H. S. NORTH.

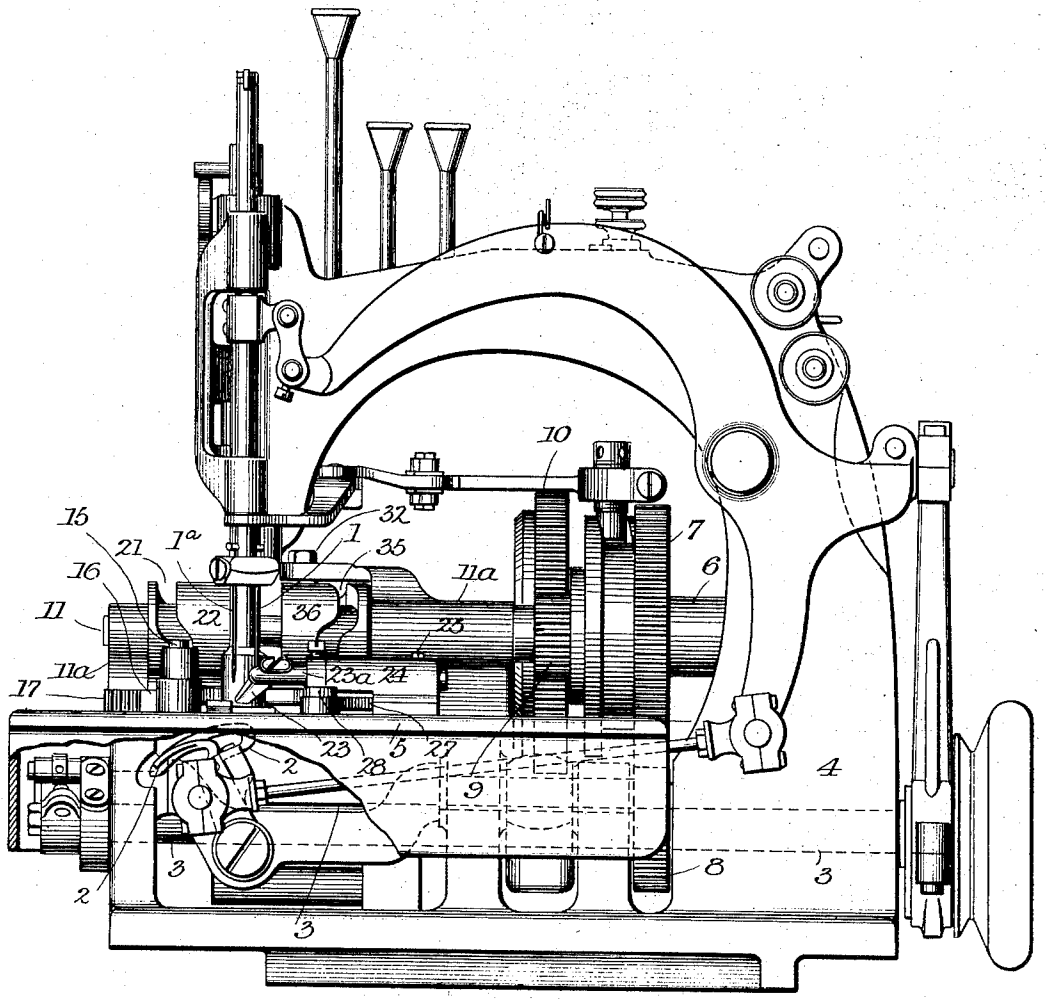
MACHINE FOR MAKING BORDERS FOR THE EDGES OF FABRICS.

APPLICATION FILED AUG. 13, 1908.

965,001. Patented July 19, 1910.

4 SHEETS—SHEET 1.

FIG. 1.



Witnesses

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FIG. 2.

