

Oct. 23, 1945.

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2,387,282

TIE SEWING MACHINE

Filed Nov. 27, 1941

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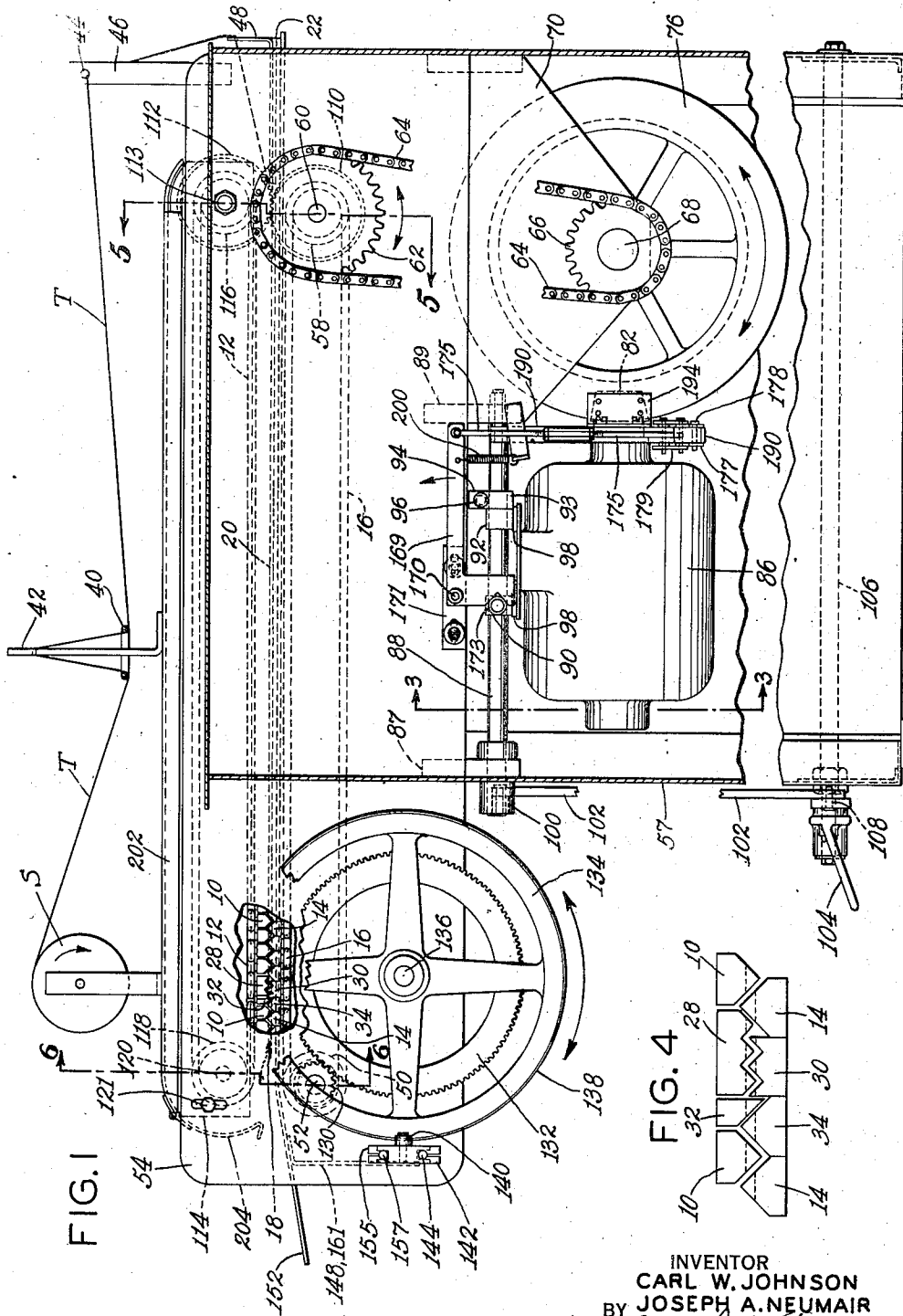


