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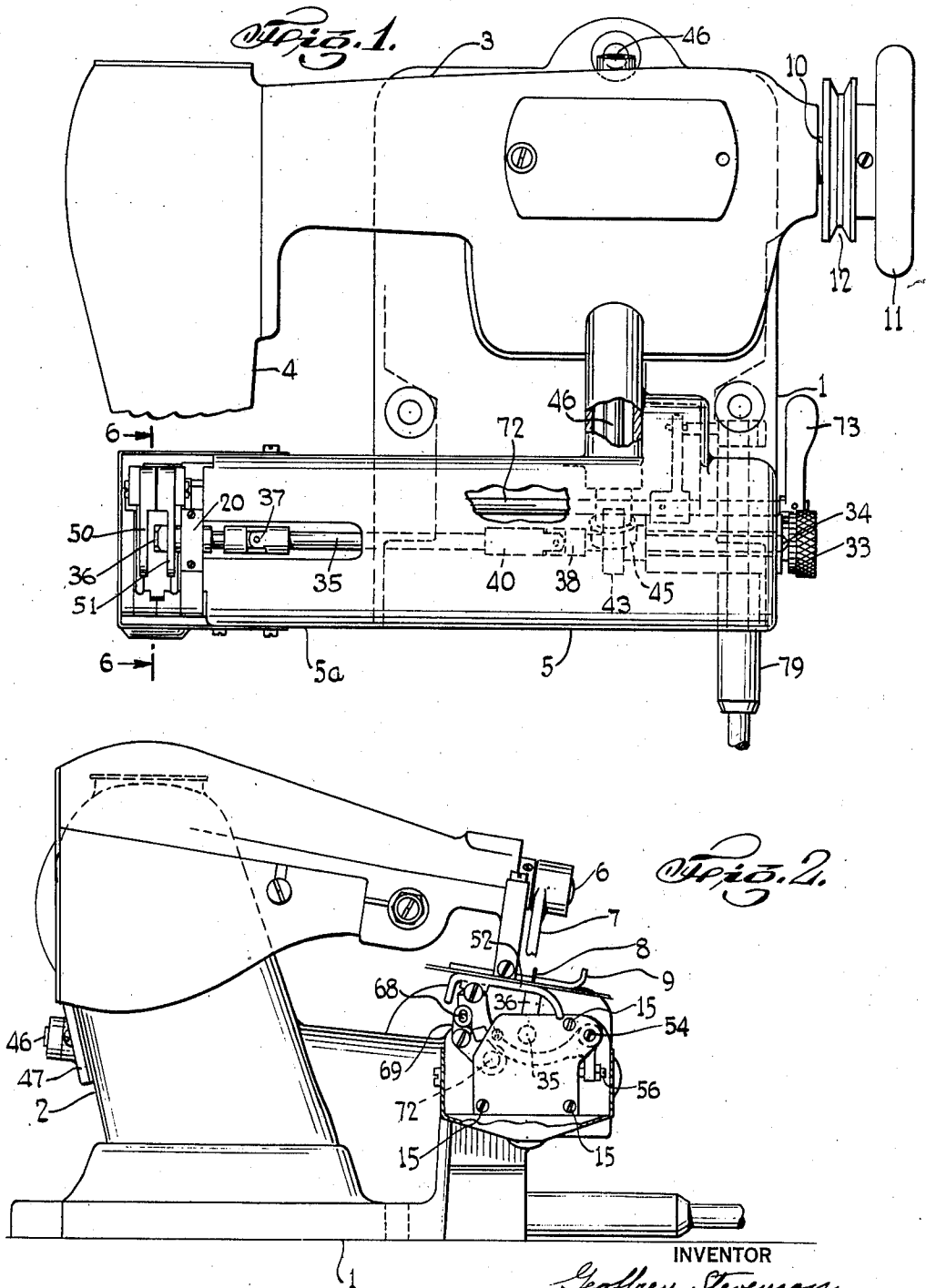
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2,333,128