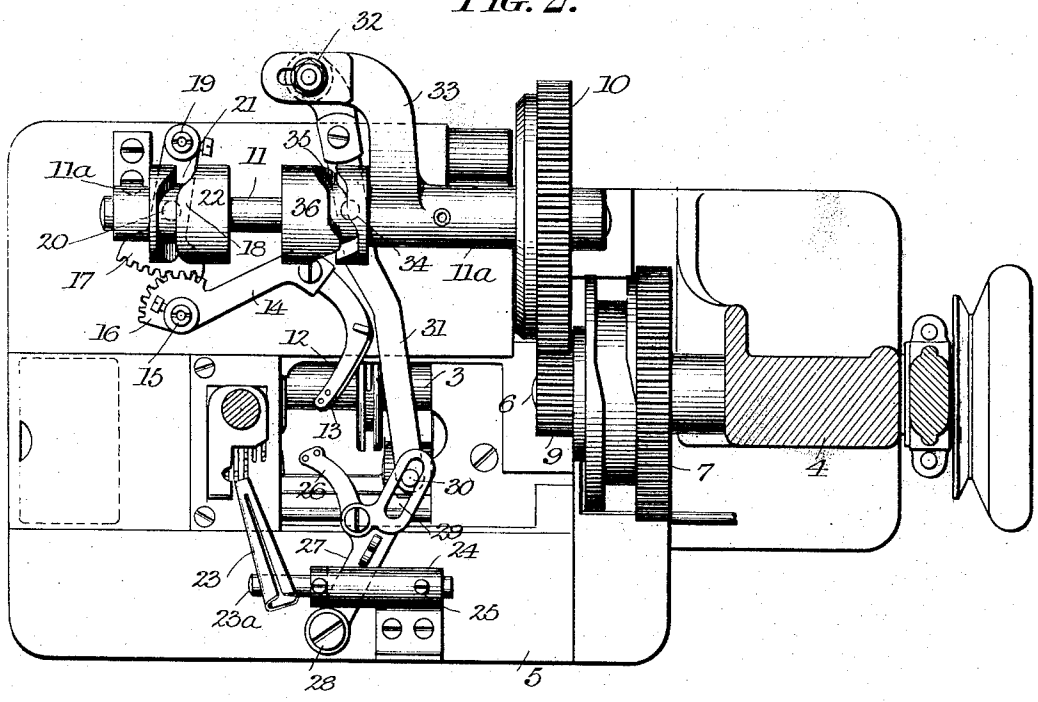
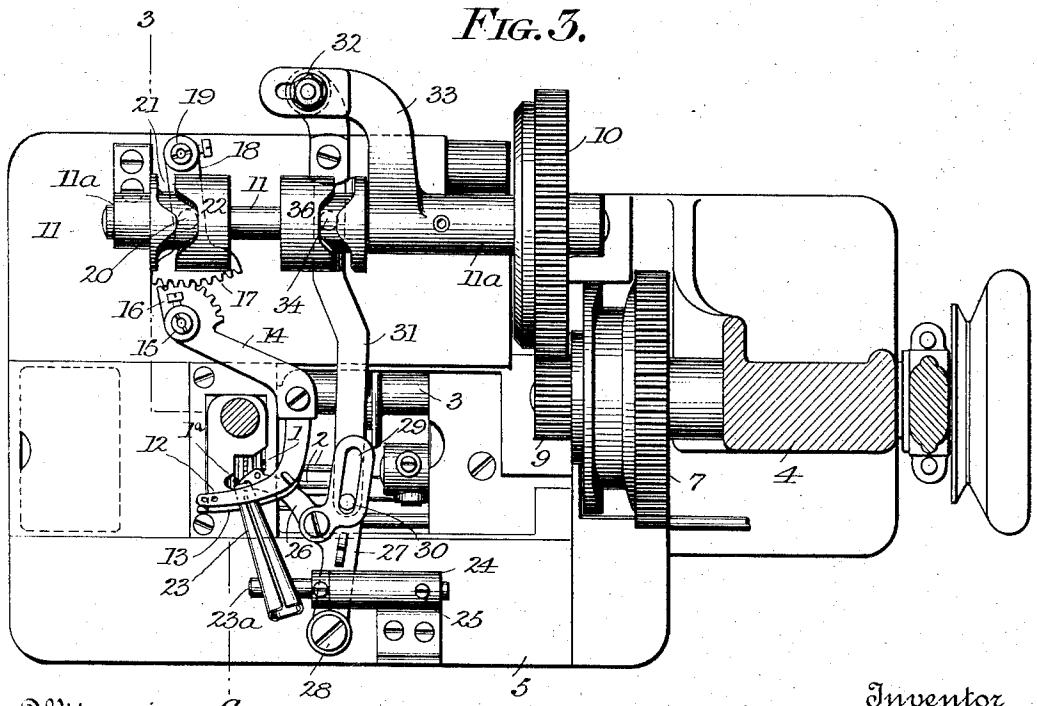


FIG. 3.



