May 6, 1941. F. A. KUCERA 2,241,264

SEWING MACHINE

Filed March 28, 1938 5 Sheets-Sheet 1

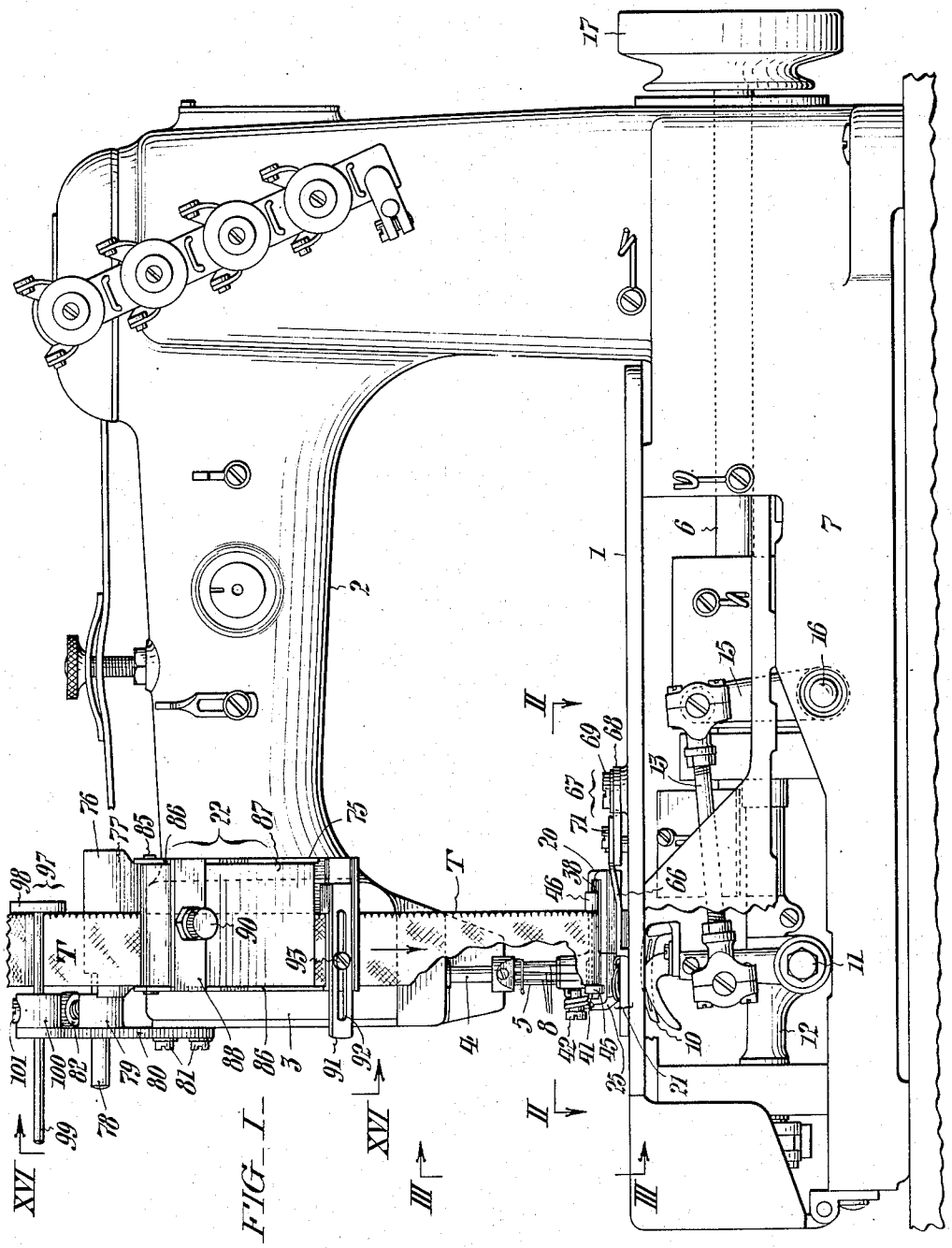


FIG. 1

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May 6, 1941. F. A. KUCERA 2,241,264