BLIND-STITCH SEWING MACHINE

Filed Jan. 31, 1940

3 Sheets-Sheet 1



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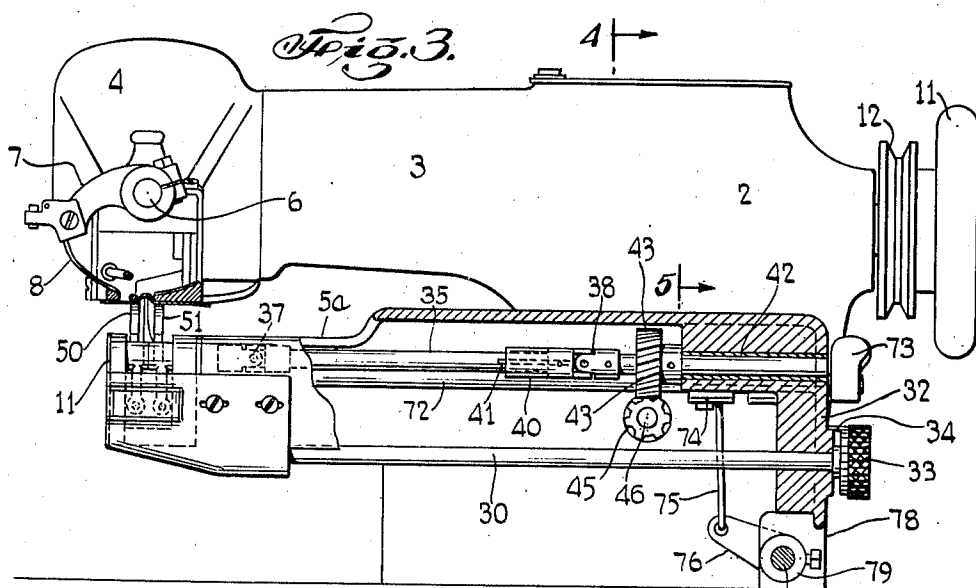
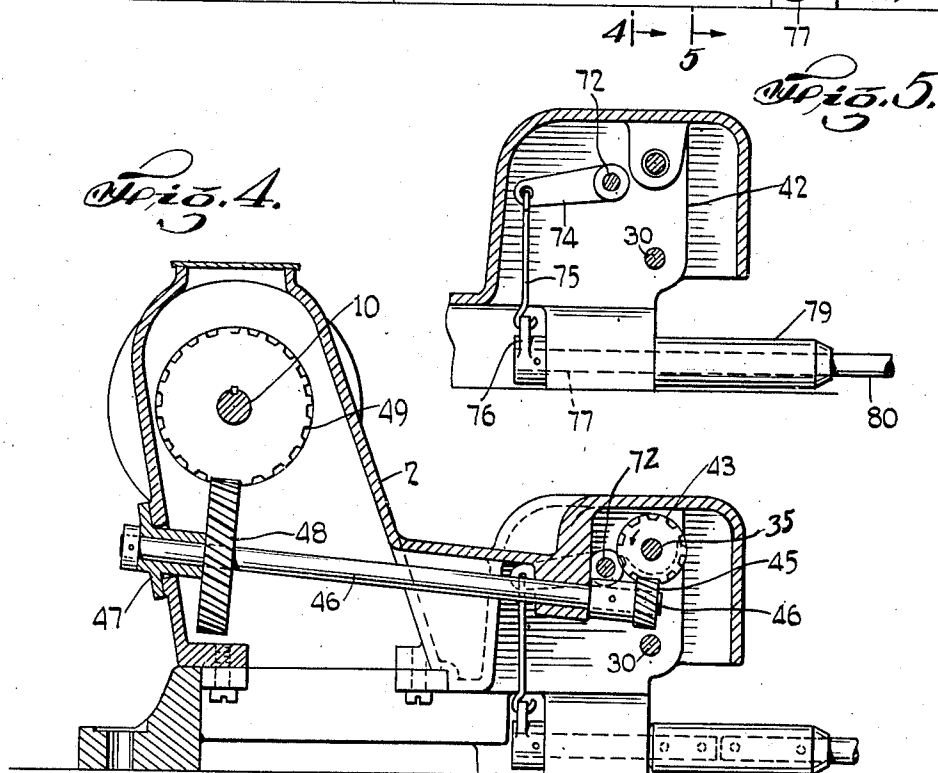
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BLIND-STITCH SEWING MACHINE