Fig. 4

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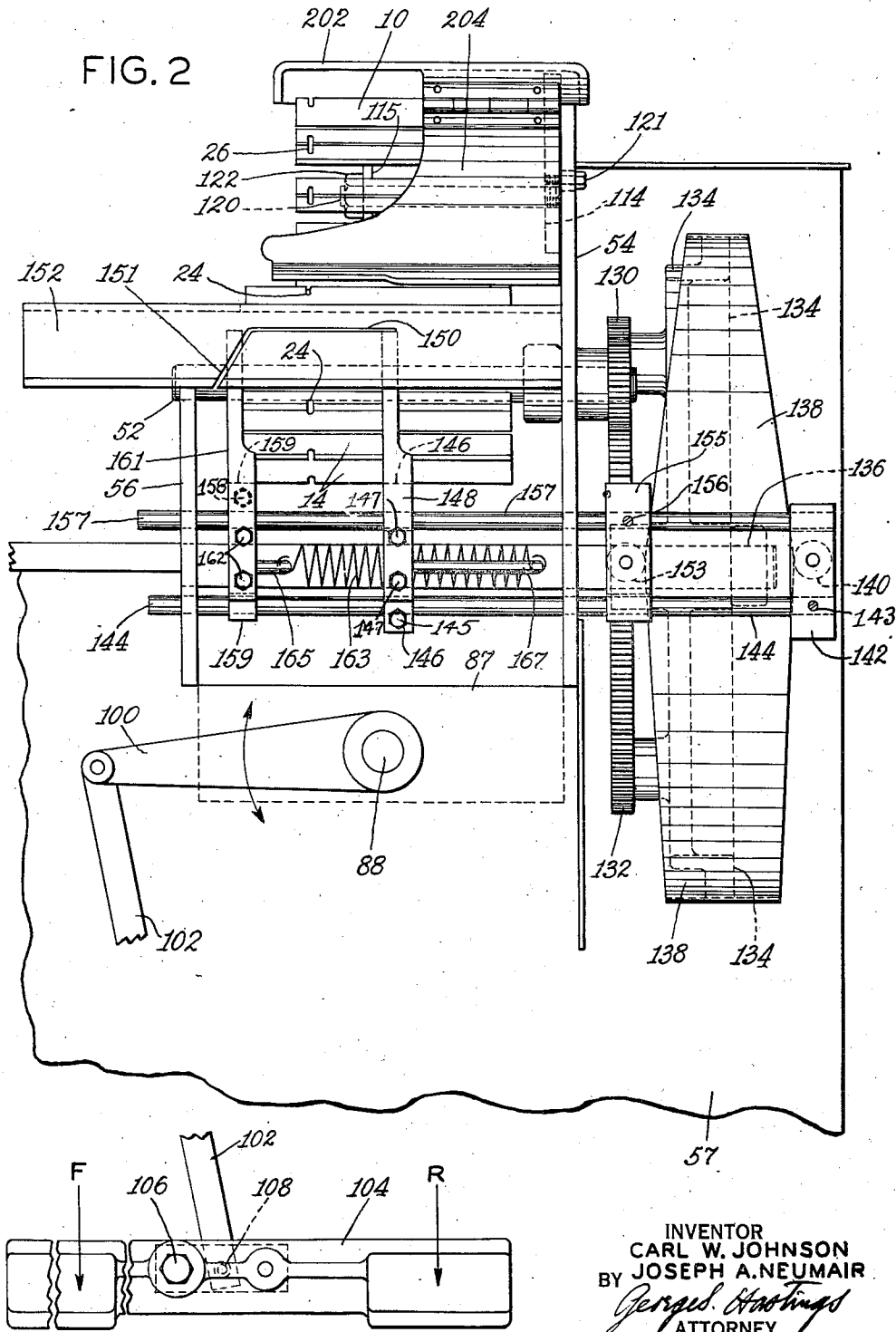
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4 Sheets-Sheet 2