SEWING MACHINE

Filed March 28, 1938 5 Sheets-Sheet 2

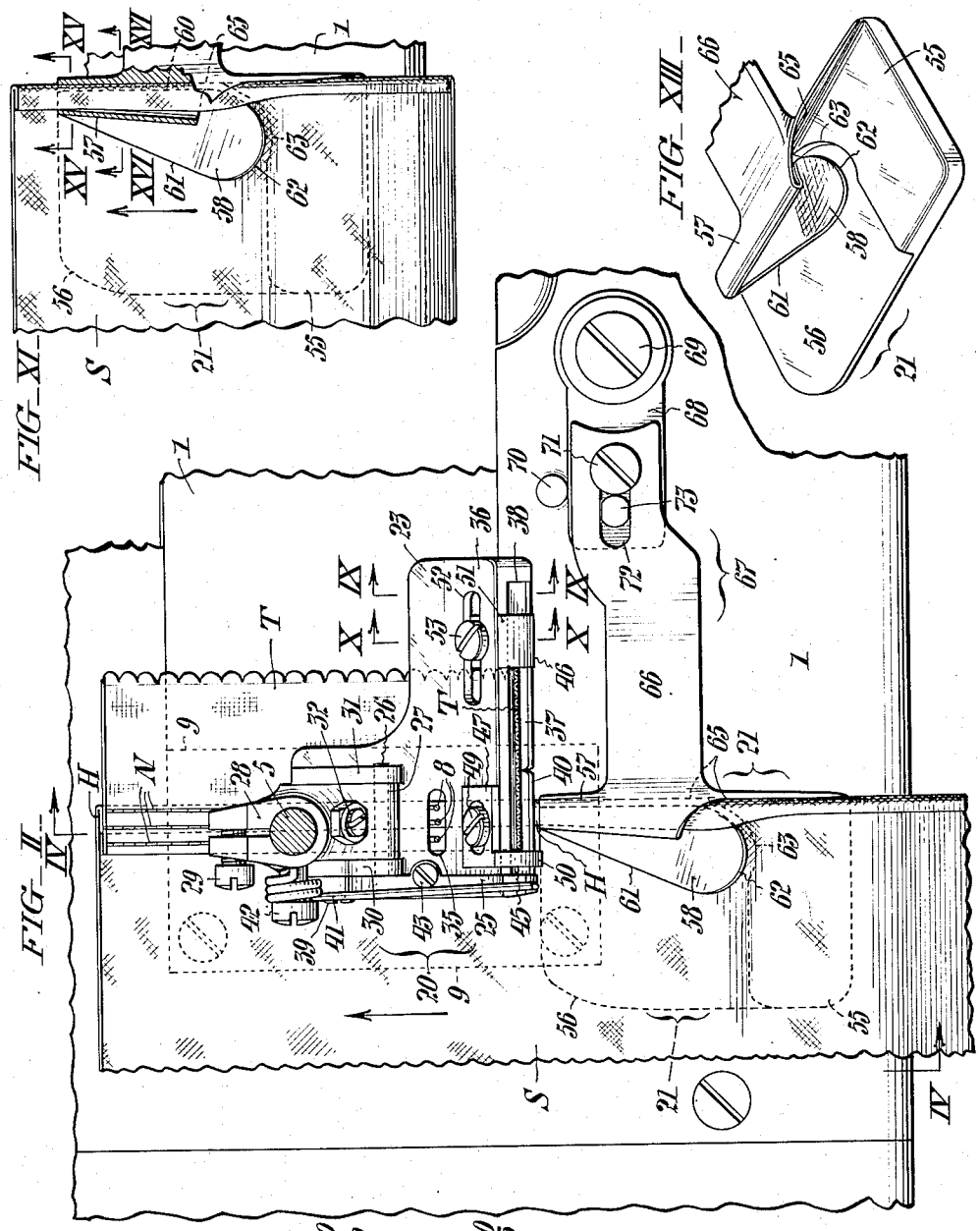


FIG. XI

FIG. XIII

FIG. II

FIG. XV

FIG. XIV

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May 6, 1941. F. A. KUCERA 2,241,264

SEWING MACHINE

Filed March 28, 1938 5 Sheets-Sheet 3

FIG. III.