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3 Sheets-Sheet 2



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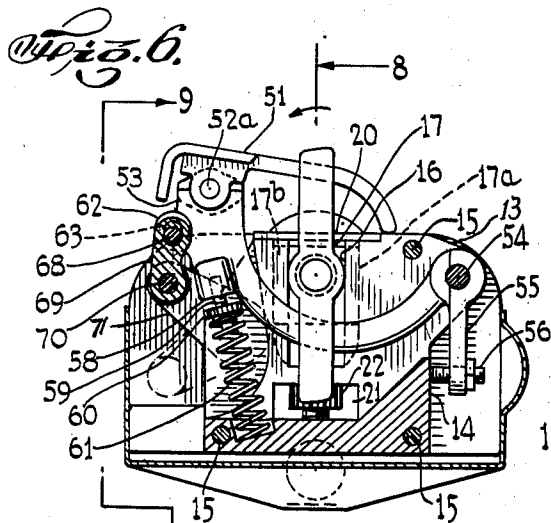
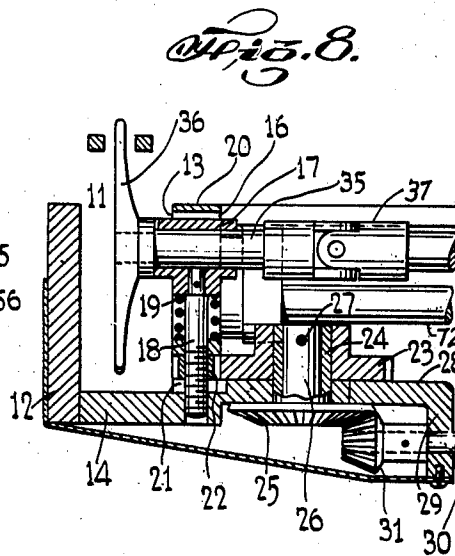
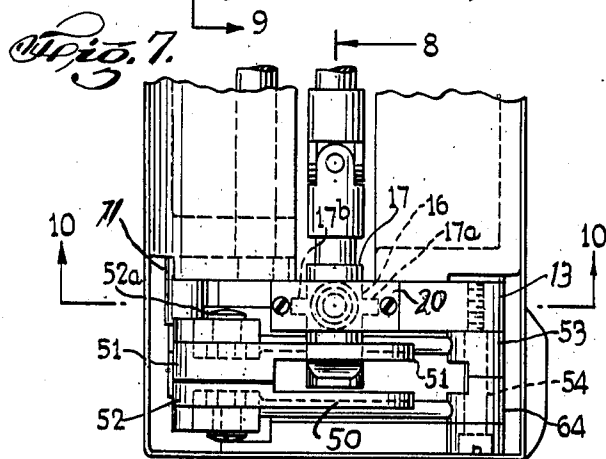
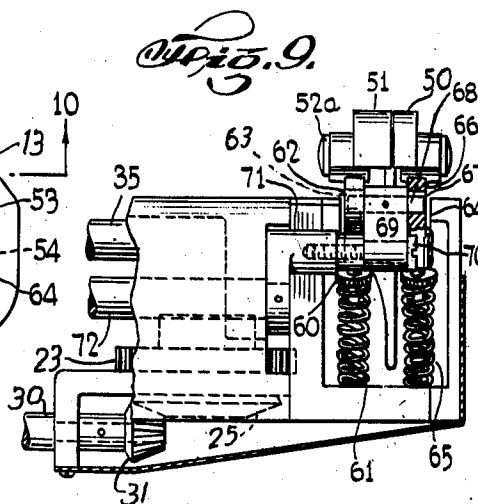
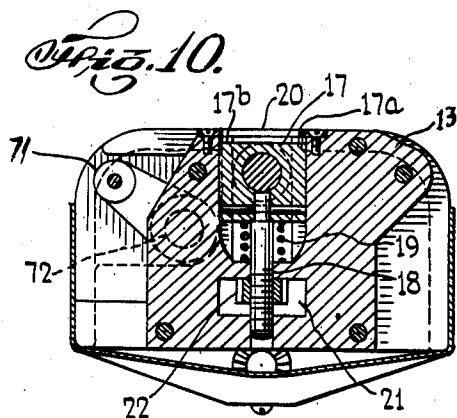
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BLIND-STITCH SEWING MACHINE

