# United States Patent

[11] 3,557,729


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[45] Patented **Jan. 26, 1971**
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[54] **BLINDSTITCH SEWING MACHINE**
**12 Claims, 16 Drawing Figs.**


[52] **U.S. Cl.** ..... **112/178**
[51] **Int. Cl.** ..... **D05b 1/24**
[50] **Field of Search** ..... 112/176, 177, 178, 260, 217.1



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| 2,679,814 | 6/1954 | Mueller | 112/177 |
| 2,718,862 | 9/1955 | Parry | 112/260 |
| 3,288,094 | 11/1966 | Roth et al. | 112/178 |



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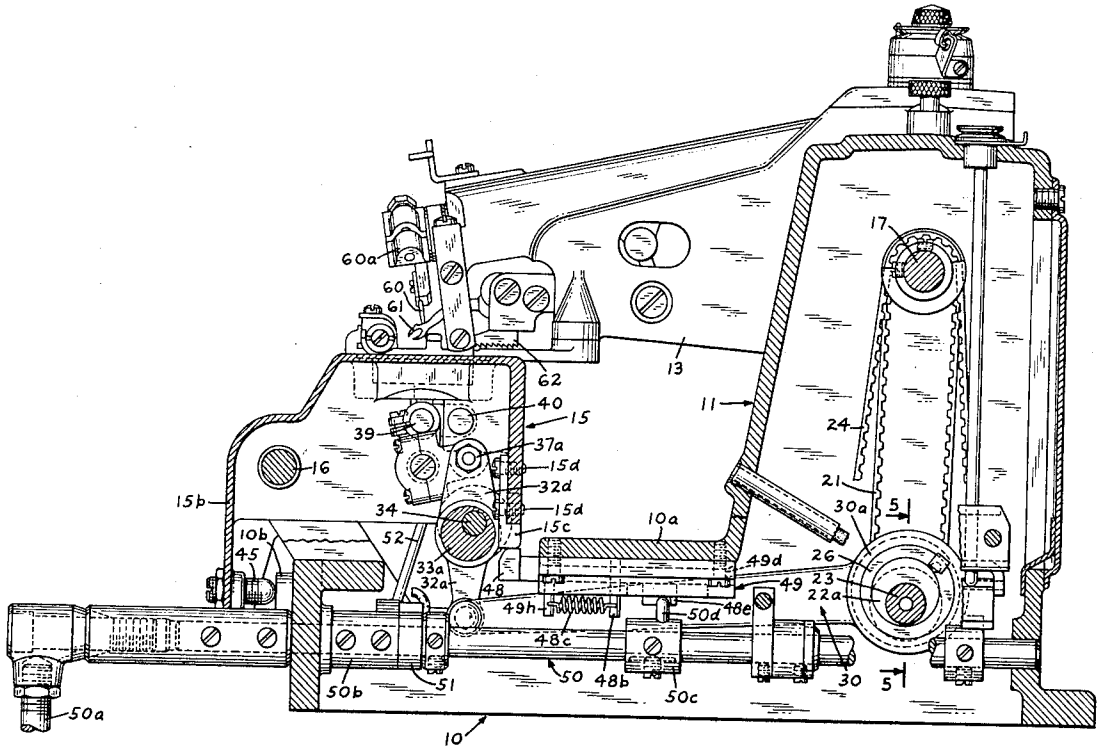
*Attorney*—H. C. Dieserud



**ABSTRACT:** An improved blind stitch sewing machine construction adapted to insure proper formation of blind stitches, of either the skip and the nonskip type, with the machine operated at very high speeds. Includes work table-locking means, for retaining the work supporting rockable table in its uppermost position, during stitch-forming operations. Means, comprising a pair of levers, are provided for disabling said locking means and then bringing about downward rocking of the worktable under the control of the operator, as by operation of a knee press. Means are provided for changing from a nonskip to a skip stitch condition of the machine, and vice versa. Such changeover from one type of stitching to the other involves a change in the location of the arc of oscillation of the work-engaging edge of the node former during a cycle of operation of the machine. Skip stitches are produced by varying the extent of oscillation of a node former during successive operations of the machine.