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4 SHEETS—SHEET 3.

FIG. 4.

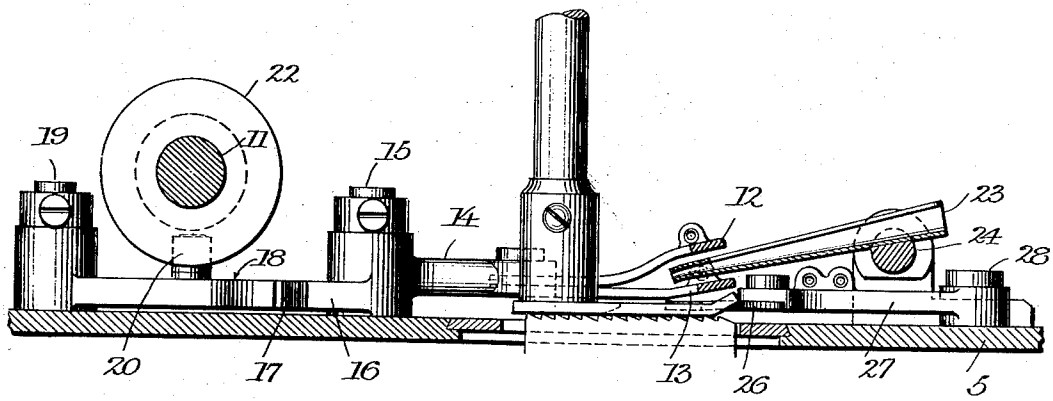


FIG. 5.

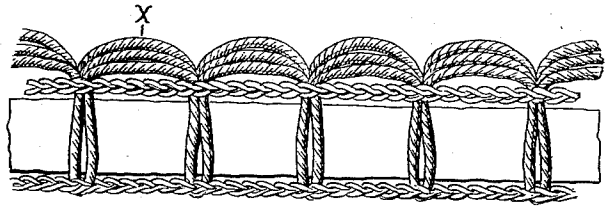


FIG. 6.

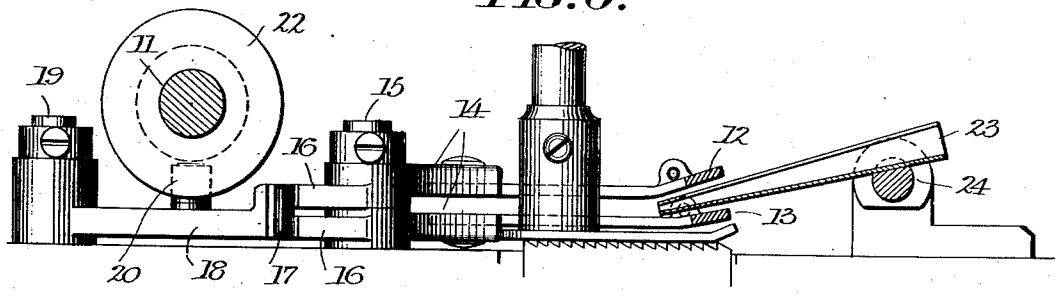
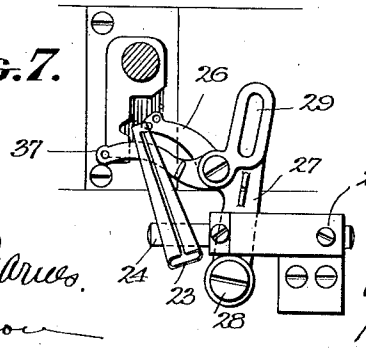


FIG. 7.



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4 SHEETS—SHEET 4.

FIG. 8.

