

July 29, 1941.

M. BUONO

2,250,745

BLIND STITCH SEWING MACHINE

Filed May 6, 1939

5 Sheets-Sheet 1

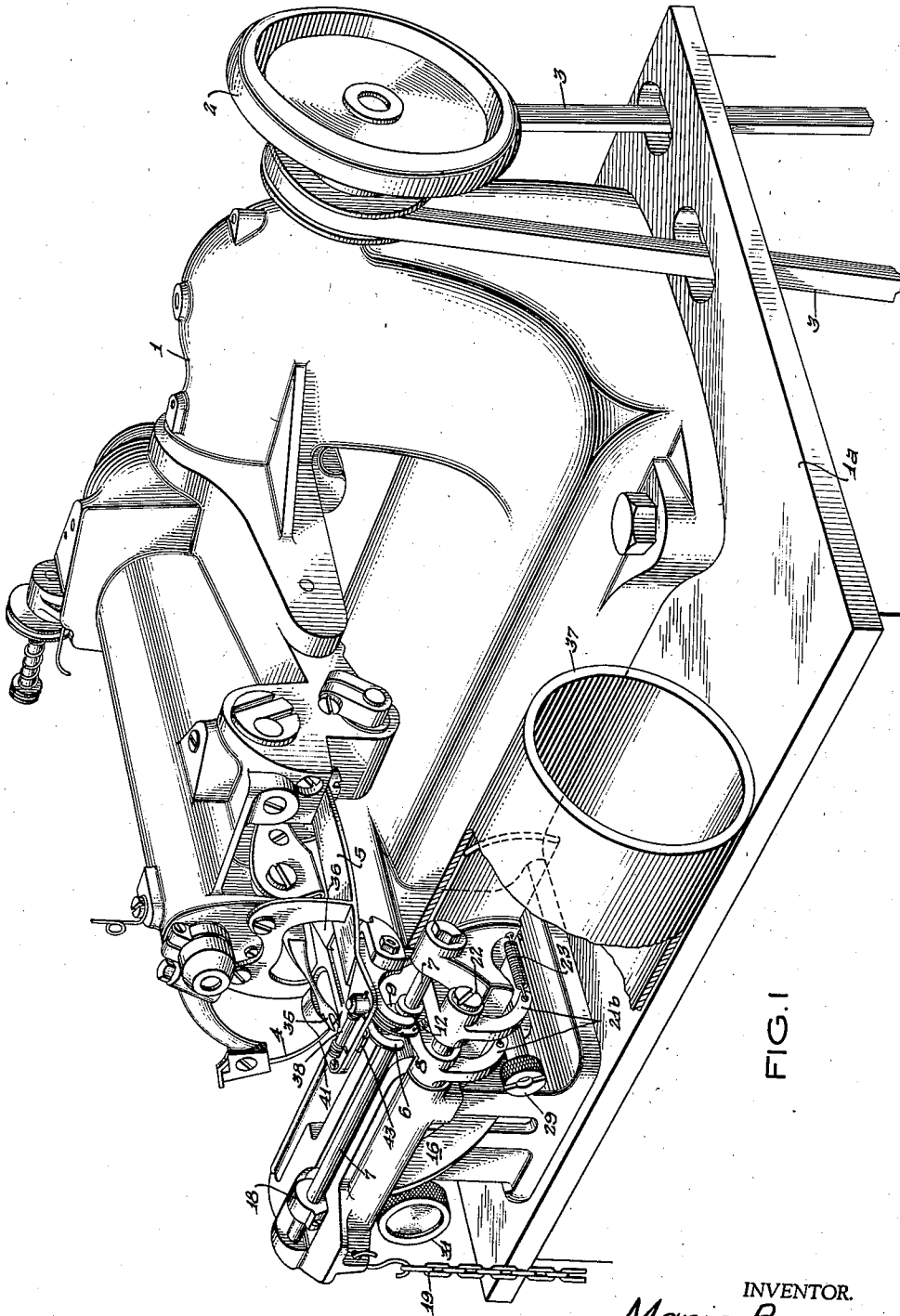


FIG. 1

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5 Sheets-Sheet 2

