

(Model.)

4 Sheets—Sheet 1.

W. WALKER.
SEWING MACHINE.

No. 353,720.

Patented Dec. 7, 1886.

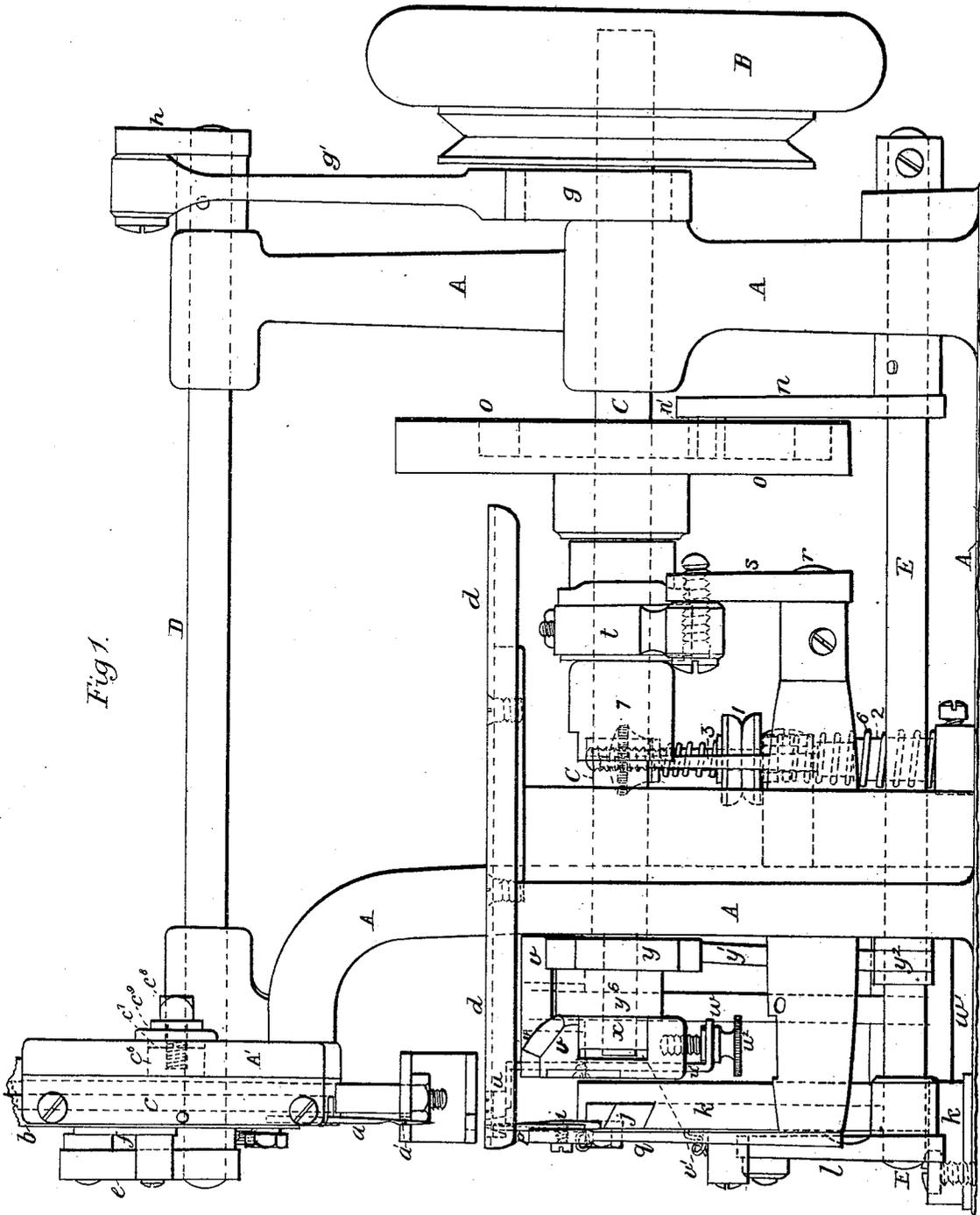


Fig. 1.

Witnesses.

E. Murdemann
W. B. Masson

Inventor

William Walker
by *E. E. Masson*
att'y.