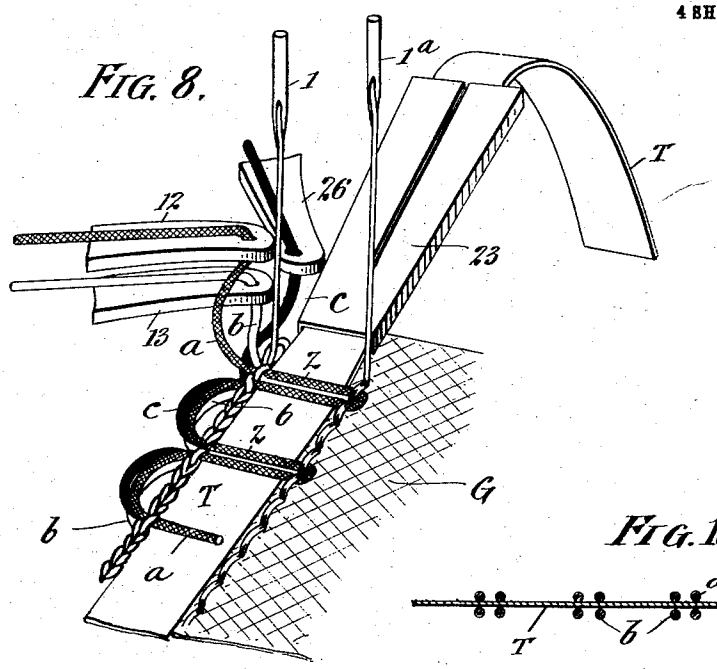


FIG. 10.

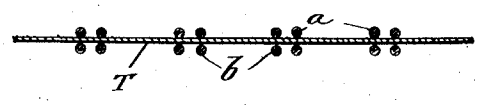
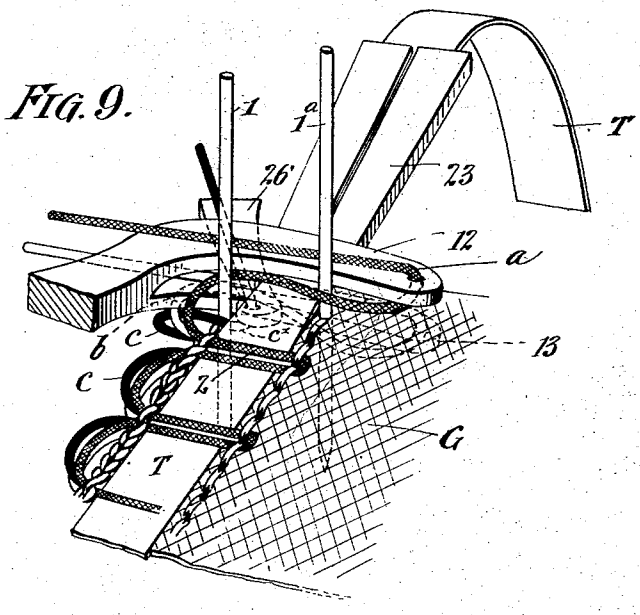


FIG. 9.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING BORDERS FOR THE EDGES OF FABRICS.

965,001. Specification of Letters Patent. Patented July 19, 1910.

Application filed August 13, 1908. Serial No. 448,406.

To all whom it may concern:

Be it known that I, HERBERT S. NORTH, of Rahway, county of Union, and State of New Jersey, have invented a new and useful Improvement in Machines for Making Borders for the Edges of Fabrics, of which the following is a specification.

This invention relates to machines for making trimmings or borders for garments and has special reference to the production of a border, consisting of cross-yarns or cross-bars connected together at their outer ends to form loops and having incorporated an ornamental ribbon or tape.

As heretofore produced the cross-bars have been formed by a number of yarns or cords, and the ribbon, by suitable mechanism, has been so incorporated that it extended alternately on opposite sides of the individual bars, every alternate bar being thus exposed.

My invention is directed to the incorporation of the ribbon between the yarns composing the individual bars, so that a portion of each bar will be exposed on both sides, the bars being thus "split" by the ribbon and producing what is known in the trade as a "split pillar-bar". By incorporating the ribbon in this manner, while the distance between the individual bars is not changed, the splitting of the bars and the exposure of a portion of the same on both sides, has the effect of bringing the bars closer together, so that the border presents a more pleasing appearance to the eye, and possesses greater value as a commercial article.