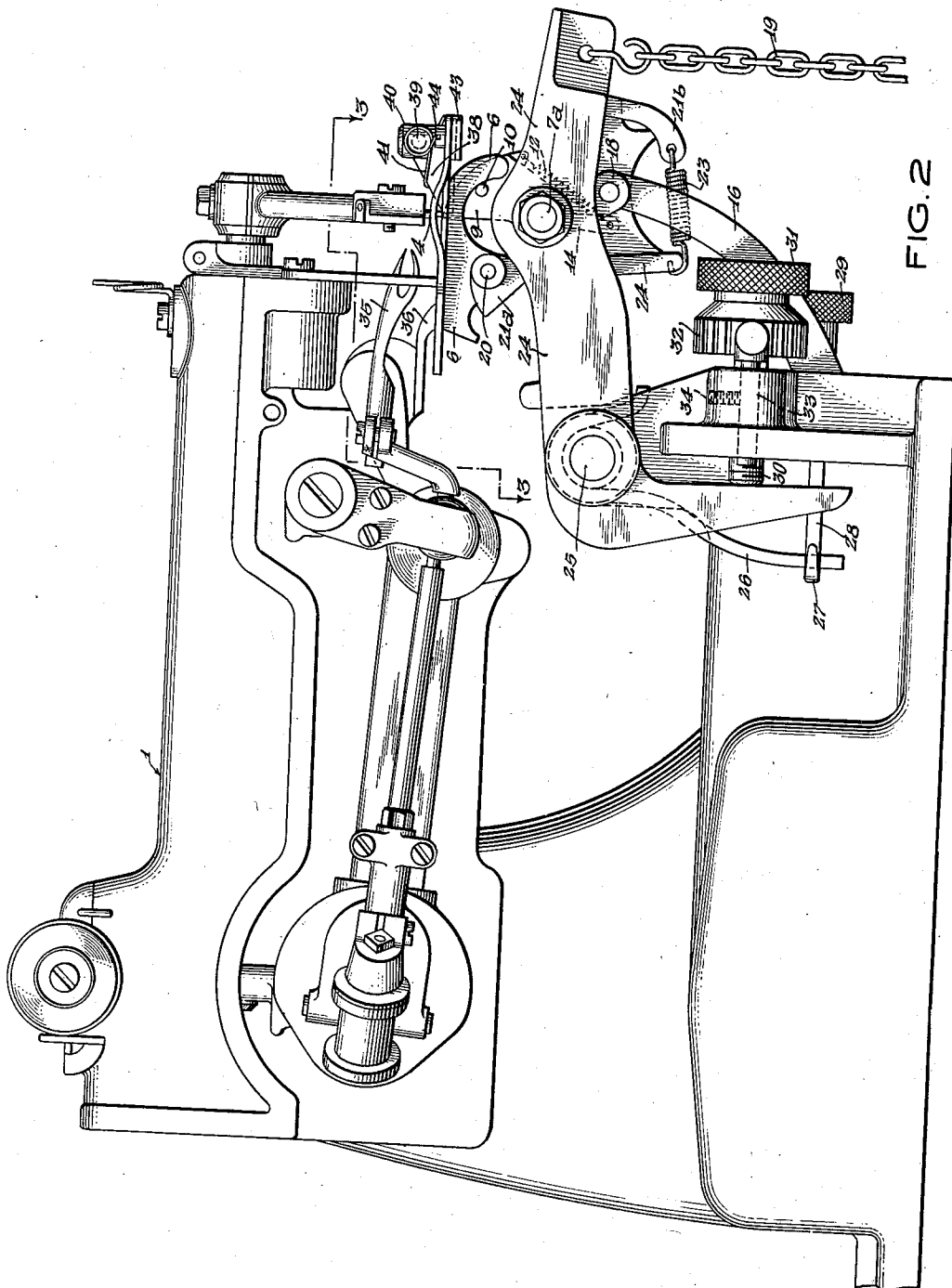


FIG. 2

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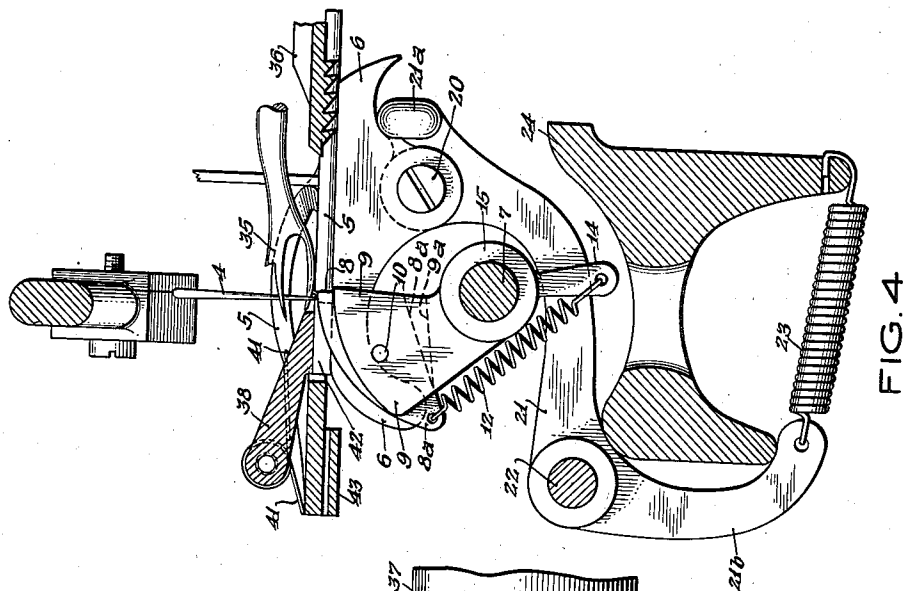
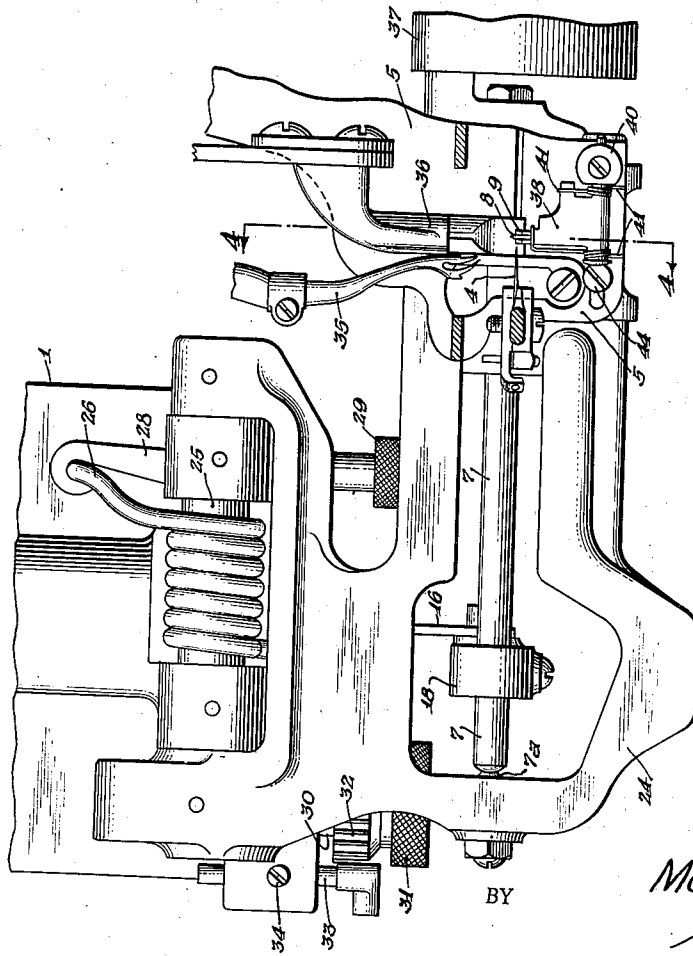
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BLIND STITCH SEWING MACHINE