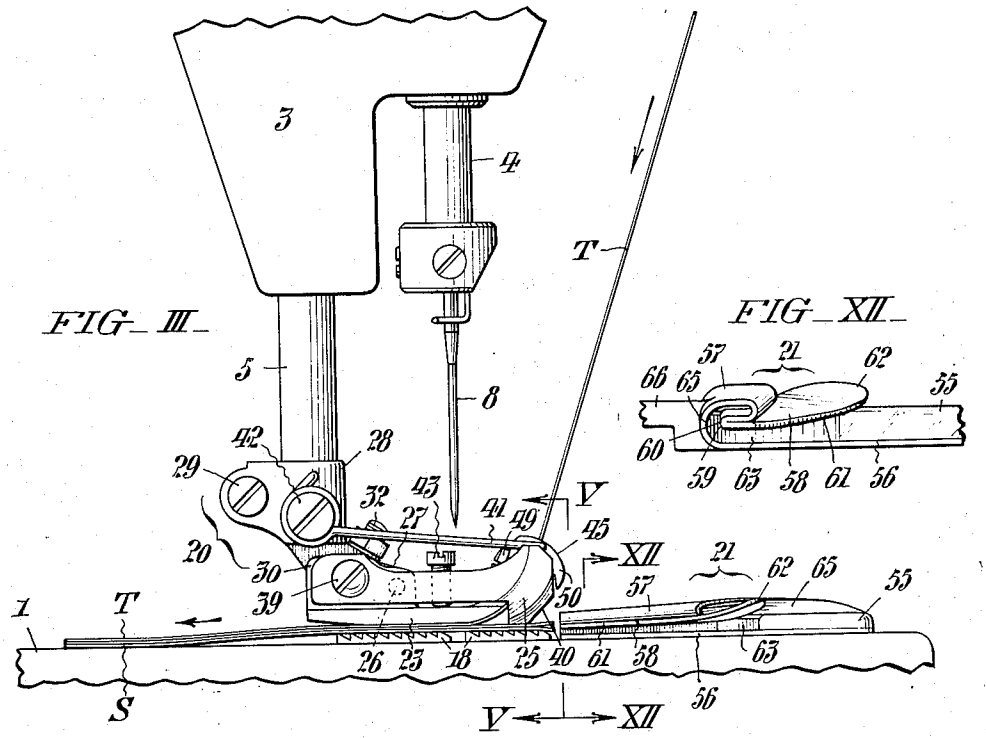
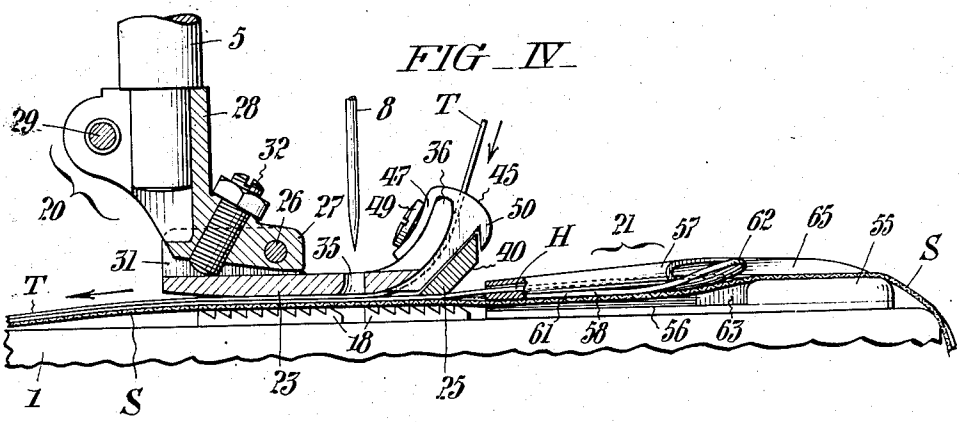


FIG. XII.

FIG. IV.



WITNESSES:
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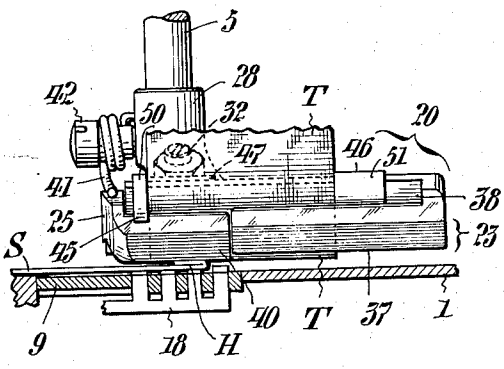
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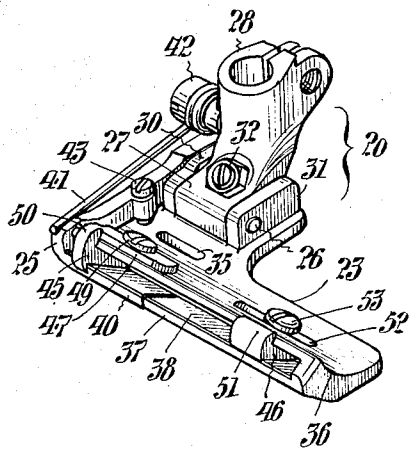
SEWING MACHINE

Filed March 28, 1938 5 Sheets-Sheet 4

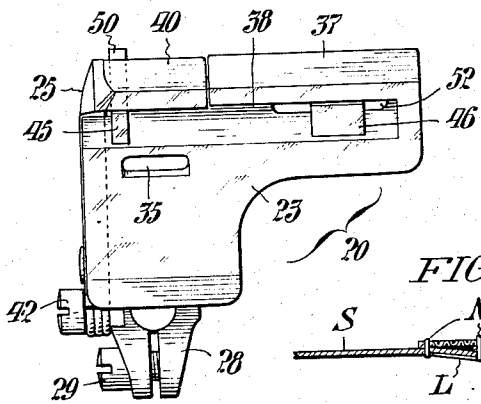
FIG_V_



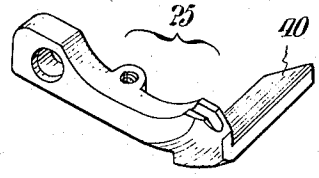
FIG_VI_



FIG_VII_

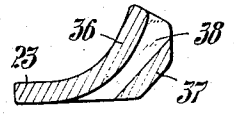


FIG_VIII_

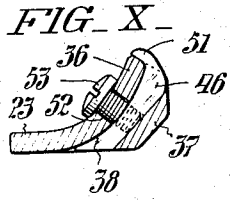


FIG_XXI_

FIG_IX_



FIG_X_



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May 6, 1941. F. A. KUCERA 2,241,264

SEWING MACHINE

Filed March 28, 1938 5 Sheets-Sheet 5

FIG. XVI.