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3 Sheets-Sheet 3



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BLIND-STITCH SEWING MACHINE

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4 Claims. (Cl. 112—178)

The invention herein disclosed relates to blind-stitch sewing machines of the type in which work-presenting mechanism is utilized to intermittently present a node of material to the stitch-forming mechanism.

In machines of this type, particularly the small high speed machines, it has been, prior to this invention, the common practice to mount the work table of the machine such that it is movable toward and away from the plane of the presser foot. The work support for supporting the work against the presser foot is mounted on the work table as is also the work-presenting mechanism. The adjustment of the penetration, and the opening of the machine is effected through this work-table. A heavy, strong spring is utilized to maintain the table rigid in the adjusted position and the adjusting mechanism and the operator must work against this spring in adjusting the penetration and in opening and closing the machine for the insertion and removal of the work.

By this invention, there is provided a blind-stitch sewing machine which includes a stationary work-table and in which the penetration adjustment operates against one resilient means and in which the operator works against only the resilient means of the work support in opening the machine for the removal and insertion of work. In accordance with the invention, the work-presenting mechanism and the work support are independently, movably mounted in a stationary work-table. The arrangement provides adequate room between the presser foot and the retracted work support for the insertion and removal of the work.

A machine embodying the invention is illustrated in the accompanying drawings in which:
Fig. 1 is a plan of the machine partly broken away;

Fig. 2 is an end elevation of the same;

Fig. 3 is a front elevation, partly in section;

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 3;

Fig. 5 is a transverse section of the work-table taken on the line 5—5 of Fig. 3;

Fig. 6 is an end section of the work table taken on the line 6—6 of Fig. 1;

Fig. 7 is a partial plan of the work table;

Fig. 8 is a partial longitudinal section of the work table taken along the line 8—8 of Fig. 6;

Fig. 9 is a partial rear elevation of the work table; and

Fig. 10 is a transverse section taken on the line 10—10 of Fig. 7.

The machine illustrated in the drawings in-

cludes (Figs. 1 and 2) a frame that comprises a casting forming a base 1 upon which the machine is mounted. Another casting, which is secured to the base 1 includes a standard 2 that extends from the base, at an angle to the plane of the base, and an arm 3 extending from the upper end of the standard. A casting forms an arm 4 extending from the end of the horizontal arm 3 towards the work table 5. The work table is formed as a casting and it is bolted to the base 1.

The stitch-forming mechanism is mounted on the end of the forwardly extending arm 4 and it is of the usual construction for machines of this type. This stitch-forming mechanism includes a needle shaft 6 which extends through the forward end of the forwardly extending arm 4. On the end of the needle shaft 6 there is secured a needle bar 7 which carries a needle 8 that is oscillated or reciprocated across an opening through a stationary presser foot 9. The needle shaft 6 is oscillated in the usual manner from the main shaft 10 of the machine which extends through the horizontal arm 3 and is journaled therein. The usual hand wheel 11 and groove pulley 12 is mounted upon the extended end of the main shaft 10. The stitch-forming mechanism of the machine may be either for forming the well-known lock or chain stitch.

The work table extends horizontally at the front of the machine. This table includes an extension 5a which extends to a point in line with the end of the presser foot. To the end of this extension, there is secured a block 11 in which the work-supporting and work-presenting mechanism of the machine is mounted.