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5 Sheets-Sheet 3



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BLIND STITCH SEWING MACHINE

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5 Sheets-Sheet 4

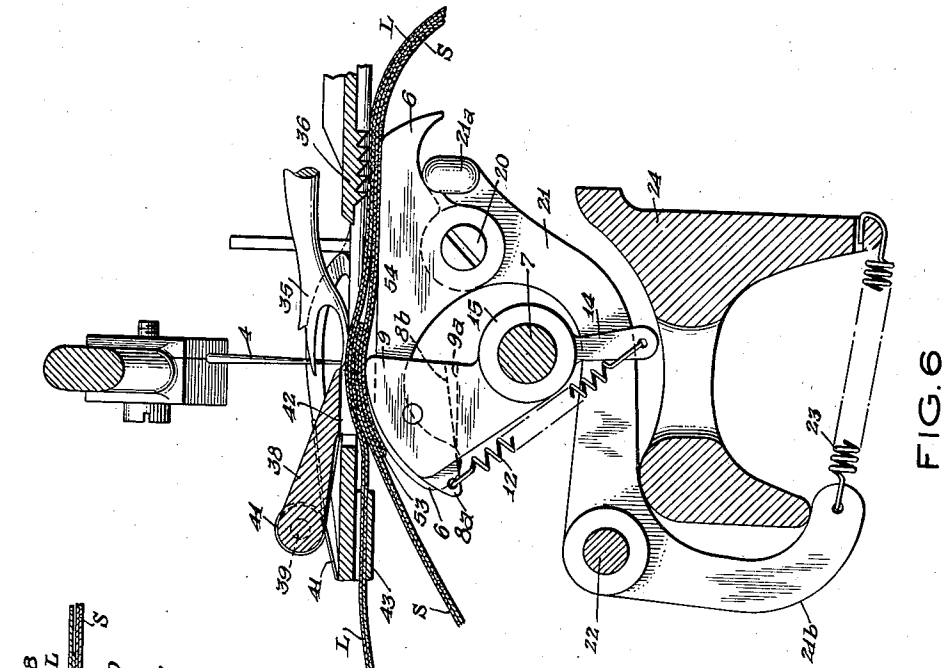


FIG. 6

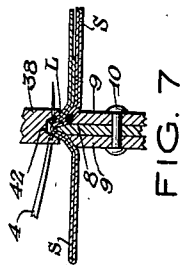


FIG. 7

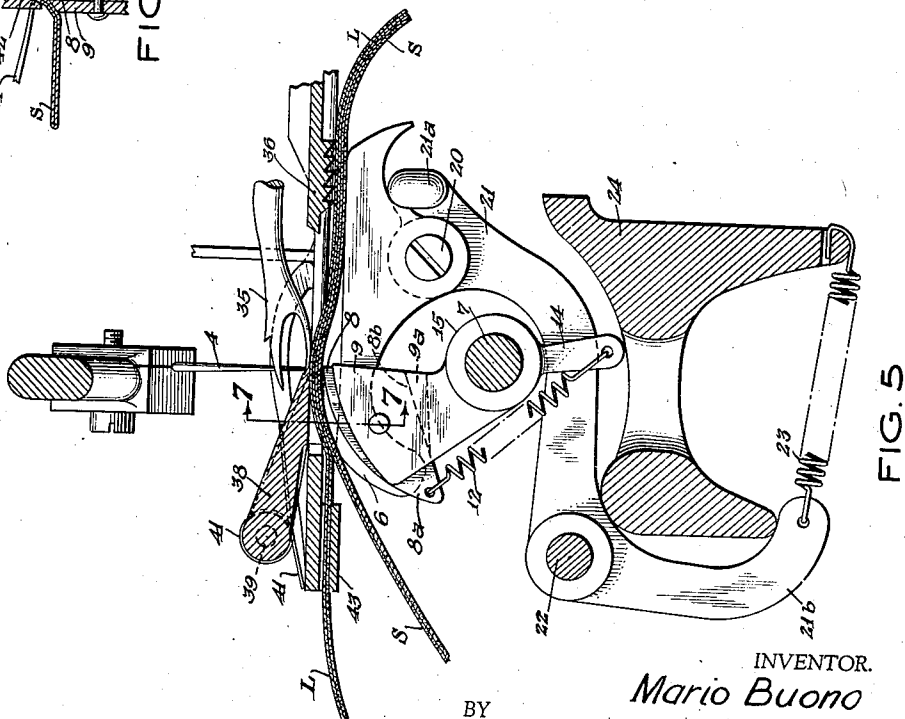


FIG. 5

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BLIND STITCH SEWING MACHINE

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5 Sheets-Sheet 5

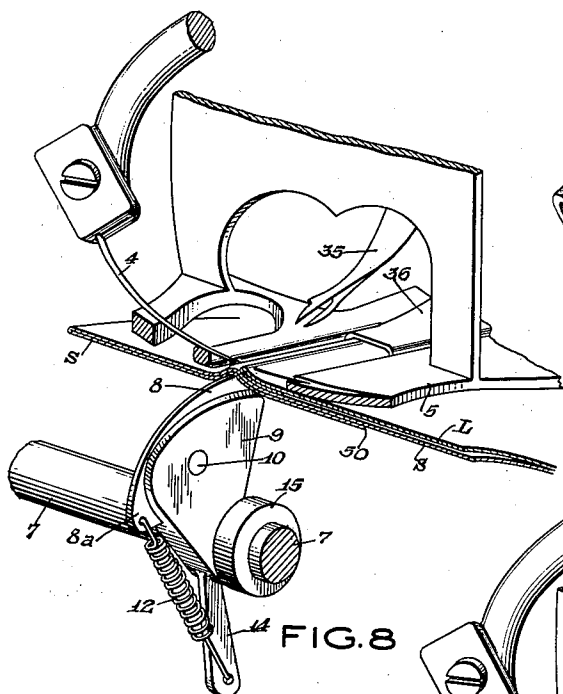


FIG. 8

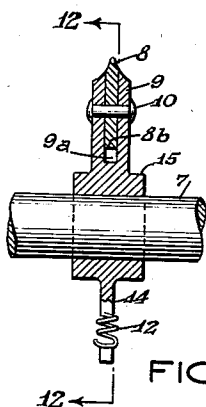


FIG. 11

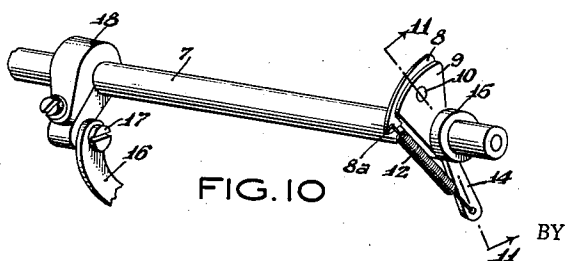


FIG. 10

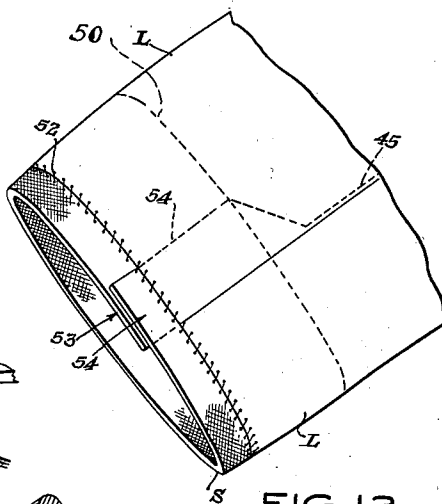


FIG. 13

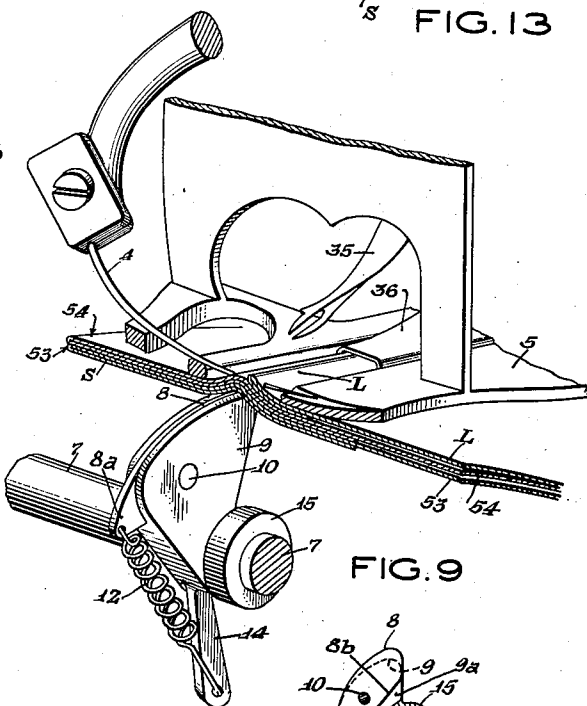


FIG. 9

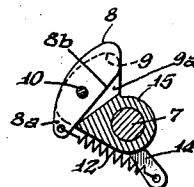


FIG. 12

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UNITED STATES PATENT OFFICE

2,250,745

BLIND STITCH SEWING MACHINE

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N. Y., a corporation of New York

Application May 6, 1939, Serial No. 272,105

5 Claims. (Cl. 112—178)

My invention relates to a new and improved blind stitch sewing machine.

One of the objects of the invention is to provide an improved machine for sewing a sleeve lining to the body of the sleeve.

Another object of the invention is to provide an improved machine for performing this operation after the body of the sleeve has been sewed into cylindrical shape along its entire length or along a part of its length, although the invention is not restricted to this particular operation, and the machine may be utilized in performing any operation and in any stage of the manufacture of a garment or a sleeve or any other part of a garment.

Another object of the invention is to provide improved means for forming the bight in the work, said means being adjustable or yieldable so as to permit the formation of the blind stitch when the work is of varying thickness, due to the fact that the work has different numbers of superposed layers at different parts thereof.

Another object of the invention is to provide a chain-stitch sewing machine of the blind stitch type, with a rib which is automatically adjusted so as to allow for variations in the total thickness of the work, said rib having a normal predetermined shape and position.