FIG. 2



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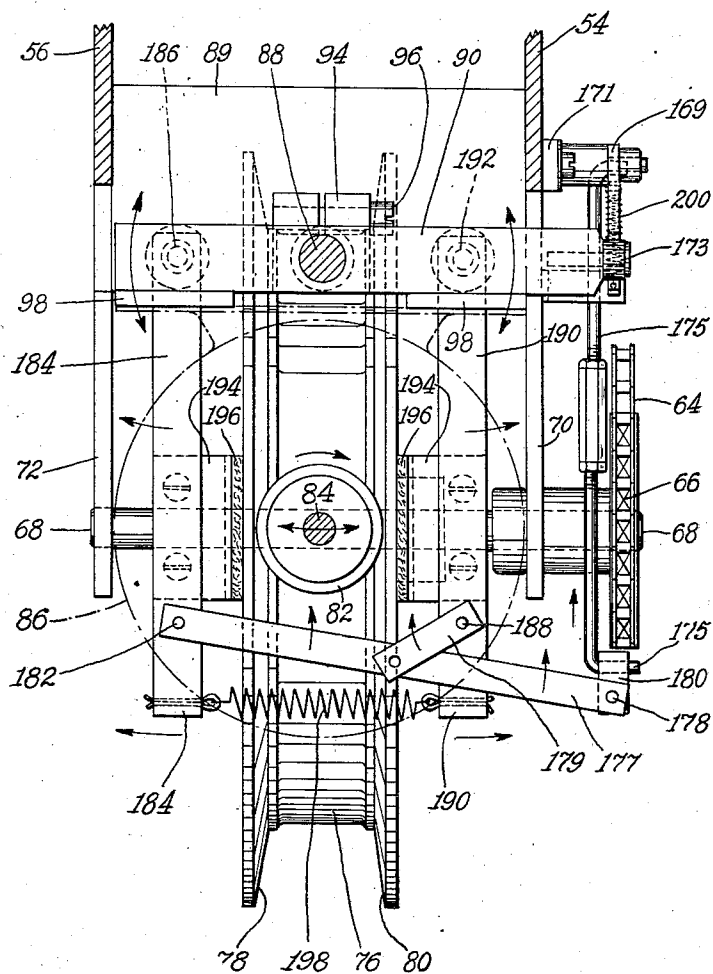
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4 Sheets-Sheet 3

FIG. 3



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2,387,282

TIE SEWING MACHINE

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Application November 27, 1941, Serial No. 420,618

5 Claims. (Cl. 112—174)

This invention relates to sewing machines, more particularly to necktie sewing machines of the stationary needle type such as shown in the patent to M. M. Newman et al., 2,098,009.

One of the objects of the invention is to provide an improved reversing mechanism for driving the crimpers to stitch the lining to the fabric and then to withdraw the same from the needle. In the reversing mechanism shown in the co-pending application of M. M. Newman et al., Serial No. 250,343, filed January 11, 1939, on which Patent No. 2,282,877 was issued May 12, 1942, the driving and reversing is effected by stepping on one or the other of a pair of pedals which control separate drives from the motor to the machine, and occasionally the operator would step upon both pedals and blow out the motor. The present reversing mechanism is so constructed that this cannot happen.

A further object is to drive the upper sprocket chain which carries crimper bars meshing with the crimper bars on the lower driven sprocket chain. Previously the lower sprocket chain only was driven, and the leading faces of the crimper bars on the lower chain would engage the trailing faces of the crimper bars on the upper chain and thereby drive the latter. Thus the crimper bars on the upper chain would not be centered in the spaces between the crimper bars on the lower chain, wherefore the lining and fabric would not be maintained snugly against the trailing faces of the crimper bars on the lower sprocket chain and stitches of the desired length would not be produced. By driving both chains this effect is avoided.

Another object is to provide the proper gear ratio between the lining guide cam and the sprocket chains so that the cam will not get out of a predetermined timing with respect to the crimper bars.

Still another object is to provide a construction for supporting the upper sprocket chain which will permit the same to be lifted for access to the lower chain.

Other objects are to provide mechanism for braking the reversing mechanism upon disengaging the latter, to prevent overtravel of the sprocket chains, and to provide a hinged guard which will not interfere with the withdrawal of the pleated necktie from the needle after stitching. With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described.