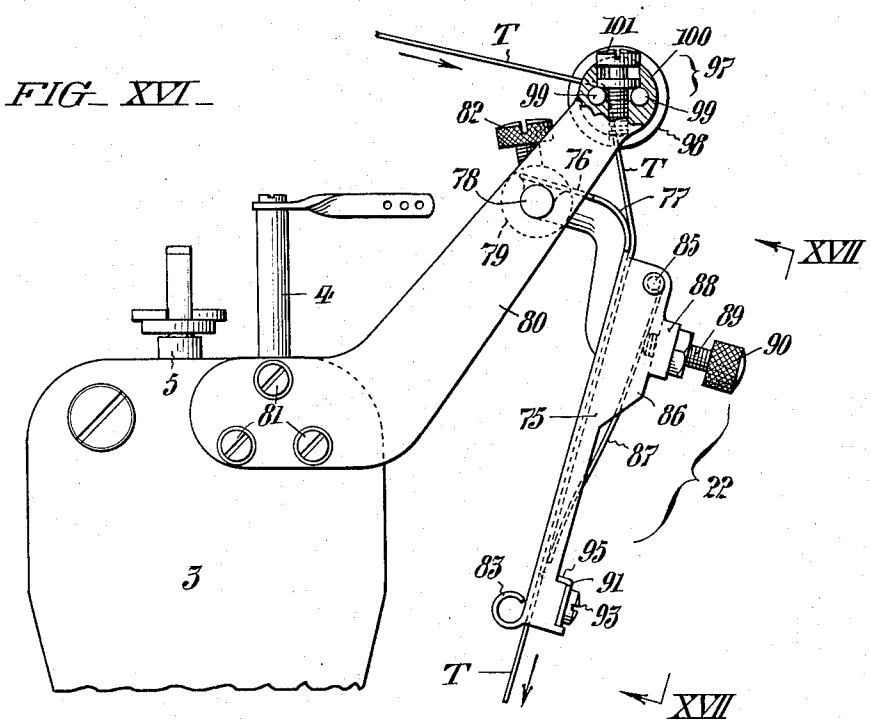


FIG. XVIII.

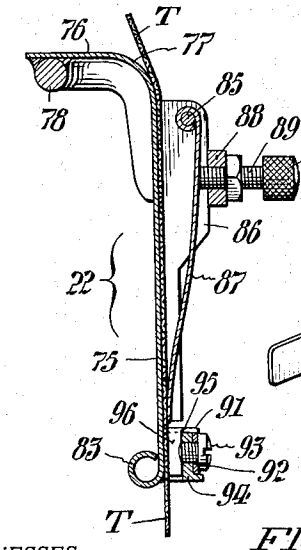


FIG. XX.

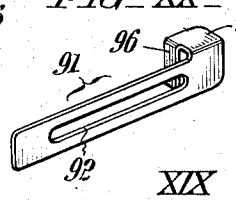


FIG. XVII.

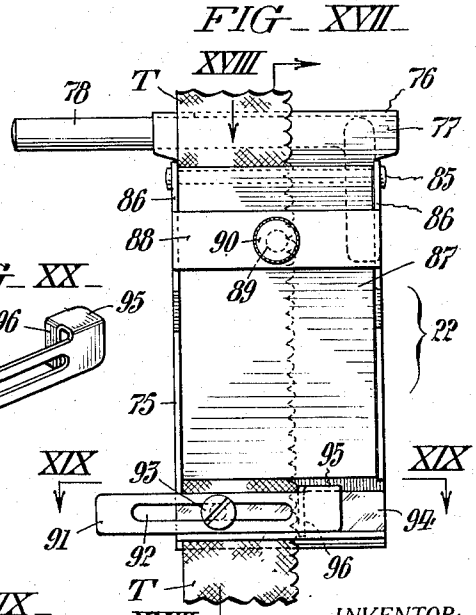
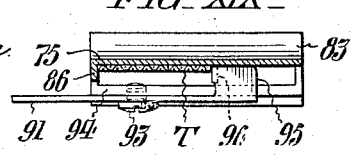


FIG. XIX.



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Patented May 6, 1941 2,241,264

UNITED STATES PATENT OFFICE

2,241,264

SEWING MACHINE

Frank A. Kucera, Chicago, Ill., assignor to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application March 28, 1938, Serial No. 198,343

5 Claims. (Cl. 112—136)

This invention relates to sewing machines, and it has reference more particularly to sewing machines of the flat bed chain stitch type, capable of producing a lengthwise yielding seam and useful in attaching elastic tape to stockings and other garments made from knitted fabric.