Another object of the invention is to provide a machine whereby the work is inserted into position from left to right, instead of being inserted into position from right to left, as has hitherto been customary.

Another object of the invention is to provide a rib having a body and a supplemental rib-member, said supplemental rib-member having a normal predetermined position relative to the rib-body and being automatically adjustable relative to the body of the rib, so as to make allowance for variations in the total thickness of the work, due to variations in the number of superposed layers of the work. While the invention is shown in connection with a chain stitch machine, it is not limited to any type of stitch. Likewise, it is not limited to the use of a rib for cooperating with the needle in order to form the stitch, and any bight-forming means, consisting of one element, or of a plurality of elements, may be used.

Other objects of my invention will be set forth in the following description and drawings which illustrate certain preferred embodiments, it being understood that the above statement of the objects of my invention is intended to generally

explain the same without limiting it in any manner.

Fig. 1 is a general perspective view of the entire blind stitch sewing machine which is generally of a conventional and well known type and in which the improved parts have been installed.

Fig. 2 is an end elevation taken at the left-hand side of Fig. 1.

Fig. 3 is a plan view, partially in section, on the line 3—3 of Fig. 2.

Fig. 4 is a section, partially in elevation on the line 4—4 of Fig. 3.

Fig. 5 is a view generally similar to Fig. 4. Fig. 5 shows the work inserted into the machine and it illustrates the sewing operation when a minimum number of superposed layers of material are located in the path of movement of the needle.

Fig. 6 is a view similar to Fig. 5 save that Fig. 6 shows the automatic movement of the supplemental rib member when more layers of work are being sewed.

Fig. 7 is a sectional view on the line 7—7 of Fig. 5.