In the accompanying drawings, which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation of the improved machine;

Fig. 2 is an end elevation thereof;

Fig. 3 is a view taken on the line 3—3 of Fig. 1, showing the reversing mechanism and the brake device, the position of the motor being shown in dot and dash lines;

Fig. 4 is a detail enlarged view of the crimper bars which coact to form several narrow pleats in the leading end of the lining and a single narrow pleat in the lining and superposed necktie fabric, behind the narrow pleats;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1; and

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 1.

Referring to Fig. 1, the crimper bars 10 on the upper sprocket chain 12 and the crimper bars 14 on the lower sprocket chain 16 have suitably beveled faces to provide triangular teeth which inter-engage with each other as shown, to form pleats in the superposed necktie lining and fabric and advance the same over the eye 18 of the needle 20. The needle is slidably mounted in a needle holder 22 of well known construction arranged at the rear end of the machine, the holder consisting of three superposed plates, the middle plate being provided with a broad slot in which is disposed the rear end of the needle which is bent into the shape of a hook. The shank of the needle extends forwardly through a narrow slot in the forward end of the middle plate of the needle holder, the narrow slot communicating with the broad slot, and through transverse slots 24 and 26 in the crimper bars 10 and 14 (Fig. 2). The slots of opposed crimper bars are aligned with each other and co-act to grip the needle while the superposed necktie lining and fabric are being advanced upon the shank of the needle, when the sprocket chains 12 and 16 are driven in a direction to stitch the lining and fabric together. Thus the needle is slid backwardly in its holder until its eye assumes the dotted position 18 shown in Fig. 1.

It is desirable to form relatively short stitches in the leading end of the lining ahead of the longer stitches which hold the fabric and lining together. For this purpose there are also mounted on the respective sprocket chains 12 and 16, opposed crimper bars 28 and 30, whose opposed faces have inter-engaging teeth which form a

series of relatively narrow pleats in the leading end of the lining, so that upon penetration of the same by the needle there will be formed a series of short stitches ahead of the stitches formed when the pleats resulting from the inter-engagement of bars 10 and 14 are penetrated by the needle. There is also provided a crimper bar 32 on the upper chain 12 which engages with one beveled face of an underlying crimper bar 34, which is of the same configuration and size as the bars 10 and 14 and mounted on the lower chain 16, to form a single pleat in both the lining and the leading end of the fabric thus uniting the same with a single short stitch when crimper bars 32 and 34 advance this pleat in the lining and the underlying leading end of the necktie fabric on the needle. The opposed crimper bars ahead of the bars 28 and 30 have the same configuration and are mounted on sprocket chains 12 and 16 in the same manner as the crimper bars 10 and 14 following the crimper bars 32 and 34, and are accordingly designated as 10 and 14, respectively. The crimper bars 28, 30, 32 and 34 have transverse slots similar to the slots 24 and 26. It should be noted, however, that the bar 32 corresponds to one half of the bar 10 and is spaced $\frac{1}{8}$ inch from the adjoining bars 10 and 28 like all the other bars on the upper sprocket chain, whereas the bars on the lower chain abut one another. Thus bar 32 will inter-engage with bar 34 which has the same size and configuration as the bars 10, 14, to form a pleat whose depth is greater than the pleats formed by bars 28 and 30, since the tip of the bar 32 projects downwardly to a greater depth than the teeth of the bar 28. In prior constructions the tip of the bar corresponding to our bar 32 terminated at a point aligned with the tips of the teeth on the bar 28, wherefore the depth of the corresponding pleat was insufficient and occasionally the stitch through said pleat was skipped, but with our construction of the bar 32 the depth of the pleat is such that the stitch uniting the fabric and lining will not be skipped.

The thread T is drawn from the spool S and guided through a ring 40 and through a hole in the bracket 42, the ring serving to tension the thread which is then drawn through a hole 44 in guide 46 and through a hole in an upright bracket 48 fastened to the top plate of the needle holder, the thread being then drawn along the transverse slots of the crimper bars wherein the needle is positioned and threaded through the eye 18 thereof.