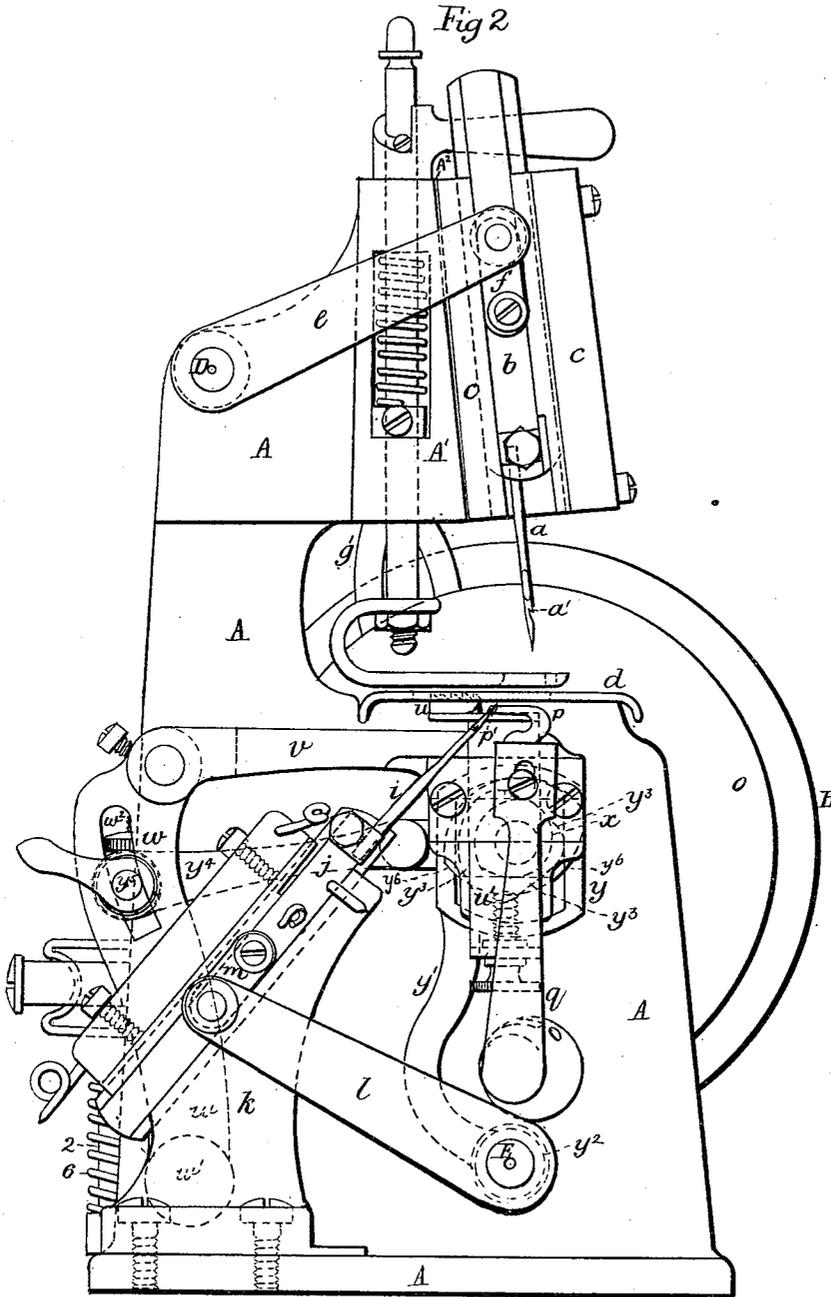
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 atty.