Fig. 8 is a general diagrammatic perspective view of Fig. 5, the representation of certain less important parts having been omitted.

Fig. 9 is a general diagrammatic perspective view corresponding to Fig. 6, the representation of certain of the less important parts having been omitted.

Fig. 10 is a detail perspective view showing the assembly of the improved rib device with its shaft.

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

Fig. 12 is a sectional view on the line 12—12 of Fig. 11.

Fig. 13 is a perspective view of the sleeve after it has been sewed by the improved machine, and before the sleeve has been turned. In this view the lining is external to the body of the sleeve.

The sewing machine illustrated herein is generally of a well-known and standard type. It comprises the usual arm 1, the drive pulley having the belt 3, the hand-wheel 2, the curved needle 4, the plate 5 which is fixed to the frame of the machine, the turnable fingers 6 which support the work, and the table 1a.

In this type of machine, the bight is formed in the work, by means of an oscillating rib. As previously stated herein, the invention is not limited to any particular type of bight-forming means, and said bight-forming means can com-

prise a plurality of relatively adjustable elements, or said bight-forming means can consist of a single element, suitably shaped or operated so as to produce the operation or operations later described herein.

As shown in Fig. 10, the rib comprises a rib-body 9, to which a supplemental rib-member 8 is turnably connected by means of a pivot 10. The rib-body 9 has an integral collar 15 which is suitably connected to the rock-shaft 7, which oscillates in unison with the rib-body 9. The collar 15 is provided with an integral arm 14. A spring 12 has one end thereof connected at 8a to the rib-member 8, and the other end of said spring 12 is connected to the arm 14. The spring 12 normally maintains the rib-member 8 yieldingly in the position shown in Fig. 10 and also in Fig. 12. The spring 12 is a tension spring, and in the normal position of the rib-member 8 the heel 8a of said rib-member 8 abuts a portion or shoulder of the rib-body 9, thus providing a stop for limiting the turning movement of the rib-member 8, under the action of the spring 12.