My improved mechanism is in the form of an attachment for a sewing machine and comprises means coöperating with the stitch forming mechanism of the sewing machine, for forming at intervals transversely extending bars, each comprising a plurality of yarns or cords, and broadly, means for incorporating a ribbon or tape between the cords or yarns of the individual bars.

In its preferred and more specific embodiment, the cross-bar forming mechanism is applied to a sewing machine equipped with two needles and their coöperating stitch forming mechanism, operating to form two rows or lines of stitches, the said bar forming mechanism comprising two thread guides arranged one above the other and movable transversely back and forth in unison in front of the needles so as to form a series of cross-bars each composed of upper and lower yarns, the ribbon or tape being automatically fed between the upper and lower yarns of the individual bars, by means of a fixed ribbon guide with its delivery end so disposed with relation to the path of movement of the thread guides that the yarns carried by said guides will be laid respectively above and below the ribbon, the ribbon in this manner splitting the bars.

My invention is not, however, limited in its application to this specific form of embodiment, as it is susceptible of various modifications as will be presently described, the essential requirement being that the ribbon be laid between the yarns of the individual bars, as distinguished from alternately on opposite sides of the bars, and this without regard to the specific means and mechanism employed.

In the accompanying drawings:—Figure 1 is a front elevation of a sewing machine with my improved mechanism applied thereto. Fig. 2 is a plan view partly in section of a sewing machine showing my improved mechanism applied thereto in its preferred form, the thread guides being in retracted position. Fig. 3 is a similar view showing the thread guides as they appear in laying their yarns transversely in front of the needles, and showing how they straddle the delivery end of the ribbon guide to carry their respective yarns on opposite sides of the ribbon. Fig. 4 is a vertical transverse section on an enlarged scale on the line *a*—*a* of Fig. 3, showing how the thread guides straddle the delivery end of the ribbon guide. Fig. 5 is a bottom plan view of the border produced by the operation of my improved mechanism. Fig. 6 is a sectional elevation of a modified form of the thread guides. Fig. 7 is another modification showing how the mechanism for forming the festoon on the ends of the cross bars may be modified to carry my invention into effect. Fig. 8 is a perspective view looking from the rear of the machine and illustrating graphically the relative positions of the needles, ribbon guide and cross-bar forming devices at one stage of the operation. Fig. 9 is a similar view illustrating the relative positions of the same parts at a succeeding stage in the operation. Fig. 10 is a sectional view illustrating the relative arrangement of the bars and ribbon in the finished product.

Referring to the drawings:—1 and 1^a represent two needles adapted in connection

with their respective stitch forming hooks 2, 2 to form two rows or lines of stitches, which parts are operated as usual from the main driving shaft 3, mounted in the frame 4 of the machine, which frame is provided with the usual bedplate 5.

6 represents a countershaft mounted in the frame work above the main shaft and provided with a gear wheel 7 driven by pinion 8 on the main shaft, the countershaft being further provided with a driving pinion 9 meshing with a gear wheel 10 on a cam shaft 11, which cam shaft is mounted in bearings 11^a on the bed-plate, the rotation of the main shaft serving, through the mechanism described, to impart a rotary motion to the cam shaft.

The foregoing mechanism is well known in the art and forms no part of my present invention, it having been heretofore employed in various forms to impart the proper movements to a cross-bar forming mechanism embodying a thread guide having a movement across and in front of the needles, and acting to form a series of loops made up of transverse cross bars and outer connecting portions, the thread guide receiving its motion from the cam shaft.