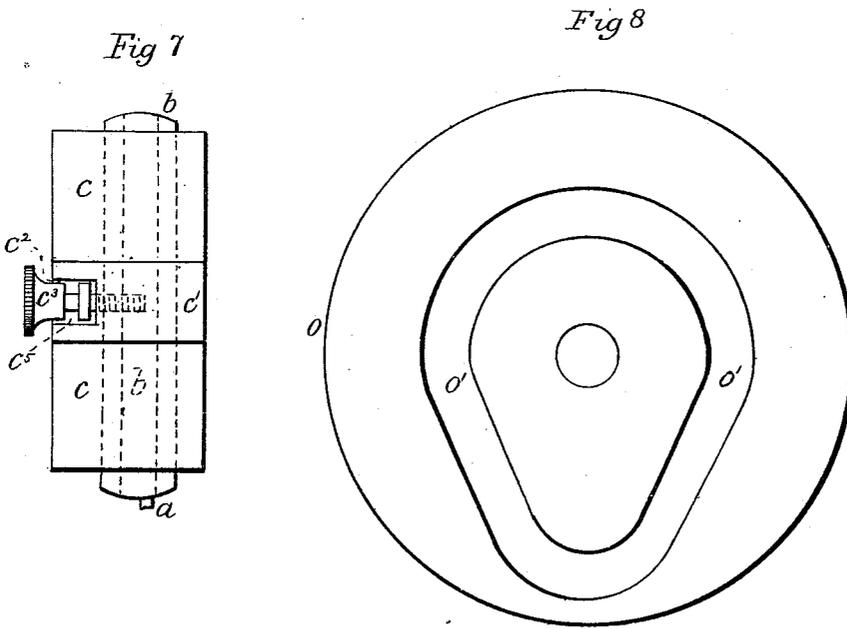
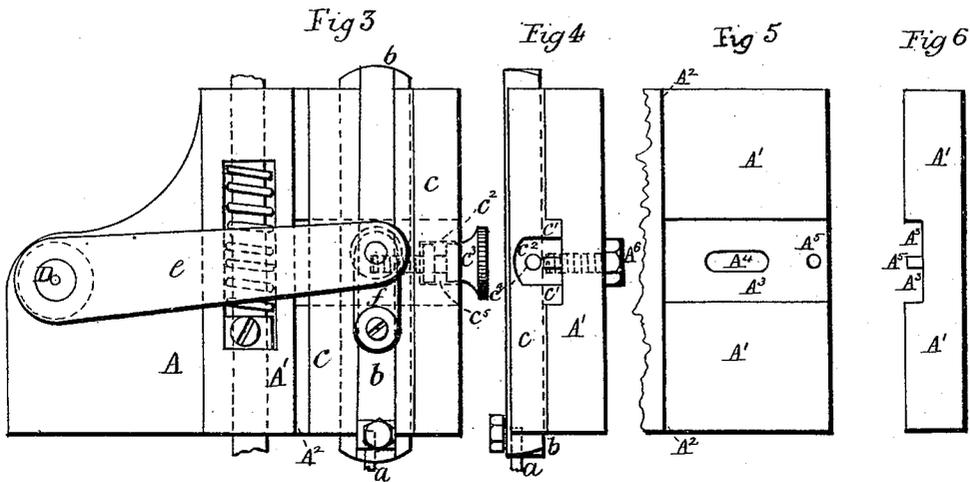
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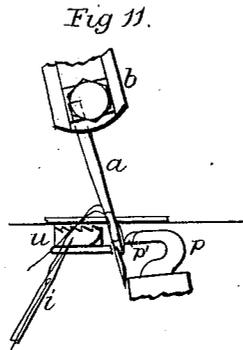
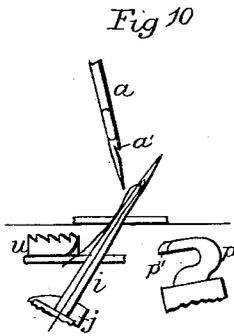
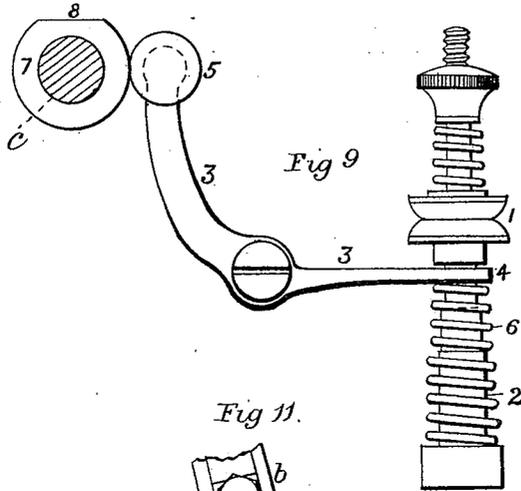


Fig 14.



Fig 12.

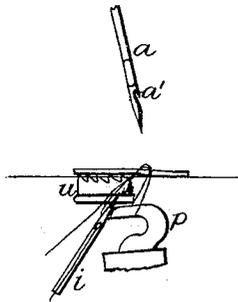
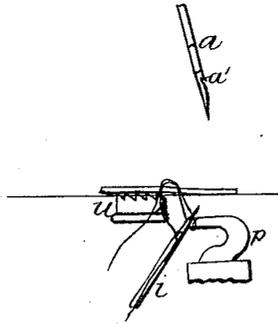


Fig 13.