As shown in Fig. 11, the rib-body or holder 9 is of U-shaped cross-section. Likewise there is a space 9a between the forward portion of the rib-member 8 and the bottom of the recess in the rib-body 9, so that, referring to Fig. 10, the rib-member 8 can be turned clockwise relative to the rib-body 9. The space 9a permits limited turning movement of the rib-member 8 relative to the rib-body 9, in said clockwise direction, so as to lower the top edge of the rib-member 8, from the normal position illustrated in Fig. 10 and in Fig. 12. The top edge-portion of the rib-member 8 is transversely tapered, as clearly shown in Fig. 11.

As shown in Fig. 10, a collar 18 is clamped or otherwise suitably connected to the rib-shaft 7. A link 16 is pivoted at 17 to the collar 18, so that the link 16 can oscillate the rib-shaft 7 in the usual manner. The rib-shaft 7 is mounted in bearings which are provided in the usual tiltable or turnable work-table 24. This work-table 24 can be turned in the usual manner, by downwardly pulling the chain 19, so as to introduce the work. One of the bearings 7a of the rib-shaft 7 is clearly shown in Fig. 3.

As shown in Fig. 2, the angular work-table 24 is pivotally connected at 25 to the frame of the machine. As shown in Fig. 4, the fingers 6 are pivotally connected at 20 to arms 21, which are pivotally connected at 22 to the work-table 24. The usual tension springs 23 are provided for holding the arms 21 in normal position. Said arms 21 have extensions 21b, and each spring 23 is connected at one end thereof to one of said extensions 21b and at the other end thereof to work-table 24.

Referring to Fig. 2, the usual torsion spring 26 is provided, in order to urge the table 24 to turn around its pivot 25 in the counterclockwise position. One end of the torsion spring 26 is held in the usual manner in the hook 27 of the shank 28 of the usual adjusting screw, which is mounted turnably in the frame of the machine. This adjusting screw has the usual head 29.

The adjustment of the angular table 24 is controlled by means of the usual adjusting screw 30, which is also mounted turnably in the frame of the machine. This screw 30 has a head 31 and the usual ratchet-wheel 32. The usual click is provided for cooperating with the ratchet-

wheel 32. The set screw 34 holds the shank 33 of the screw 30 in its adjusted position.

As shown in Fig. 6, each arm 21 has a finger 21a which acts as a stop to limit the turning movement of the respective finger 6 relative to its arm 21. The machine also has the usual looper 35 and the usual feed-dog 36. The fingers 21a may have different shapes as shown in Figs. 2 and 6.

The parts illustrated herein are standard, save for the construction and operation of the rib and certain other parts which will be pointed out particularly in the claims. I have therefore not illustrated many of the well-known details of the standard type of machine.

One of the novel features of the invention is that the work is introduced in to the stitching position from right to left, instead of from left to right. Another novel feature is the provision of a sleeve or drum 37 which is connected to the work-table 24. This sleeve is located at the right-hand side of the path of the stitching movement of the needle 4, which is oscillated in the usual manner.

As shown in Fig. 4, the rib-member 8 cooperates with a top finger 38, having a lug 39 which is mounted turnably in a bearing 40. A torsion spring or springs 41 tilt the finger 38 downwardly, so that the bight of the work is formed between the under-surface of the finger 38 and the rib-member 8. This is clearly shown in Fig. 7, which also shows the groove or recess 42 which is formed in the bottom wall of the bight-finger 38.

As shown in Fig. 4, the plate 5 is provided with a guide 43 for the lining. This guide 43 is connected adjustably to the member 5 by means of the clamping screw 44. As shown in Fig. 3, the shank of said screw extends through a slot in member 5. Said guide has a horizontal slot through which the edge of the lining is fed. The edge of the slot acts as a guide for the edge of the lining. This guide, per se, is well-known. The material of the lining, folded at its edge so as to provide two superposed layers, is led to the point where the stitch is formed, using the guide 43.

The body S of the sleeve is a tubular member which is formed by sewing a single layer of cloth along a longitudinal seam 45, which does not extend to the free end of the sleeve. At its free end, the material of the body of the sleeve is bent inwardly, so as to form a cuff whose inner transverse edge is indicated by the reference numeral 50. The sleeve has a longitudinal slit or opening at its free end where the stitches of seam 45 have been omitted, and said transverse edge 50 is located inwardly of the inner end of said longitudinal opening. At said opening, the sleeve has overlapping sleeve portions 53 and 54. Therefore, when the blind-stitches 52 are formed in the material of the body S, at points spaced from said overlapping sleeve-portions 53 and 54, two layers of the material of the body of the sleeve are presented to the needle, in addition to two layers of the lining L. Stitches are formed in the lining at its folded edge-portion, as shown in Figs. 8 and 9. When the rib-member 8 is in the normal position shown in Figs. 8, 10 and 12, its inner edge 8b is located so that the outer edge of said rib-member forms a bight in the two layers of the sleeve-body and said rib-member supports the two layers of lining L at the folded edge of said lining, so as to form blind-stitches in the sleeve-body and to connect the folded edge of the lining

to the sleeve between the free or outer end of the sleeve and the edge 51 of the cuff. Four layers of fabric are thus presented to the needle.