The block 11 (Figs. 6-10) extends directly below the presser foot 9 and includes two spaced end pieces 12 and 13 secured together and in spaced relation by a bottom piece 14. The block is secured to the end of the work table by machine screws 15. The end piece 13 has a vertical groove 16 formed therein, in which groove there is received a bearing block 17 that is slidably mounted within the groove. The bearing block includes tongues 17a and 17b, one on each side thereof which are received within complementary slots in the side wall of the groove 16. These tongues and grooves position the bearing block and prevent movement thereof parallel to the plane of the presser foot while permitting sliding movement of the bearing block in a direction towards and away from the presser foot. To the lower end of the bearing block, there is secured a rod 18 which is threaded at its lower end. A spring 19 surrounding the rod 18 acts between the base of

the groove in which the block is mounted and the lower end of the bearing block to urge the bearing block upwardly in a direction towards the presser foot. A cover plate 20 extends over the groove 16 in the end wall 13 and limits the upward movement of the bearing block.

Through the rod 18 the position of the bearing block 17 with respect to the presser foot may be changed and adjusted for a purpose that will hereinafter appear. The rod 18 extends through the base of the groove in which the bearing block is mounted and through an opening in the bottom piece 14 of the block 11. A transverse groove 21 (Figs. 6, 8 and 10) is provided in the end wall 13 and forms a recess in which a gear 22 is received. The gear 22 is internally threaded and engages in threaded engagement with the rod 18. Meshing with the gear 22 (Fig. 8), there is a gear 23 that is secured on the hub 24 of a beveled gear 25. The beveled gear 25 is mounted on a shaft 26 and the hub of the beveled gear and the hub of the gear 23 are secured for rotation together and with the shaft 26 by a pin 27. The hub 24 of the gear 26 extends through an opening in an extension 28 of the end wall 13, the extension 28 extending parallel to the work table. A lateral or perpendicular, downwardly extending, extension 29 formed on the end of the extension 28 forms a bearing for a shaft 30 which extends therethrough. On the end of the shaft 30, there is mounted a beveled gear 31 that meshes with the beveled gear 25. The shaft 30 extends longitudinally of the work table (Fig. 3) and through the far end wall 32 thereof in which it is journaled. On the end of the shaft 30 there is secured a knurled finger wheel 33 which operates against a spring detent 34.

By turning the wheel 33, through the train of gears just described, the gear 22 (Figs. 6, 8 and 10) is rotated and moves the bearing block 17 either against the action of the spring, away from the presser foot, or permits movement towards the presser foot depending upon the direction in which the knurled wheel 33 is rotated. In this way, the position of the bearing block 17 with respect to the presser foot may be adjusted and the bearing block fixed in any adjusted position with respect to the presser foot. It will be noted that the groove 21 in which the gear 22 is received, is wider than the thickness of the gear 22. The spring 19, however, normally maintains the gear 22 abutting against the upper wall of the recess 21. However, in the event of abnormal forces acting upon the bearing block 17, the bearing block may move against the action of the spring 19 away from the presser foot. The amount of movement, however, will not be sufficient to disengage the gears 22 and 23, as the width of the recess 21 is insufficient to permit these gears to become disengaged upon a downward pressure on the bearing block sufficient to compress the spring 19.

The end of a shaft 35 (Fig. 8) extends through the bearing block 17, and on the end of the shaft, between the end walls 12 and 13 of the block 11, there is mounted a node-former 36 (Figs. 6 to 8). This node-former comprises two diametrically opposite blades or node-forming elements. The outer edges of these blades may be of equal distance from the center of the node-former or may vary. If a one to one machine is desired, that is, a machine in which the depth of penetration of the work is the same for each successive stitch, the blades of the node-former are

made of equal length. On the other hand, if a skip stitch, or two to one machine is desired, one blade is made shorter than the other so that the depth of penetration is varied on successive stitches and constant for alternate stitches. The blades of the node-former increase in thickness towards the center or hub to re-enforce the blades.

The shaft 35 is a flexible shaft in that it is capable of flexing in a direction transverse to its axis of rotation. The particular shaft (Figs. 3 and 8) illustrated includes two spaced universal joints 37 and 38. Between these universal joints there is a telescopic relation of the shaft. This telescopic relation is effected through a sleeve 40 which receives the solid shaft. A key 41, engaging in keyways in the shaft and the sleeve, prevents relative rotational movement of the shaft and sleeve but permits telescopic or longitudinal elongation and contraction of the shaft. In this way, there is attained a longitudinal expandable and transversely flexible shaft. Some longitudinal expansion and contraction of the shaft is required since the bearing block 17 moves in a fixed path substantially perpendicular to the axis of the shaft. The telescopic arrangement described is utilized to provide this longitudinal expansion and contraction of the shaft. The other end of the shaft, the end opposite to that on which the node-former is mounted, is journaled in a bearing 42 provided therefor in the work table.