In my improved mechanism in its preferred form, I employ two thread guides, an upper one 12, and a lower one 13, sustained in fixed relation one above the other, but movable in unison across and in front of the needles; these thread guides thus acting to lay a plurality of yarns at intervals across the stitches formed by the needles, thus forming cross-bars each comprising a plurality of yarns, an upper series formed by the upper thread guide, and a lower series formed by the lower thread guide, the inner ends of the cross bars being bound in by the inner row of stitches and the outer ends being bound by the outer row of stitches. The thread guides are fixed to one end of a horizontal curved arm 14, mounted near its opposite end on a vertical stud 15 projecting upwardly from the bed-plate, the end of said arm beyond the stud being formed with a toothed segment 16, meshing with a corresponding toothed segment 17 on the forward end of an operating lever 18, mounted at its rear end on a vertical stud 19 on the bed-plate. The operating lever has projecting upwardly from it a pin or friction wheel 20 engaging in a cam groove 21 in a cam 22 on the cam shaft 11, before alluded to, the form of the cam groove being such that as the shaft is rotated, the lever will be vibrated back and forth, and by means of the intermeshing segment gears, the looper arm will be correspondingly vibrated and impart to the thread guide the proper movements transversely across and in front of the needles to form the cross-bars.

23 represents a guide for the tape or ribbon to be incorporated in the cross bars, which guide is hollow to receive and guide the ribbon, and is sustained in fixed position in front of the needles so as to direct the ribbon in the direction of the feed of the machine, the delivery end of the guide being so disposed that it lies across the general path of movement of the thread guides, but in a position between the two guides, so that the latter as they swing across and in front of the needles, will pass respectively above and below the delivery end of the guide, thus laying their respective yarns on opposite sides of the ribbon as the latter emerges from the guide. In this manner the cross-bars, each composed of a number of yarns, have the ribbon incorporated between these yarns, the yarn carried by the upper guide passing on one side of the ribbon, and that carried by the lower guide passing on the opposite side of the ribbon, the latter thus splitting the individual bars, a portion of each of which will be exposed on both sides of the border.

The ribbon guide 23 is fixed at its outer end to a transversely extending horizontal cylindrical rod 23^a seated loosely in a correspondingly formed socket in a block 24 fixed to the bed-plate, the rod being clamped firmly in the socket and held in position by means of a clamping screw 25, threaded in the block and adapted to bear against the rod. By this means the guide may be adjusted horizontally and transversely with reference to the feed of the machine, and also vertically at its end in order to preserve its proper operative relation to the thread guides.

As shown in Fig. 6, instead of providing a single arm for the two thread guides, the latter may be carried by separate arms, each provided with two toothed segments and driven by the segment on the operating lever 18, the latter having teeth of greater height so as to operate both arms.

In the machine shown in the drawings there coöperates with the cross-bar forming guides, a third thread guide 26 operating beneath the others, whose function is to form the festoon on the edge of the cross bars. The thread guide 26 serves to carry its thread or yarn into the path of the outer needle, that is, the right hand needle referred to Fig. 1, at substantially the same point that the guides 12 and 13 carry across the cross-bars, the thread guide 26 then withdrawing its yarn outside the path or line of the needle until the yarns for the cross-bar are again thrown across, when the thread guide 26 again brings its threads or yarns into the line of stitches formed by said outside needle. It will thus be seen that it serves to form a festoon along the outer edge, as shown at x in Fig. 5. The thread guide 26 projects laterally from between the

ends of a horizontally swinging lever 27, mounted at its outer end on a vertical stud 28 rising from the bed-plate, the opposite end of the lever being provided with a slot 29 which receives a pin 30 projecting upwardly from the inner end of a horizontal long lever 31, extending beneath the cam shaft 11 and mounted at its end on the lower end of a hanger 32 carried by a bracket 33 fixed to the frame, the lever 31 being thus capable of a horizontal vibrating motion, which by reason of the engagement of its pin in the slot in the lever 27, will impart a corresponding motion to said lever 27 and causing the thread guide 26 to properly cooperate with the cross-bar forming thread guides. Lever 31 is provided beneath the cam shaft with an upwardly extending friction roll or pin 34, engaging in a cam groove 35 in a cam 36 on the cam shaft, the shape of the cam groove being such that by the rotation of the shaft lever 31 will be so vibrated that the thread guide 26 will have imparted to it its proper movements to cooperate with the cross bar mechanism to form the festoon on the cross bars.

The present invention is applicable to any form of sewing machines in which two thread-carrying needles are employed and arranged to coöperate with complementary stitch-forming mechanism embodying two thread-carrying hooks located beneath the bed-plate; and it is obviously immaterial what style of stitch is produced by these parts, provided the thread of each needle is interlocked with the thread of its respective hook. The machine illustrated and the stitches formed thereby are both well known in the art and require no detailed description herein, it being sufficient to state that the vertical parallel needles are arranged one slightly in advance of the other with respect to the line of feed, as shown in Figs. 2 and 3, and that the stitch is formed whether the needles pierce the goods or not.