The chief aim of my invention is to make it possible, with sewing machines of a specified type, to control the natural curl along the top edge of the stocking fabric and reduce it to the form of a relatively-narrow, flat ravel-resisting fold or hem of uniform width, and at the same time to control the garter tape and guide it under regulatable tension into superimposition upon the hem of the fabric for penetration by the needle—or certain needles if there be a group of them—of the sewing machine, so that in the finished stocking the fabric will be devoid of puckering adjacent the seam and free to expand and contract compensatively with the elastic tape as the stocking is drawn over the leg.

This desideratum I attain in practice as hereinafter more fully disclosed, through provision of instrumentalities in addition to the usual stitch forming and feeding elements of the sewing machine, including a presser foot with incorporated guide means for the elastic tape which is adjustable transversely of the direction of feeding; a controller in advance of the presser foot having a semi-volute passage adapted to be traversed by the fabric and a ledge within said passage, which cooperates to reduce the curl, to transform it into a flat retroversion, and to present said retroversion to the needle or needles of the machine; means whereby the controller is supported with capacity for adjustment transversely of the direction of feeding; a guide above the hemmer and in advance of the presser foot, by which the tape is presented to the needle or needles with a marginal portion thereof superimposed upon the retroversion of the fabric, said guide having regulatable means for tensioning the tape; and means for supporting the tensioning guide with capacity for adjustment in the direction of feeding as well as crosswise of the direction of feeding so that it may be accurately aligned with the guide means on the presser foot.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein Fig. I is a view, in front elevation, of a chain stitch sewing machine conveniently embodying my invention.

Fig. II is a fragmentary horizontal sectional view drawn to a larger scale and taken as indicated by the arrows II—II in Fig. I.

Fig. III is a fragmentary view in elevation looking as indicated by the arrows III—III in Fig. I.

Fig. IV is a fragmentary transverse sectional view taken as indicated by the arrows IV—IV in Fig. II.

Fig. V is a fragmentary detail sectional view taken as indicated by the arrows V—V in Fig. III showing the presser foot in front elevation.

Fig. VI is a perspective view of the presser foot.

Fig. VII shows the bottom plan of the presser foot.

Fig. VIII is a perspective view of an independently movable component of the presser foot.

Figs. IX and X are detail sectional views of the presser foot taken as indicated respectively by the arrows IX—IX and X—X in Fig. II.

Fig. XI is a fragmentary detail view in plan with the curl controller shown in longitudinal section.

Fig. XII is an elevation of the delivery end of the curl controller viewed as indicated by the arrows XII—XII in Fig. III.

Fig. XIII is a perspective view of the hemmer.

Figs. XIV and XV are cross sectional views of the curl controller taken as indicated respectively by the arrows XIV—XIV and XV—XV in Fig. XI.

Fig. XVI is a fragmentary view in end elevation looking as indicated by the arrows XVI—XVI in Fig. I, and showing the guiding and tensioning means for the elastic tape.

Fig. XVII is a detail view in front elevation of the guiding and tensioning means looking as indicated by the arrows XVII—XVII in Fig. XVI.

Fig. XVIII is a sectional view taken as indicated by the arrows XVIII—XVIII in Fig. XVII.

Fig. XIX is a transverse sectional view of the tape guide and tensioning means taken as indicated by the arrows XIX—XIX in Fig. XVII.

Fig. XX is a perspective view of a gauge member associated with the tape guiding and tensioning means; and

Fig. XXI is a diagrammatic view in section showing how the elastic tape is seamed to the body of a stocking in accordance with my invention.

Except as hereinafter specifically pointed out, the sewing machine which I have shown in Fig.

I for convenience of illustrating my invention is of standard construction in that it has a horizontal work support 1, an overreaching longitudinally extending arm 2 with a terminal head 3 at its free end wherein are slidably guided a needle bar 4 and a presser bar 5. By suitable means, not illustrated, within the arm 2 deriving movement from a horizontal drive shaft 6 within the base 7 of the machine, the needle bar 4 is reciprocated vertically so that the three transversely-arranged needles 8 at its lower end are passed up and down through a throat plate 9 set into the work support in the usual manner. Arranged to cooperate with the needles 8 beneath the work support is a single looper 10 which is pivoted at 11 to a rocker 12 mounted for oscillation about a longitudinally-extending axis. The rocker 12 is actuated by suitable means (not shown) from the drive shaft 6 to impart needle approaching and avoiding movements to the looper 10. Loop taking movements are on the other hand, imparted to the looper 10 through a means which is only partly shown in Fig. I including a horizontal connecting link 13 by which the looper is coupled with an oscillating arm 15 on a rock shaft 16 extending transversely of the machine base and actuated in a well known way from the drive shaft 6. The machine is operated through application of power by belt to a pulley 17 at the outer end of the drive shaft 6. By means of a feed dog 18 having spaced front and rear sections which operate upwardly through slots in the throat plate 9, the work being sewed is intermittently progressed on the work support 1 in the direction indicated by the arrows in Figs. II and IV.