The lower sprocket chain 16 may be formed as a triple width chain running over a triple sprocket 50 fastened on a shaft 52 supported in the front frame 54 (Fig. 1) and a rear frame 56 (Fig. 3), these frames being supported by a bed 57, and chain 16 also runs over a triple sprocket 58 mounted on a shaft 60 which is supported in the front and rear frames 54 and 56. Shaft 60 carries a sprocket 62 driven by a sprocket chain 64 from a sprocket 66 mounted on a shaft 68 journaled in bearing brackets 70 and 72 supported from frames 54 and 56. On the shaft 68 is mounted a V-pulley or friction wheel 76 having flanges 78 and 80 between which is arranged a cone-shaped driving pulley 82 adapted to be moved into engagement with either inner face of the flanges 78 and 80 to drive the shaft 60 in a forward or backward direction. The cone pulley 82 is mounted on the shaft 84 of an electric motor 86 which is suitably connected to a source

of electric current. On a shaft 88 suitably supported in a bracket 87 fastened to the bed 57 and a cross bar 89 fastened to the brackets 70 and 72 and frames 54 and 56, are mounted frames 90 and 92, the latter having welded or otherwise fastened thereto a split collar 93 whose ends 94 are fastened together by a screw 96 thereby securing the frame 92 to shaft 88. The bases of the frames 90 and 92 are connected by plates 98 to which the motor is fastened. The end of shaft 88 protruding from bed 57 is provided with an arm 100 connected by a link 102 to a treadle 104 fulcrumed on a shaft 106 mounted in the bed 57 of the machine. The link 102 is connected to treadle 104 by a pin 108 shown at the right of the fulcrum in Fig. 2, so that upon depressing the end of the treadle marked "F" the shaft 88 will be rocked by the connection of the treadle to the arm 100 in a clockwise direction and the friction pulley 82 will be engaged with the flange 80 of the V pulley 76 to drive the shaft 68 forwardly. When the end of the treadle marked "R" is depressed, the cone pulley 82 will be engaged with the flange 78 to drive the shaft 60 in the rearward direction. Thus the shaft 60 may be driven forwardly or rearwardly and a gear 110 mounted on shaft 60 will drive a gear 112 mounted on a sprocket 116 supported by a bolt 113 passing through the front frame 54 and supporting the rear end of the bars 114 and 115. The triple sprocket 116 loosely mounted on the portion of bolt 113 between the bars 114 and 115 drives the triple sprocket chain 12, the latter running over the triple idler sprocket 118 loosely mounted on the stud 120 (Figs. 1 and 6) passing through the front end of bar 115, the sprocket 118 and a pair of rollers disposed between sprocket 118 and bars 114 and 115, and threaded into the front end of the bar 114 which is fastened to the front frame 54 by a screw 121 passing through an elongated slot in the frame 54. The outer ends of the bolt 113 and the stud 120 are thus connected by the support bar 115. On the stud 120 are loosely mounted rollers (shown in Fig. 6) at either end of the triple sprocket 118 to support the ends of the crimper bars as they pass around the sprocket 118. A nut 122 threaded on the outer end of the shaft 120 retains the sprocket and rollers thereon.

Upon removing the screw 121 it is possible to tilt the bars 114 and 115 upwardly with the sprocket chain 12 to afford access to the crimper bars on the lower sprocket chain. While the fastening of the bar 114 by the screw 121 may be dispensed with it has been found that if the bars 114 and 115 are left unsupported at their front ends and free to pivot on the bolt 113 at their rear ends, to permit them to be swung upwardly when the fingers of an operator are accidentally inserted between the crimper bars of the upper and lower chains, that the pleating and stitching of the materials will not be performed satisfactorily unless the upper sprocket chain is weighted. With the present construction the screw 121 may be loosened and the bars 114 and 115 swung upwardly or downwardly to position the crimper bars on the upper sprocket chain in the desired relation with respect to the bars on the lower chain to pleat and stitch the materials satisfactorily. Thus the bars 114 and 115 may be swung upwardly or downwardly on bolt 113 to raise or lower the stud 120 and thereby raise or lower the sprocket 118 with the chain 12. The extent of this adjustment is limited by the length of the slot in frame 54 through which screw 121 passes.

Heretofore the upper chain carrying the crimper bars was not driven, and in the present construction the additional drive for the upper chain tends to keep its crimper bars in the desired position relative to the crimper bars on the lower chain and decrease the drag.