Witnesses.

E. A. Hudemann.
W. B. Masson

Inventor.

William Walker
by E. E. Masson
att'y.

UNITED STATES PATENT OFFICE.

WILLIAM WALKER, OF LUTON, COUNTY OF BEDFORD, ENGLAND.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 353,720, dated December 7, 1886.

Application filed May 11, 1886. Serial No. 201,810. (Model.) Patented in England June 24, 1885, No. 7,694, and in France April 14, 1886, No. 175,477.

To all whom it may concern:

Be it known that I, WILLIAM WALKER, a subject of Her Majesty the Queen of Great Britain, residing at Luton, in the county of Bedford, England, have invented new and useful Improvements in Sewing-Machines, (for which I have obtained Letters Patent in Great Britain, No. 7,694, bearing date June 24, 1885, and Letters Patent in the Republic of France on April 14, 1886, No. 175,477,) of which the following is a specification, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in machines for sewing straw plait and suitable for the manufacture of straw hats and bonnets.

My invention consists in the employment of two needles—a barbed needle operating vertically or obliquely, arranged above the work-plate, and an eye pointed needle arranged obliquely below the work-plate—the said needles being arranged to operate at an angle to each other and in combination with a looper or other suitable device. The under needle, or that beneath the work-plate, is of the ordinary sewing-machine type and carries the cotton. The said needle pierces the work obliquely or at an angle thereto, carrying the thread through the work. The upper needle (or that above the work-plate) may operate either vertically or obliquely, and is provided with a barb which takes the loop of thread brought up by the under needle and carries the said loop through the work as the said upper needle descends. The looper or other device takes the loop from the upper needle, and the feed-movement carries the said loop over the point of the under needle at its return movement, and thus a succession of chain or loop stitches is formed, showing a long stitch (from a quarter to a half inch long) on the under side of the material and a very short stitch on the upper side. By thus locating the eye-pointed needle carrying the thread on the under side, the work can be passed right side up under the presser-foot and a very limited amount of thread be run through the perforations made, and the operator is enabled to see the sewing produced on the upper or right-side surface of the material and easily control its course.

In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a front end elevation of the same. Figs. 3, 4, 5, 6, and 7 illustrate the means for adjusting the upper needle when the said needle operates vertically. Fig. 8 is a view of the cam-disk which operates the lower needle. Fig. 9 is an elevation of the stop-tension device. Figs. 10 to 13 are diagrams illustrating the method of forming the stitch. Fig. 14 shows the barbed needle on an enlarged scale.

Like letters indicate like parts in all the figures.

A is the framing and base of the machine. B is the driving-wheel. C is the main or driving shaft. D is the shaft from which the upper needle-bar is operated, and E is the shaft from which the lower needle-bar is operated.

The upper needle, *a*, is carried by the bar *b*, and the said bar is fitted so as to work freely in a dovetail-slot in the plate *c*. The said plate *c*, with the needle-bar and needle, are supported over the work-plate *d* by the bracket *A'* of the frame of the machine. The needle and its bar have a reciprocating motion vertically or at right angles to the work, as shown in Fig. 3; or they may operate in a slightly-oblique position, as shown in Fig. 2, the point of the needle being directed toward the operator. In both cases the needle and bar are provided with means whereby the needle can be adjusted so as to vary the point at which it shall enter the work, and consequently (as hereinafter explained) the length of the stitch on the face of the work.

Figs. 3, 4, 5, 6, and 7 illustrate the means I employ for adjusting the needle *a* when it operates vertically. Fig. 3 is a front end view of the bracket *A'*, with plate *c* and needle-bar *b* and means for adjustment. Fig. 4 is an edge view of the same. Fig. 5 is a view of the face of the bracket *A'*, and Fig. 6 an edge view of the same. Fig. 7 is a view of the back of the plate *c*, in which the needle-bar *b* works.

The back of the plate *c* is formed with a horizontal rib, *c'*, which fits and slides freely in a horizontal groove, *A³*, in the face of the bracket *A'*. In about the center of the said groove *A³* is a slot, *A⁴*, and near the outer end of the said groove *A³* is a pin or stud, *A⁵*. (See 100

Figs. 5 and 6.) The rib c' on the plate c being inserted into the groove A^3 , (as in Fig. 4,) the said plate is clamped to the bracket A' by means of a screw, A^6 . The outer edge of the back of the plate c is formed with a recess, c^2 , to receive the stem of the shouldered adjusting-screw c^3 , the threaded portion of which screw screws into a hole, c^4 , in the body of the plate c . The stem of the screw c^3 has a circumferential groove, c^5 , in which groove, when the parts are fitted together, the pin A^5 on the bracket A' works. Thus by loosening the screw A^6 and turning the screw c^3 the plate c can be moved along the groove A^3 in the bracket A' , and the position of the needle adjusted as desired. After the adjustment the clamping-screw A^6 is again tightened up.