Fig. 8 shows the loopers 12 and 13 as about to pass across the line of feed in front of the needles, the latter being in their lifted position. Moving from left to right, the threads *a* and *b*, carried respectively by the upper and lower guides, are passed across the ribbon or tape T on opposite sides thereof, substantially in the manner indicated in Fig. 3. The needles then descend, the needle 1 passing between the threads *a* and *b*, and the previously formed bar *z*, and the needle 1^a passing between said threads *a* and *b* and the rear of the thread guides 12 and 13, so that on the rise of the needles and the retreat of said guides, a loop will be left around the thread of needle 1^a. The guides then move to the extreme end of their throw and rest, while the needles make two, three or more stitches, as may be desired, and provided for in the relative arrangement of parts heretofore described, and the design of the cams. The guides 12 and 13 again move to the left (Figs. 8 and 9), and the above operations are repeated, the thread of needle 1^a serving to secure the ornamental border to the goods G, and the threads of needle 1 to hold the transverse bar *z* properly spaced apart and the individual strands of said bars together. Simultaneously with the above described action of the guides 12 and 13, the supplemental guide 26, carrying thread *c*, moves back and forth and across the line of stitches formed by needle 1 and leaves a single loop *c'* around said needle for every double loop that is formed around the needle 1^a by the two threads *a* and *b*, thus forming the ornamental festoon hereinafter referred to.

Obviously, thread guide 26 may carry a plurality of threads, if desired, or it may be omitted altogether for effecting the operation of the machine with respect to the threads *a* and *b*.

As shown in Fig. 7, this mechanism for forming the festoon, may be so modified as to lay also the lower yarn or portion of the cross bar, in which case one of the guides of the mechanism first described may be omitted. This modification consists in applying to the festoon forming mechanism, a second thread guide 37 sufficiently long to pass beyond the outer needle when the lever 27 is swung to carry the festoon thread guide inward to the inner needle, the result being that this long thread guide will in its advance and retreat lay the under yarn of the cross bars beneath the ribbon just as it was laid by the lower guide of the mechanism first described.

It is seen, therefore, that my mechanism, by which the ribbon or tape is automatically incorporated between the yarns of the individual cross bars, is susceptible of various modifications, and my invention in its broad comprehension, is intended to embrace all these modifications and all equivalent means for effecting this result.

Having thus described my invention, what I claim is:—

1. In a machine for making trimmings or borders for fabrics, the combination with stitch forming mechanism adapted to form two rows of stitches, thread guides both movable across the space between the stitches and acting to lay at intervals upper and lower yarns between said rows of stitches, thus forming cross-bars, and a ribbon guide arranged to feed a ribbon between the upper and lower yarns of each bar.

2. In a mechanism for making trimmings or borders for fabrics, the combination with two stitching needles and their coöperating stitch forming mechanism adapted to form two rows of stitches, of two thread guides arranged one above the other, means for

moving said thread guides simultaneously across and in front of the needles, thereby forming cross-bars connecting the rows of stitches and each comprising upper and lower yarns, and a fixed ribbon guide having its delivery end so disposed with relation to the path of movement of the thread guides that the latter will pass respectively on opposite sides of the ribbon; whereby the latter will be laid between the yarns of each bar.

3. A machine for making trimmings or borders for fabrics, including, in combination, means for forming two rows of stitches, means for carrying a plurality of yarns or cords simultaneously to and fro across said rows to be stitched together in each of said rows of stitches at the point where said yarns or cords are carried across them, and means for presenting an additional yarn or cord at the point where said plurality of yarns or cords intersect one of said rows of stitches; whereby the additional yarn and the plurality of yarns may be stitched together at said point only.

In testimony whereof I hereunto set my hand this thirtieth day of July, 1908, in the presence of two attesting witnesses.

HERBERT S. NORTH.

Witnesses:
CHARLES SURVER,
WILLIAM E. BELLIS.