On the end of the shaft 52 protruding from frame 54 is mounted a pinion 130 which drives a ring gear 132 attached to a wheel 134 fastened on the shaft 136. The wheel 134 on its periphery carries a cam 138 which has a predetermined contour for guiding the cam followers of the lining guide mechanism. One of the cam followers 140 is supported by a block 142 fastened by a pin 143 to a rod 144. A screw 145 fastens a block 146 to the rod 144, and to the block 146 is detachably secured by screws 147 a guide finger 148 which has a downwardly bent portion on its upper end underlying the transverse portion 150 of the L-slot 151 in the inclined plate or table 152 which is provided with an extension supported on and extending along the frame 56. The other cam follower 153 is carried by a block 155 which is fastened by a screw 156 to a rod 157 passing through notches in the upper ends of the blocks 142 and 146 and fastened by a screw 158 to the block 159 on which is secured a guide finger 161. The latter is detachably secured to block 159 by screws 162, and finger 161 is of the same shape as finger 148 and interchangeable with it, and also provided with a bent portion on its upper end underlying the transverse portion 150 of slot 151. One end of a tension spring 163 is fastened to a hook 165 on block 159 and its other end is secured to a post 167 secured to the block 146. Thus the guide fingers 161 and 148 are yieldingly urged toward each other, the extent of separation thereof being determined by the contour of the cam 138 which is similar to that shown in the co-pending application of J. A. Neumair, Serial No. 441,464, filed May 2, 1942, and suitably designed to displace the finger 161 outwardly to a position wherein its bent upper end lies at the outer side of the bend in the slot 151 to permit the lining to be slid through the outer end of the slot into the transverse portion 150 thereof when the crimper bars 28 and 30 are approaching the position shown in Fig. 1 around the sprockets 118 and 50. At the same time the finger 148 is disposed in a position to engage one edge of a lining held centrally with respect to the notches 24 and 26 in the crimper bars and the needle. The leading end of the lining is then inserted between the crimper bar 28 and the preceding crimper bar 10, wherefore it is clamped between the adjacent sides of the same to be impaled upon the point of the needle as bars 28 and 10 are advanced to the position shown in Fig. 1. The leading end of the necktie fabric is superposed on the lining and inserted between the crimper bar 32 and the crimper bar 28, one edge of the fabric being positioned along a stationary guide (not shown) on table 152 which is similar to that shown in the application of Max M. Newman, Serial No. 343,515, filed July 2, 1940, to place the fabric in the desired central position relative to the needle, the leading end of the fabric being clamped between the adjacent sides of the bars 28 and 32 and stitched to the lining as the bars 28 and 32 continue traveling toward the rear sprockets. The length of the opposed runs of the sprocket chain is sufficient to stitch a desired maximum length of fabric to a lining, and the transverse contour of the cam or pattern band 138 is such that the followers 148 and 161

are moved toward each other to equidistant positions at either side of the desired center line of the lining coinciding with the needle to properly guide the lining during substantially its entire length until the cam 138 returns to the position shown in Fig. 2 which occurs when the crimper bars 28 and 30 have been advanced a predetermined maximum distance toward their rear sprockets.

The gear ratio between the ring gear 132 and the pinion 130 is such that when the sprocket chains 12 and 16 make one or more complete circuits around the sprockets and back to initial position the cam 138 will also be returned to its initial position wherein the crimper bars 28, 30, 32 and 34 are adjacent the point of the needle. A suitable gear ratio for this purpose is 24 teeth on pinion 130 and 134 teeth on gear 132 if the chain 16 has 134 links or pitches and the sprocket 50 has 12 teeth. Therefore the gear 132 and cam 138 will be turned two complete revolutions when the chains 12 and 16 make one complete circuit. Heretofore the proper ratio of these gears was not used, wherefore if the sprocket chains were driven in a reverse direction to make one or more complete circuits, as when drawing the thread through the grooves 24 and 26 of the crimper bars preparatory to threading it through the eye of the needle, the cam 138 would be out of time with respect to the crimper bars 28 and 30. It is customary in threading the loose end of the thread T to insert it between the crimper bars on the portions of the chains 12 and 16 running over sprockets 58 and 116 and at one side of the grooves 24 and 26 of the crimper bars whereby the end of thread T will be nipped between opposed crimper bars on chains 12 and 16 as they interengage one another. Then when the chains 12 and 16 are further advanced rearwardly the end of thread T will be drawn between the opposed runs of chains 12 and 16 and nipped by the following crimper bars as they interengage with one another adjacent sprockets 58 and 116. The chains are usually advanced rearwardly for at least one complete circuit after the end of thread T has been nipped between the crimper bars.