When the stitches 52 are formed in the overlapping sleeve-portions 53 and 54, six layers of cloth are presented to the needle, namely, two layers of sleeve-portion 53, two layers of sleeve-portion 54, and two layers of the lining L.

The rib-member 8 then turns automatically from the position shown in Fig. 8 to the position shown in Fig. 9, until the top-edge of rib-member 8 is flush or substantially flush with the tops of the separated walls of the rib-body 9. The members 8 and 9 then act as a composite rib to form the bight in the four layers of cloth of the sleeve-portions 53 and 54, and to present the two layers of lining L to the needle 4, so that the needle pierces said layers of the lining. Blind-stitches are thus formed throughout in the body of the sleeve but the corresponding stitches through the folded edge of the lining are through-and-through stitches.

The rib-member 8 thus yields automatically when the sleeve body is turned relative to drum 37, and the lining is fed in unison with said turning movement of the sleeve body.

When the rib-member 8 is in the inner position shown in Fig. 9, the edge 8b may partially abut the bottom edge of the recess in rib-body 9 or said edge 8b may be spaced wholly from said bottom edge.

The blind stitches 52 are preferably formed only in the top layer of the cloth of the cuff of the sleeve.

After the folded edge of the lining has thus been sewed to the next adjacent layer of the cuff, the sleeve is turned in the usual manner, so that the lining is located inwardly of the sleeve.

The adjustment of the work-table is varied in order to make allowance for different thicknesses of material.

The lining can thus be easily connected to the tubular sleeve-body with great speed and uniformity and without stopping the continuous operation of the sewing machine. The sleeve-form is turned and the lining is fed in unison with the strokes of the member 36, and the stitches are formed while the layers of cloth are stationary.

I prefer to form blind-stitches of the chain type.

The improved mechanism may be used to sew the lining to the sleeve before the body of the sleeve has been sewed into tubular form.

The body of the sleeve may be designated as the lower piece of fabric, said piece having at least two layers which are superposed with reference to the line of blind stitches 52. The lining may be designated as the upper piece of fabric which is superposed relative to the lower piece of fabric and said upper piece of fabric has two layers at the line of stitch.

When a chain-stitch is formed, the curved needle moves through the fabric of the sleeve and of the lining, in a direction which is transverse to the line of feed, or which is inclined to the line of feed. The looper then engages the loop of thread which is pulled out of the eye of the needle, and the looper moves said loop so that the thread passes through said loop at the next stitch-forming stroke of the needle. The completed chain-stitch therefore has visible thread-members which are inclined to the free edge of the sleeve, as shown in Fig. 13.

When such sleeve is turned, the visual effect is

substantially the same as if the work had been done by fine hand-sewing.

Numerous changes and omissions could be made without departing from the spirit of the invention. For example, it is not necessary for the needle to pass through the material of the body of the sleeve and also through the lining, at each operative stroke of the needle, and numerous other variations will be apparent to persons skilled in the art.

For convenience, the sleeve-form shown in Fig. 13 may be designated as an unturned sleeve-form. The left-hand edge of the sleeve-form shown in Fig. 13 may be designated as the free edge thereof, since said edge will be the free edge of the turned sleeve. The stitches are therefore produced by passing the thread through the top layer of the unturned sleeve-form in a direction away from the free edge thereof, and passing the thread through the layers of the lining in the same direction. A through-and-through stitch is normally formed in the lining, because its fabric is much thinner than the fabric of the body of the sleeve. However, if the lining material were sufficiently thick, a blind stitch could be formed therein. The lining is normally provided with two layers at the line of stitch because its material is thin, but the lining may have a single layer at the line of stitch.

The needle-thread may pass through-and-through the cuff layer and form blind stitches in the body of the sleeve-form, so that said stitches are not visible at the exterior of the turned sleeve.

The stitch is uniform and of uniform depth throughout. Any suitable adjustable stop means may be used for limiting the movement of member 8 relative to member 9 when the total thickness of the work is temporarily increased, due to the fact that different parts of the work are of different thickness. Of course the stitches 52 are spaced inwardly from the inner edge of the longitudinal opening at the cuff of the sleeve. The major portion of the longitudinal edge of cuff-element 54 is sewed to the cuff-element 53. At its free end, the sleeve therefore has a lateral zone of unequal thickness, in which the overlapping cuff members are located.

The sleeve is turned intermittently relative to its longitudinal axis, and the lining is fed intermittently together with the sleeve. The sleeve-form is turned and the lining is fed by member 36. The bight is preferably formed while the sleeve is stationary. The rib is preferably moved wholly away from the sleeve to free the sleeve, while the sleeve is being turned in one of its intermittent movements.

Hence the bights are preferably formed intermittently. However, it is not necessary for the rib to be spaced wholly from the inner surface of the sleeve-form while it is being turned.

The drum 37 may be fixed to work-table 24, or said drum may be turnable relative to work-table 24, around the axis of said drum.