In adapting a standard flat bed chain stitch sewing machine such as briefly described up to this point for the purpose of my invention, i. e., for applying elastic tape to knitted stockings and the like, I have provided supplemental cooperating elements including a presser foot of special construction which is comprehensively designated 20 in the drawings; a curl controller comprehensively designated 21, and a tape guide and tensioning device designated 22.

From Figs. III–VII, it will be observed that the presser foot 20 comprises a main component 23 and an auxiliary component 25, which, as presently explained, is movable independently of said main component. As shown, the main component 23 is pivotally connected by a transverse pin 26 to the forwardly projecting toe portion 27 of a split supporting shank member 28 which is secured to the lower end of the presser bar 5 by a clamp screw 29. The pivot pin 26 (see Fig. II) passes through apertured upstanding ears 30, 31 at the rear of the main component 23. The main component can thus rock up and down and adapt itself to irregularities in the work progressed beneath it by the action of the feed dog 18, its swinging movement being limited in one direction, by a stop screw 32 adjustable in the shank member 28, see Figs. II and IV. Immediately in advance of the ears 30, 31, the main component 23 of the presser foot has a transversely extending slot 35 for passage of the needles 8. As further shown in Figs. II and IV, the front end of the main component is upwardly rounded as at 36 to facilitate passage of the elastic tape T (Figs. II and IV) beneath it, and, moreover, has a parallel sloping bar portion 37 spaced therefrom to form in part a transverse slot 38 for guiding the elastic tape T. The independently movable presser foot component 25 (Fig. VIII) is in the form of an arm which is pivotally connected by a screw 39 (Fig. III) to the outer side of the ear 30 on the component 23. At its free end, the component 25 has a sloping lateral bar projection 40 which is complemental to, and which meets the bar projection 37 on the main component 23 to complete the transverse guide slot 38 for the tape. A finger spring 41 having a coiled portion wrapped about a screw stud 42 engaging into the shank member 28 serves to yieldingly depress the component 25 whereof the independent movement is limited by an adjustable stop screw 43 arranged to contact with the top surface of the main component 23 as shown in Figs. III and VI. Adjustable along the tape slot 38 in the presser foot 20 are edge guides 45, 46 for the tape, the guide 45 having the configuration of a clip which engages over the upturned front end 36 of the main presser foot component 23, and which is formed with a wing 47 at one side thereof slotted as at 48 for passage of the shank of a securing screw 49. At the front, the edge guide 45 overhangs the bar 40 of the independently movable presser foot component 25 as shown at 50 in Fig. IV. The edge guide 46, see Fig. X, is shaped to correspond with the cross sectional configuration of the tape slot 38 and is extended inwardly at the top as at 51 in Fig. VI to overlap the top edge of the upturned front end 36 of the main component 23, which latter has a slot 52 to clear the shank of a headed securing screw 53. By virtue of the provisions just described it is possible not only to vary the size of the slot 38 for elastic tapes of different widths but to laterally adjust the path of travel of the tape laterally in respect to the needles 8.

The curl controller device 21 rests upon the work support 1 immediately in advance of the presser foot 20 (as considered with regard to the direction of feeding), and as shown in Fig. XIII, has a loading platform 55 at its front end at an elevation above its main surface 56. Beyond the loading platform 55 and along one of its side edges, the curl controller 21 has a semi-volute scroll 57, see Figs. XIV, XV, which tapers from its receiving end to its delivery end. Extending laterally inward from the scroll 57 and overreaching the main surface 56 of the controller 21 is a wing 58 whereof the inner edge 59 coincides with the inner straight edge 60 of the scroll (see Fig. XIV) with resultant provision of a ledge internally of said scroll. The outer edge 61 of the tongue forms an acute angle with the internal ledge such that said wing is tapered like the scroll but to a much greater degree. The front end of the wing 58 is rounded and bent upward as at 62 so as to extend above the level of the loading platform 55. The loading platform 55 is rounded as at 63 in Figs. II, XI and XIII, to merge into the outer edge wall 65 of the scroll 57 and to conform with the rounding 62 of the wing 58. The curl controller 21 is affixed to one section 66 of the lengthwise adjustable arm 67, the other section 68 of said arm engaging, with interposition of a friction washer a pivot screw 69 which engages downwardly into the work support 1. As a consequence of this arrangement, the curl controller 21 can, when necessary or desired, be swung about the pivot screw 69 to a retracted position out of the way for convenience of access to the presser foot 20, its active or advanced position being determined by a stop stud 70 on the work support 1. The adjustable connection for the arm 67 includes, as shown in Fig. II, a headed clamp screw 71 whereof the shank passes down through a longitudinal slot 72 in the section 66 and engages into the section 68. The two sec-

tions of the arm 67 are maintained in alignment by a lug projection 73 on the one which projects up into the slot 72 of the other, see Fig. II.