When the needle operates in a slightly-oblique position, as shown in Fig. 2, I form on the back of the plate c a stud, c^6 , (see Fig. 1,) which fits into a socket, c^7 , in the bracket A' . The stud c^6 is tapped to receive the screw c^8 , which, when screwed up tightly against the washers c^9 , holds the plate c firmly in position against the face of the bracket A' . The stud c^6 forms a pivot for the plate c , so that by loosening the screw c^8 the plate c , and with it the needle-bar b and needle a , can be adjusted so as to vary the angle at which the needle shall operate, the extent of the movement of the plate c being limited by the shoulder or abutment A^2 .

The requisite reciprocating motion is imparted to the needle a from the rock-shaft D by means of the arm or lever e , secured on the forward end of the said rock-shaft and pivotally connected to one end of the link f , which is pivotally connected at its other end to the needle-bar b . The rock-shaft D receives its motion from the main shaft C by means of the eccentric g and eccentric-rod g' , connected to the arm or lever h , secured on the rear end of the said rock-shaft.

The needle a is formed with a barb, a' , a short distance from its point, (as clearly shown in the enlarged view, Fig. 14,) the point of the said barb being in the direction of the point of the needle. The object of this barb will be hereinafter explained.

The lower needle, i , which is of the ordinary sewing-machine type, and carries the cotton, is carried by the needle-bar j , which is fitted to work freely in an oblique dovetail slot in the standard k , secured to the frame or base A of the machine. The needle i enters the work at about an angle of forty-five degrees, and is so arranged that when through the work it crosses the path of the upper needle, a , the upper needle, a , being so arranged as to pass close to the needle i when the two needles cross each other. The lower needle is operated by the arm or lever l on the forward end of the rock-shaft E , the said arm or lever being pivotally connected to a link, m , pivoted on the needle-bar j . Motion is imparted to the rock-shaft E from the main shaft C by means of the arm or lever n and cam-disk o , the pin and friction-

roller n' on the said lever taking into the cam-groove o' of the said cam-disk.

It is necessary that the needles be so arranged that the upper needle, a , crosses the lower needle, i , when the latter is above the work, and enters the loop of thread formed by the lower needle, and carries it through the work at a point in advance of that at which the work was pierced, and the loop brought up through the work by the under needle. The distance between the point at which the lower needle enters the work and that at which the upper needle enters the work is the length of the stitch on the upper surface of the said work.

I employ a looper or other suitable device, to operate in combination with the needles a and i , for the purpose of taking the loop from the needle a when below the work-plate and (in conjunction with the feed-movement) passing the said loop over the point of the needle i . The looper p (shown in the drawings) is carried by the vibrating arm or lever q , mounted on the rock-shaft r , motion being imparted to the said shaft by the arm or lever s on the inner end of the said shaft, connected to the eccentric t on the driving-shaft C . The point of the looper p is formed with a recess, p' , in which recess the point of the needle i lies when the looper is at the end of its forward stroke, and thus the passage of a loop of thread from the looper p over the point of the needle i is facilitated. Other suitable devices may be used instead of the looper p . Thus a sliding bar or rod might be employed, the said bar or rod working in a horizontal line and having a suitably-pointed end for taking the loop from needle a and conveying it to needle i .

In the feeding arrangement shown in the drawings the serrated feed-bar u is carried by a stem, u' , which slides in a vertical groove in the horizontal bar v . This bar v is hinged to the rocking arm w , which is pivoted at w' . The stem u' of the serrated feed-bar is bent under the bar v and provided with a screw, u^2 , setting in the under side of the bar v , by means of which screw the height of the serrated feed-bar u can be adjusted. The eccentric x on the end of the driving-shaft C works in a horizontal groove, v' , in the forward end of the bar v , and gives the rising and falling motions to the feed-bar. The strap y is carried on a rocking arm, y' , pivoted at y^2 , and the said strap fits over an eccentric, y^3 , on the driving-shaft C . To the inner side of the strap y is pivoted a bar, y^4 , which on its other end carries a pin, y^5 , which works in a cam-slot, w^2 , in the rocking arm w . The pin y^5 is provided with any suitable device whereby it may be clamped in any desired position in the slot w^2 . The revolution of the eccentric y^3 within the strap y rocks the arm y' and imparts, through the bar y^4 , the backward and forward movement of the feed, the extent of the movement being regulated by raising or lowering the pin y^5 (on the end of the bar y^4) in the cam-slot w^2 . The

eccentrics x and y' may be cast in one piece with the boss y^s , by which they can conveniently be secured on the shaft C.