Intermediate the universal 38 (Figs. 3 and 4) and the bearing 42, there is mounted on the shaft a helical gear 43. This gear 43 meshes with another helical gear 45 secured on the end of a shaft 46. The shaft 46 extends rearwardly of the machine and at its rear end it is journaled in a bearing block 47 mounted in the rear wall of the standard 2. Within the standard 2, there is mounted on the shaft 46 a helical gear 48. This gear meshes with a gear 49 mounted on the main shaft 10 of the machine. Thus, the shaft 35 is caused to rotate with the shaft 10. The ratio of the gears 43 and 49 is one to one. The ratio of the gears 45 and 43 is two to one. In consequence, the shaft 35 and the node-former 36 rotate at one-half the speed of the main shaft of the machine. The gears are adjusted on the shaft, so that the node-former is operated in timed relation with respect to the oscillations of the needle, a blade of the node-former being in node-forming position as the needle crosses the opening through the presser foot.

Work-supporting platens 50 and 51 (Figs. 6, 7 and 9) are arranged to support the work against the presser foot, there is a platten on each side of the opening through the presser foot and on each side of the node-former, the node-former and the opening through the presser foot being in the same vertical plane. The platten 51 is pivotally secured by a pivot 52a to the end of a bracket 53. The bracket 53 is shaped as clearly shown in Fig. 6 and is pivotally mounted at its forward end upon a pivot pin 54 that extends between the end walls 12 and 13. An arm 55 extends from the bracket 53 and has a threaded opening therethrough, through which opening a set screw 56 is threaded. The set screw, engaging the forward end of the bottom wall 14, limits the movement of the platten 51 towards the presser foot.

On the bracket 53, there is formed a shoulder 58 in which there is secured a threaded pin 59. The pin 59 has threaded thereon a knurled nut

60. Between the nut 60 and a recess formed in the bottom wall 14 of the block 11, there is a spring 61 which acts to move the bracket 53 in a direction to press the platten 51 against the under-surface of the presser foot. The knurled nut 60 provide an adjustment for adjusting the force with which the spring 61 acts upon the bracket. On the rear end of the bracket 53, there is formed a lug 62. This lug has an elongated transverse slot 63 extended therethrough.

The platten 50 is mounted on a similar bracket 64 that is also pivotally mounted on the pivot pin 54. A spring 65 acts upon the bracket 64 to urge the bracket in a direction to effect engagement of the platten 50 and the presser foot.

The bracket 64 likewise includes a lug 66 having an elongated slot 67 therethrough. These brackets are independently movable towards the presser foot and the plattens are independently mounted so that they may move freely and independently in accordance with variations in thickness of the work passing through the machine.

To open the machine for the insertion or the removal of work, the plattens are withdrawn against the action of the springs 61 and 65. To this end, a pin 68 extends between and is received in the elongated slots in the lugs on the brackets. These elongated slots permit movement of the brackets relative to the pin and thus permit independent movement of the plattens. Between the brackets, there is secured to the pin a link 69 through which the pin 68 extends. The opposite end of the link 69 is pivotally secured by a pivot screw 70 to the end of a crank 71. The crank 71 is mounted upon a shaft 72 that is journaled in the wall 13 of the block 11 and that extends longitudinally of the work table. It is journaled at its opposite end (Fig. 5) in the bearing block 42. The shaft 72 extends through the end of the work table and has mounted thereon (Fig. 3) a lever 73 through which the shaft may be rotated. Within the work table and adjacent the inner end of the bearing block 42 (Figs. 3 and 5) another lever 74 is mounted upon the shaft 72. To the end of the lever 74, there is secured one end of a link or chain 75. The other end of the link 75 is secured to a lever 76 mounted upon a forwardly extending shaft 77 journaled in a bearing block 78 formed in the work table. The shaft 77 extends forwardly of the machine and on its forward end it is provided with a sleeve 79 to which the shaft 80 of a knee press (not shown) may be secured.