In traversing the curl controller 21, the knitted stocking fabric S is broken in passing over the inner edge of the loading platform 55, by the depressing action of the wing 58 as shown in Fig. IV, while at the same time, the raised end 62 of said wing engages the natural curl of the fabric along the raw edge from beneath in Figs. II and XI. In advancing through the attenuated passage of the scroll 57 the edge curl of the fabric is gradually reduced and at the same time flattened, so that it emerges from the discharge end of said scroll, as a flat retroversion H of a definite uniform width. With the curl controller 21 laterally adjusted to the position shown in Fig. II, the retroversion H of the knitted fabric is guided so as to be penetrated by the two right hand needles of the group 8.

The guide and tensioning device 22 for the elastic tape T is arranged above the curl controller 21 in advance of the presser foot 20 and comprises a member 75 (Figs. XVI—XIX) which is fashioned to shallow channel configuration to provide a guideway for the tape. At the top of the device 22 the back or web portion of the channel member 75 is bent rearward at right angles as at 76, the transition being effected through a smooth curve 77 of large radius over which the tape enters the channel; and permanently secured to the underside of the portion 76 adjacent its horizontal edge, is a supporting bar 78 which engages into an axially apertured boss 79 on an upwardly and forwardly reaching angular bracket arm 80 fastened by screws 81 to the outer end face of the needle head 3 of the sewing machine. By virtue of this construction, it will be apparent that the device 22 can be adjusted forwardly or rearwardly in the direction of feeding as well as laterally of the line of feeding, the adjustment being fixable by a set screw 82 which engages laterally into the boss 79 of the bracket arm 80, and which clamps against the supporting bar 78 of said device. At the bottom or discharge end of the channel member 75, the cross web of the latter is curled rearwardly and upwardly as at 83 to provide a smooth round surface about which the tape passes as it leaves the device 22. Pivoted on a pin 85 extending transversely between the side flanges 86 of the channel 75 at the top is a spring tongue 87 which corresponds in width with said channel. Bridging the channel immediately below the pin 85 is a cross bar 88 with a tapped aperture at the center in which an adjusting screw 89 is engaged. As shown in Fig. XVIII the inner end of the screw 89 bears upon the spring tongues 87 so that the lower edge of the latter is caused to impose a drag upon the tape T, as the latter traverses the guide channel 75. From Fig. XVI, it will be noted that the screw 89 is provided with a knurled head 90 whereby it may be manually manipulated while the machine is running to adjust the tension of the tongue 87 and thereby vary the tension on the tape as desired or required. In order that the device 22 may be adjusted for guiding tapes of different widths, there is provided a gauge member 91 which has a longitudinal slot 92 for passage of the shank of a headed clamp nut 93 engaging into a cross bar 94 that bridges the side flanges of the channel 96 at the lower end of the latter. At its inner end the gauge 91 is formed with a lateral projection 95 having a downwardly directed tab 96 which constitutes a stop for one edge of the tape as shown in Fig. XVII, the other edge of the tape running in contact with a left hand side flange 86 of the channel 75. The tape T is supplied from a roll (not shown) suitably supported above the machine at the rear of the latter, and before entering the device 22 traverses the supplemental guide 97 consisting, see Figs. I and XVI, of a disk head 98 from one side of which a pair of spaced parallel prongs 99 project. As shown, the prongs 99 of the supplemental guide 97 pass through correspondingly spaced apertures in a boss 100 at the upper end of the bracket arm 80 in which they are secured, with provision for endwise adjustment, by clamp screws 101.

As already stated, with the curl controller 21 adjusted as shown in Fig. II, the retroversion or fold H is delivered for penetration by the two right hand needles of the group 8. In this connection it is to be noted that the retroversion H is fully formed as it leaves the scroll 57 on its way beneath the presser foot and before it meets with the tape T which is superimposed upon said retroversion as the latter and the tape are concurrently progressed in marginally-lapped relation by the feed dog 18. In the present instance, the guides 50 and 51 on the presser foot 20 are so adjusted that the inner or left hand edge of the tape T is brought beyond the left hand needle of the group 8 for penetration by the latter, said needle also passing through the single thickness of the stocking fabric beyond the retroversion H. The elastic tape T is thus secured to the stocking fabric by three parallel lines N of needle loops which are interconnected by the crosswise loops L formed from the looper thread as diagrammatically shown in Fig. XXI, such seam having the capacity to expand and contract lengthwise compensatively with the tape and the stocking fabric. During the sewing, the component 23 of the presser foot 20 bears heavily on the seam from above to insure positive progression of the work by the feed dog 18; while the independently movable component 25 bears lightly on the stocking fabric inwardly of the tape with just sufficient pressure to hold the fabric down without causing distortion thereof. By proper adjustment of the screw 89 pressing upon the spring tongue 87 of the guiding and tensioning device 22, the drag induced in the tape T may be regulated to a nicety to preclude puckering of the stocking fabric adjacent the seam. It is of course, important that the device 22 be properly adjusted in the direction of feeding and crosswise thereof so that the tape may move freely without deviating from a direct path of travel enroute to the guide slot 38 of the presser foot 20. It will be further apparent that the overlap of the tape relative to the stocking fabric may be changed as desired by adjusting the edge stops 45, 46 along the slot 38 in the presser foot 20, and by compensatively adjusting the guiding and tensioning device 22 bodily crosswise of the direction of feeding. The machine is also adaptable for tapes of different widths by adjusting one or both of the edge guides 45, 46 on the presser foot 20 and by correspondingly adjusting the gauge member 91 of the guiding and tensioning device 22.