Thus sufficient thread will be drawn from spool S to provide a sufficient length of thread projecting from between the opposed runs of chains 12 and 16 adjacent sprockets 50 and 118 which may be grasped to position the thread in the grooves 24 and 26 of the opposed crimper bars along the opposed runs of chains 12 and 16. Then the projecting end of thread T can be inserted into the eye of needle 18. Since the chains 12 and 16 are moved through a distance corresponding to their entire length while this operation is performed, the cam 138 will be turned two revolutions and will be returned to the same position. If the cam 138 had been in the proper position to proceed with the sewing of the lining to the fabric, then when the sprocket chains 12 and 16 make one complete circuit the cam 138 will be returned to the same position and stitching of the fabric to the lining can be commenced.

It was found that upon depressing the treadle 104 the sprocket chains would tend to over-run the desired position, and time would be wasted returning them to the desired position. Accordingly there is provided in the present construction mechanism for braking the V-pulley 76 upon movement of the cone pulley 82 from driving engagement with either flange 78 or 80 to its normal intermediate position. For this purpose the lever 169 which is fulcrumed on a stud 170 fas-

tened in the plate 171 adjustably fastened to the front frame 54, has a V-shaped cam notch engaging with cam roller 173 on the frame 90. The lever 169 is connected by an adjustable link 175 with a toggle-joint consisting of a long link 177 and a short link 179. One end of the link 177 is connected by a pin 178 to a block 180 attached to the end of the link 175 and the other end of link 177 is connected by a pin 182 to a bar 184 pivoted on a stud 186 fastened in the cross-bar 89. The short link 169 is connected by a pin 188 to a bar 190 pivoted on a stud 192 similarly fastened in the bar 89. To each of the arms 184 and 190 is fastened an angle iron 194 which is equipped with a facing of suitable brake lining material 196. The bars 184 and 190 are connected by a tension spring 198 which normally maintains the brake lining material 196 in engagement with the sides of the V-pulley 76. A spring 200 assists in maintaining the V-notch of the lever 169 in engagement with the cam roller 173 on the frame 90, so that when the motor is rocked upon depressing either end of the treadle 104, the brake linings 196 are disengaged from the sides of the V-pulley 76, but upon releasing the treadle the motor swings back to a vertical position and the spring 198 is permitted to re-engage the brake linings with the sides of the V-pulley 76.

To the upper edge of the bar 114 is fastened a cover 202 overlying the upper run of the upper sprocket chain 12, and at the front end of the cover 202 is hinged a guard 204 which hangs down in position to prevent the operator from inserting her fingers between the upper and lower crimper bars. Heretofore the guard has been fastened to the cover and upon reversing the motion of the crimper bars to withdraw the stitched lining and fabric from the needle, bunching of the pleats formed in the necktie has interfered with its egress from under the guard. With the present construction, the bunched material will just swing the guard upwardly and not interfere in any way. It will also be noted that the lip on the lower edge of the guard is upwardly bowed from its middle section toward its outer side, thus furnishing sufficient space to permit manual insertion of the lining and fabric through this space into the crimper bars, and yet hindering insertion of the operator's fingers into the path of the crimper bars. It may also be noted that the guard 204 is suitably cut away to permit inspection of the movement of the material into the crimper bars.

What is claimed is:

1. In a sewing machine having an elongated needle, the combination with a pair of endless sprocket chains having opposed runs, one of said chains overlying the other chain, two pair of sprockets over which said chains run, endless series of crimper bars supported on each of said sprocket chains, the crimper bars on each of the opposed runs of said chains being adapted to interengage with the crimper bars on the other of the opposed runs and pleat a superposed necktie lining and fabric and advance the same upon said needle to stitch the same, a pair of supports on which the sprockets of said overlying chain are mounted, a frame on which one end of said supports is pivotally mounted, said frame being provided with an elongated slot adjacent the other end of said supports, and a screw passing through said slot and threaded into one of said supports.