Thus, the shaft 72 may be rotated either through the lever 73 by hand or through a knee press. Upon rotation of the shaft 72 in a direction towards the rear of the machine, counter-clockwise as seen in Fig. 10, the link 69 is moved to cause the pin 68 to engage the lower ends of the slots in the lugs 62 and 66. Forward movement of the shaft 71 draws the plattens away from the presser foot. In this way, the plattens may be drawn or retracted until the platten 51 engages the bearing block 17. This provides an adequate opening for the insertion and removal of work in the machine.

In the machine illustrated, the node-former rotates continuously in the direction of the movement of the work through the machine. The position of the bearing block is adjusted through the finger nut 33, for the particular thickness of the cloth being sewn, so that the blades of the node-former project a node of the material through the opening in the presser foot and into the path of the needle. The node-former is timed

so that these nodes in the material are formed and presented as the needle makes its forward or penetrating stroke. When the needle is fully withdrawn, the node-former blades lie parallel to the plane of the presser foot and so allow the maximum space for opening the machine for the removal or insertion of work. It will be apparent, of course, that the number of blades in the node-former may be varied for particular situations with a corresponding variation in the ratio of the node-former shaft and the main shaft. Likewise, the length of the node-former blades may vary to effect the different relations of successive stitches.

From the foregoing description of the embodiment of the invention illustrated in the drawings, it will be seen that by this invention, there is provided a blind-stitch sewing machine which is greatly simplified in construction and in which the only force that the operator has to work against in order to open the machine is the force of the springs urging the plattens into the contact with the presser foot. These are very light springs in comparison to that utilized to hold a movable work table rigid. A stationary, rigid, work table is provided and a simple adjustment is also provided for adjusting the node-former in its relation to the presser foot or the path of the needle. In the event a heavy seam or several thicknesses of cloth passes through the machine, the spring 19 permits the node-former to retract so that the added thicknesses of material is accommodated.

It will be obvious that various changes may be made by those skilled in the art in the details of the embodiment of the invention illustrated in the drawings and described above within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In a blind-stitch sewing machine of the kind described, the combination comprising a presser foot having an opening therethrough, stitch-forming mechanism on one side of the presser foot, a stationary work table, work-presenting mechanism on the other side of the presser foot for presenting work to the stitch-forming mechanism including a rotatable node-former mounted on the work table, a resilient mounting therefor arranged to permit movement of the node-former perpendicular to the plane of the presser foot, and means for operating the node-former.

2. In a blind-stitch sewing machine of the kind described, the combination comprising a substantially horizontally disposed presser foot having an opening therethrough, stitch-forming mechanism on one side of the presser foot, work-presenting mechanism for presenting work to the stitch-forming mechanism including an angularly movable node-former, a resilient mounting therefor arranged to permit movement of the node-former perpendicular to the plane of the presser foot, means for operating the node-former, a work-support for supporting the work against the presser foot mounted for movement away from the presser foot independently of the node-former and sufficiently for the insertion and removal of work.

3. In a blind-stitch sewing machine of the type described, the combination comprising a presser foot having an opening therethrough, stitch-forming mechanism on one side of the presser foot, work-presenting mechanism on the other side of the presser foot for presenting the work to the stitch-forming mechanism including an

angularly movable node-former, a resilient mounting for the work presenting mechanism, a work support movable with respect to said resilient mounting, resilient means acting on the work support in a direction to urge the work support towards the presser foot, and means arranged to act directly on the work support for moving the work support away from the presser foot.

4. In a blind-stitch sewing machine of the kind described, the combination comprising a substantially horizontally disposed presser foot having an opening therethrough, stitch-forming

5 mechanism on one side of the presser foot, work-presenting mechanism for presenting work to the stitch-forming mechanism including an angularly movable node-former, a resilient mounting therefor arranged to permit movement of the node-former toward and away from the presser foot, means for operating the node-former, a work support for supporting the work against the presser foot mounted for movement away from the presser foot independently of the node-former, and means for moving the work support independently of the node-former.

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