Having thus described my invention, I claim:

1. In a sewing machine, stitch forming and feeding instrumentalities; a controller for manipulating the curled edge of knitted stocking fabric or the like, in the form of a tapering half-turn scroll having a flat inturned portion inter-

mediate its top and bottom walls and a tongue in continuation of said flat portions extending in advance of the scroll in the direction of feeding, said tongue having a rounded edge which laterally under-reaches the curl of the fabric as the fabric edge is advanced through the attenuating passage within the scroll to open up the curl without reversing it and to assist in converting said curl into a narrow flat hem of uniform width; and a tensioning guide which delivers elastic tape under definite tension in marginally overlapping relation upon the flat hem of the fabric as said hem emerges from the controller, for presentation of the overlap area of the fabric and the strip to the stitch forming instrumentalities of the machine.

2. In a sewing machine having stitch forming and feeding instrumentalities; a controller for manipulating the curled edge of knitted stocking fabric or the like, including means for laterally engaging within the edge curl of the fabric to open it as the fabric is advanced, and an attenuating passage by which the opened curl is subsequently converted, without reversing it, into a narrow flat hem of uniform width; a tensioning guide which delivers elastic tape under definite tension in marginally overlapping relation upon the flat hem of the fabric as said hem emerges from the controller, for presentation of the overlap area of the fabric and strip to the stitch forming instrumentalities of the machine; and means whereby the controller and the tape guide can be adjusted relatively to vary the overlap between the fabric and the tape.

3. In sewing machines having stitch forming instrumentalities; feed means including spaced front and rear feed dog sections aligned in the direction of feeding; a controller for manipulating the curled edge of knitted stocking fabric or the like, including means for laterally engaging within the edge curl of the fabric to open said curl as the fabric is advanced, and an attenuating passage by which the opened curl is subsequently converted, without reversal, into a narrow flat hem of uniform width; a tensioning guide which delivers elastic tape under definite tension in marginally over-lapping relation upon the flat hem of the fabric as said hem emerges from the controller, for presentation of the over-lap area of the fabric and the strip to the stitch forming instrumentalities; a main presser foot which coacts with the rear feed dog section to concurrently advance the fabric and the tape after the superimposition of the two is effected; and an independently movable auxiliary presser foot which cooperates with the front feed dog section to feed the body fabric immediately in advance of the point where it meets with the tape.

4. In a sewing machine having stitch forming instrumentalities; feed means including spaced front and rear feed dog sections aligned in the direction of feed; a controller for manipulating the curled edge of knitted stocking fabric or the like, including means for laterally engaging within the edge curl of the fabric to open said curl as the fabric is advanced, and an attenuating passage by which the opened curl is subsequently converted, without reversal, into a narrow flat hem of uniform width; a tensioning guide which delivers elastic tape under definite tension in marginally overlapping relation upon the flat hem of the fabric as said hem emerges from the controller, for presentation of the over-lap area of the fabric and strip to the stitch forming instrumentalities; a main presser foot which coacts with the rear feed dog section to concurrently advance the fabric and the tape after the superimposition of the two is effected; and an auxiliary presser foot pivotally connected for up and down movement to the main presser foot, which auxiliary foot cooperates with the front feed dog section to feed the body fabric immediately in advance of the point where it meets with the tape.

5. In a sewing machine having stitch forming instrumentalities; feeding means including spaced front and rear feed dog sections aligned in the direction of feeding; a controller for manipulating the curled edge of knitted stocking fabric or the like, including means for laterally engaging within the edge curl of the fabric to open said curl as the fabric is advanced, and an attenuating passage by which the opened curl is subsequently converted, without reversal, into a narrow flat hem of uniform width;. a tensioning guide which delivers elastic tape under definite tension in marginally over-lapping relation upon the flat hem of the fabric as said hem emerges from the controller, for presentation of the overlap area of the fabric and strip to the stitch forming instrumentalities; a main presser foot which coacts with the rear feed dog section to concurrently advance the fabric and the tape after the superimposition of the two is effected; an independently movable auxiliary presser foot which cooperates with the front feed dog section to feed the body fabric immediately in advance of the point where it meets with the tape; and a supplemental tape guide on the main presser foot whereby the tape is directed downwardly into a transverse interval between the two presser foot sections.

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