2. In a necktie sewing mechanism, the com-

bination with an elongated stationary needle, of a pair of endless traveling supports having opposed horizontal portions, one of said portions lying above the other of said portions, crimper members mounted on each of said supports, the crimper members on one support being adapted to interengage with the crimper members on the other support along said opposed portions of the supports for forming several narrow pleats in the leading end of a necktie lining only and advancing them upon the needle, a pair of opposed crimper bars mounted on said supports immediately behind said crimper members, the crimper bar on one support being arranged to interengage with the crimper bar on the other support along the opposed portions of said supports and form a single pleat in the lining and the leading end of a fabric superposed thereon, the crimper bar on the upper endless support along said opposite portions extending downwardly a greater distance than the crimper members on said upper support for forming a single pleat having a greater depth than the pleats in the leading end of the lining, said crimper bars coacting to advance said single pleat upon the needle, and crimpers behind said crimper bars, the crimpers on said upper support along said opposed portions extending downwardly a greater distance than said crimper members for forming pleats having a greater depth than the pleats in the leading end of the lining.

3. In a sewing machine having an elongated needle, the combination with a pair of opposed endless members having opposed upper and lower horizontal runs, endless series of crimper bars supported on each of said members and having triangular teeth, the triangular teeth of the crimper bars on each of said opposed runs being arranged to interengage with the triangular teeth of the crimper bars supported on the opposed endless member to form a series of uniform pleats in a superposed necktie lining and fabric and advance the same upon the needle to stitch the fabric and lining together, and the crimper bars on said lower horizontal run of the opposed runs having edges disposed at right angles to said lower horizontal run and arranged in abutting relationship with one another to prevent sagging of said lower run.

4. In a sewing machine having an elongated needle having an eye in its forward end, a set of endless flexible, traveling supports having opposed runs which extend along said needle, series of crimpers mounted on said supports and adapted to interengage along said opposed runs and thereby pleat an associated necktie fabric and lining and advance the pleated lining and fabric along said needle to stitch the same together, a rotary endless pattern member, a pair of spaced lining guides arranged to engage and guide the edges of the portion of the lining in front of said crimpers and thereby guide the lining as it is being pleated and advanced upon the needle, said lining guides being provided with cam followers engaging the opposite edges of said pattern band, and the edges of said pattern band having a contour such that the lining guides will be moved toward and away from each other and thereby maintained in engagement with the lining edges as the lining is advanced by said crimpers; the combination with means for driving said supports in a forward direction to cause said crimpers to pleat and advance the entire length of a necktie lining, and the portion of a necktie fabric associated therewith, upon said needle to stitch the

same together, said means being operable to drive the supports in a reverse direction to withdraw the stitched fabric and lining from the needle, and mechanism driven from said means for revolving said pattern band a single complete revolution, and thereby returning said pattern band to initial position, while the crimpers have traveled sufficiently in a forward direction to advance a complete lining upon said needle, said mechanism and means being so proportioned that when said supports are advanced in a reverse direction a distance corresponding to their entire length, as when drawing the thread between said opposed runs for insertion in the eye of the needle, the pattern band will be turned through several complete revolutions and returned to its initial position.

5. In a sewing machine having an elongated needle, the combination with a pair of endless sprocket chains having opposed runs, one of said

chains overlying the other chain, two pair of sprockets over which said chains run, endless series of crimper bars supported on each of said sprocket chains, the crimper bars on each of the opposed runs of said sprocket chains being adapted to interengage with the crimper bars on the other of the opposed runs and pleat an associated necktie fabric and lining and advance the same upon said needle to stitch the same together, a support on which the sprockets of the overlying chain are mounted, a frame on which said support is pivotally mounted, and a device for detachably securing said support to said frame whereby the overlying chain may be swung upwardly upon releasing said device, by pivotally moving said support upwardly on its pivotal mounting on said frame.

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