To insure that the needle a shall properly take the loop of cotton brought up by the under needle, i , tension is put on the cotton from the time when the under needle is at its top stroke until the loop has entered the barb a' on the upper needle. For this purpose I use the stop-tension device shown in Fig. 9. The cotton is passed through the tension-disks 1, and thence through suitable guides to the under needle, i . The tension-disks 1 are mounted on a suitable rod, 2, secured to the base of the machine, as shown in Figs. 1 and 2. A short spiral spring and regulating-nut are arranged above the upper tension-disk. The bell-crank lever 3 is pivoted to the frame of the machine, and its end 4 is slotted or forked so as to receive the standard 2, this slotted end of the bell-crank lever being under the lower tension-disk. The other end of the said lever carries a friction-roller, 5.

The spring 6 on the standard 2 normally keeps the end 4 of the lever pressed against the lower tension-disk, and also keeps the friction-roller 5 in contact with the cam 7 on the main shaft C. This cam 7 causes the end 4 of the lever to depress the spring 6, except during the passage of the friction-roller 5 over the flat side 8 of the said cam, when the spring 6, being released from the pressure of the lever, forces the end 4 of the lever against the tension-disks 1 with sufficient power to stop the passage of the cotton through the said tension-disks. The cam 7 is so arranged on the shaft as to put on the tension and stop the passage of the cotton from the completion of the upward stroke of the needle i until the needle a has entered the loop and received the cotton into its barb a' .

Any other suitable feeding mechanism which will give a regular or uniform feed to the work and any other suitable stop-tension device may, however, be employed with my improved machine instead of the feeding mechanism and stop-tension device hereinbefore described. I also wish it understood that I do not limit myself to the means above described for operating the needles and their bars, or the looper, as any other suitable means may be employed which will give the required movements to the said needles and bars and looper.

The operation of my improved machine is as follows: The under needle, i , carrying the cotton, passes up through the work, and the

upper needle, a , is timed to descend and enter the loop of cotton thrown out by the return movement of the under needle, i , as shown in Fig. 10. This movement of the needle i causes the cotton to be drawn round the upper needle, a , so that the barb a' of the said needle takes the cotton and carries it through the work, as shown in Fig. 11, the cotton being gripped between the tension-disks 1, while the barb a' is taking the loop of thread. The looper p is timed to take the loop at the return movement of the upper needle, a , as shown in Fig. 12, and carry the said loop forward close to the under needle, i , the point of the said needle lying in the recess p' at the point of the hook, as shown in Fig. 2. The feed movement, which takes place when the upper needle has cleared the work, carries the loop to the end of the looper p and over the point of the under needle, i , as shown in Fig. 13. The said needle moves forward through the loop, and the operations before described are repeated, thus forming a succession of loop or chain stitches. The stitch formed is a short double thread on the top of the work, varying in length according to the adjustment of the upper needle, a , and its bar b , and a long single and treble thread on the under side of the work, varying in length according to the adjustment of the feed-movement.

Having now particularly described the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a machine for sewing straw plait, the combination of the barbed needle a , arranged above the work-plate and provided with means of adjustment to vary the point at which it shall pierce the work, whereby it may be operated at various angles to the work, the eye-pointed needle i below the work-plate, and the looper p , with mechanism for giving a regular and uniform feed to the work, the said needles a and i and looper p being arranged and operating substantially in the manner herein set forth.

2. In a machine for sewing straw plait, the needle-bar carrying the barbed needle a , arranged to operate vertically or obliquely above the work-plate, and means for adjusting the same with the eye-pointed needle i below the work-plate, and a looper, combined, arranged, and operating substantially as herein set forth.

WILLIAM WALKER. [L. S.]

Witnesses:

WM. McLELLAN,
SIDNEY CLARKE HOOK.