While the primary movement of rib-element 8 and 9 is an oscillating movement, said oscillating movement has an up-and-down component, and said component is effective for forming the bight so as to form the stitch and for releasing the layers of fabric. Hence the invention includes a bight-forming device which has a vertical up-and-down movement.

However, in the preferred embodiment, the invention includes a work-support whose supporting surface can be adjusted up-and-down

relative to the path of the needle so as to provide a primary adjustment for materials of different thicknesses, said work-support having connected thereto bight-forming means which are automatically operable to form bights which are located at different distances from the path of the needle, so as to allow for local variations in the total thickness of the work.

I claim:

1. A blind stitch sewing machine for sewing a sleeve lining to the body of a sleeve which has an inturned cuff at its free end and which has longitudinally overlapping portions at said free end, comprising a curved needle, means adapted to oscillate said needle in a predetermined path, a movable work-table having a portion thereof located below said path and movable up-and-down relative to said path, a sleeve-support connected to said table and located at one side of said path, said sleeve-support being adapted to turnably support said sleeve so that the free end of the sleeve and the edge of its inturned cuff are located laterally at opposite sides of said path, a lining-guide located below said path and adapted to guide the movement of a lining-member with the edge-portion of said lining-member in position to be pierced by said needle, bight-forming means adapted to form a bight in the material of the sleeve and to upwardly bend the folded edge-portion of said lining-member so that said bight and said edge-portion are intersected by the needle in a stitch-forming stroke thereof, said bight-forming means having a body and also having an element which is yieldably mounted on said body, said element being movable relative to said body in an up-and-down direction relative to the path of the needle, spring-means yieldingly maintaining said element in predetermined normal relation relative to the body, whereby said element can move relative to said body in proportion to the thickness of the work, a supplemental movable finger having a recess in its bottom-face, said supplemental finger being located above said bight-forming means, said recess of said finger being vertically aligned with said bight-forming means so that the material which is supported on said bight-forming means can be forced into said recess, a spring adapted to downwardly move the supplemental movable finger.

2. For use in a blind-stitch sewing machine, bight-forming means having a body, said body having side-portions and a recess between said side-portions, an auxiliary member located in said recess, said auxiliary member being movable relative to said body, a spring adapted to yieldingly hold said member in a predetermined normal position in which its edge-wall projects above the edge-walls of said side-portions, said element being movable to a position in which its edge-wall is at least substantially flush with the edge-walls of said side-portions, and a movable finger having a recess in its bottom face, said recess of said movable finger being aligned with said bight-forming means so that the material which is supported on said bight-forming means can be forced into said recess of said movable finger, a spring adapted to urge said finger in a direction towards said bight-forming means.

3. For use in a blind-stitch sewing machine, bight-forming means having a body, said body having side-walls, said side-walls respectively having outer faces and inner faces, said body having a recess between the inner faces of said side-walls, said side-walls having respective bight-forming edge-walls, an auxiliary bight-forming member located in said recess, said auxiliary bight-forming member being movable relative to said body and having a bight-forming edge-portion, a spring adapted yieldingly to hold said auxiliary bight-forming member in a predetermined normal position in which its bight-forming edge-portion projects above the bight-forming edge-walls of said side-walls, said auxiliary bight-forming member being movable to a position in which its bight-forming edge-portion is at least substantially flush with the bight-forming edge-walls of said side-walls.

4. For use in a blind-stitch sewing machine, bight-forming means having a body, said body having side-walls, said side-walls respectively having outer faces and inner faces, said body having a recess between the inner faces of said side-walls, said side-walls having respective bight-forming edge-walls, an auxiliary bight-forming member located in said recess, said auxiliary bight-forming member being movable relative to said body and having a bight-forming edge-portion, a spring adapted yieldingly to hold said auxiliary bight-forming member in a predetermined normal position in which its bight-forming edge-portion projects above the bight-forming edge-walls of said side-walls, said auxiliary bight-forming member being movable to a position in which its bight-forming edge-portion is at least substantially flush with the bight-forming edge-walls of said side-walls, the edge-portion of said auxiliary bight-forming member being chamfered so that said edge-portion has walls which are inclined to each other, the edge-walls of said side-walls being inclined upwardly from outer faces of said side-walls towards the inner faces of said side-walls.

5. For use in a blind-stitch sewing machine, bight-forming means having a body, said body having spaced side-walls, said side-walls respectively having outer faces and inner faces, said body having a recess between the inner faces of said side-walls, said body being mounted on a pivot which is spaced from said side-walls, an auxiliary bight-forming member located in said recess and mounted on a pivot which is connected to said side-walls, said side-walls having bight-forming edge-walls, said auxiliary bight-forming member having a bight-forming edge-portion, a spring connected to said body and to said auxiliary bight-forming member, said spring being adapted yieldingly to hold said auxiliary bight-forming member in a normal position in which the bight-forming edge-portion of said auxiliary bight-forming member is located above the edge-walls of said side-walls, said auxiliary bight-forming member being turnable on its pivot to a position in which the bight-forming edge-portion of said auxiliary bight-forming member is at least substantially flush with said edge-walls of said side-walls.

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