above the path of travel of said impaling pins and provided with a shoulder terminating in a depressed tapered tongue portion adapted to ride upon a plurality of loops carried by said impaling pins, and a reciprocating thread needle and looper adapted to successively pass under and over said stitch finger at the base of said tapered tongue portion to form the stitches over and about said shoulder whereby said shoulder forms the zone of formation and said tapered tongue portion forms the zone of retreat for the stitches.

11. In a machine for uniting knit fabrics, a series of impaling pins, a reciprocating thread needle and looper, a vertically movable stitch carrying guide arm having a shoulder in close proximity to the paths of said needle and looper, said shoulder terminating in a pointed free end extending above a plurality of said impaling pins and adapted to ride upon the loops of fabric to be united on said impaling pins, the needle and looper moving in paths in opposite sides, respectively, of said shoulder and said shoulder constituting the zone of stitch formation and said pointed free end the zone of retreat for the stitches as formed by said reciprocating thread needle and looper.

12. In a machine for uniting knit fabrics, the combination with a plurality of impaling pins, and a reciprocating thread needle and thread carrying looper; of a stitch carrying guide arm pivotally mounted above the path of travel of the impaling pins and provided with a shoulder between the paths of travel of said needle and looper, said shoulder constituting the zone of stitch formation and terminating in a tapered tongue portion in frictional engagement with a plurality of said impaling pins and adapted to be carried above the adjacent loops of fabric to be united as the latter are carried under said tongue portion, said tongue portion forming the zone of retreat for the chain of stitches.

13. In a machine for uniting knit fabrics, the combination with a continuously revolving ring of impaling-pins, and a laterally movable oscillating arm carrying a reciprocating curved thread needle passing above each of said impaling-pins; of a driving shaft provided with a laterally movable connecting member adapted to reciprocate said thread needle, and a cam bodily operatively connected to said laterally movable oscillating arm whereby said thread needle is carried laterally during its reciprocatory movements in the loops to correspond with the movements of the latter as carried by said impaling-pins.

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

EDWIN O. DAVIS.

Witnesses:

O. C. BILLMAN,
SAM BILLMAN.