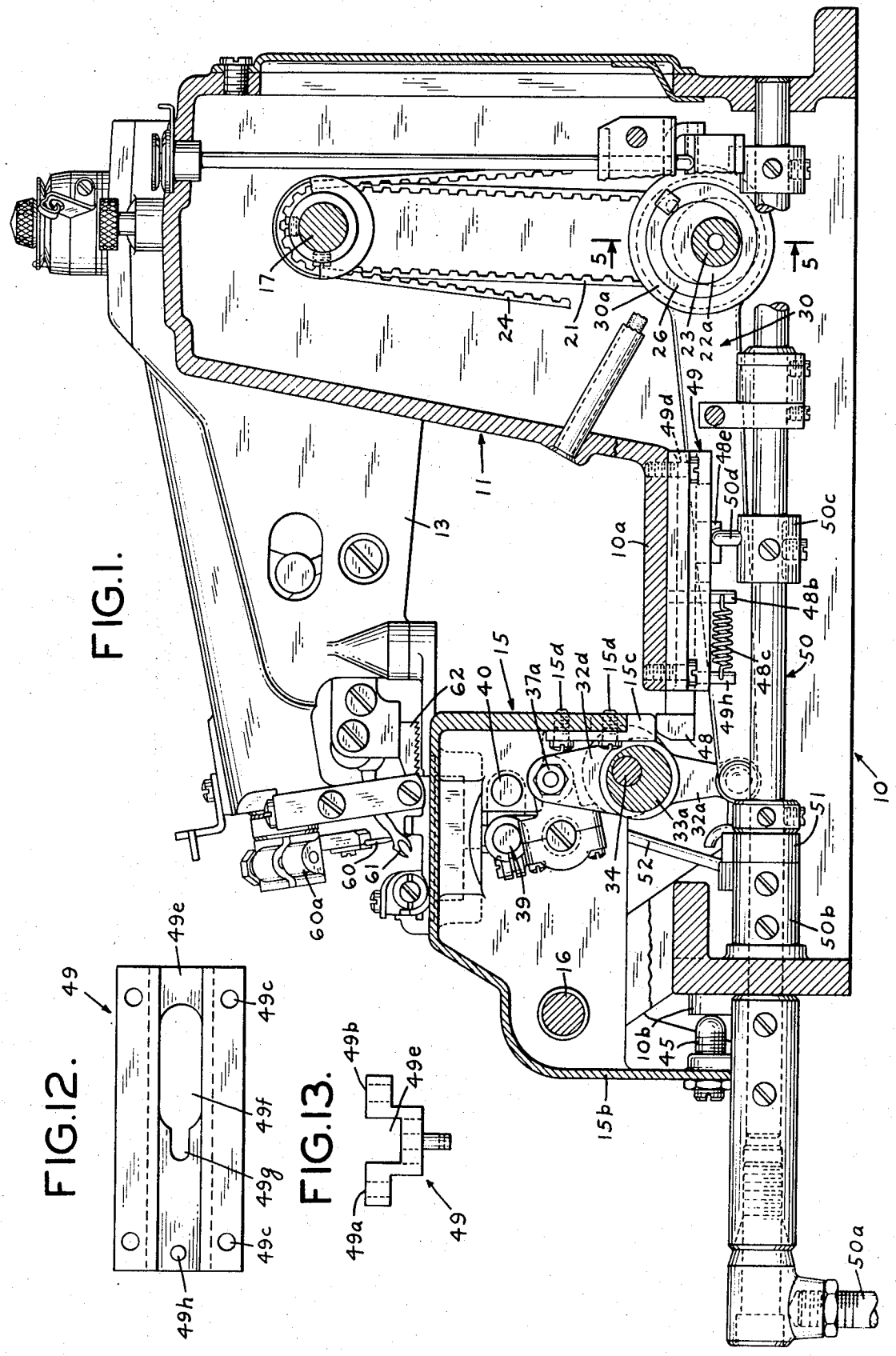



FIG. 1.




FIG. 12.




FIG. 13.

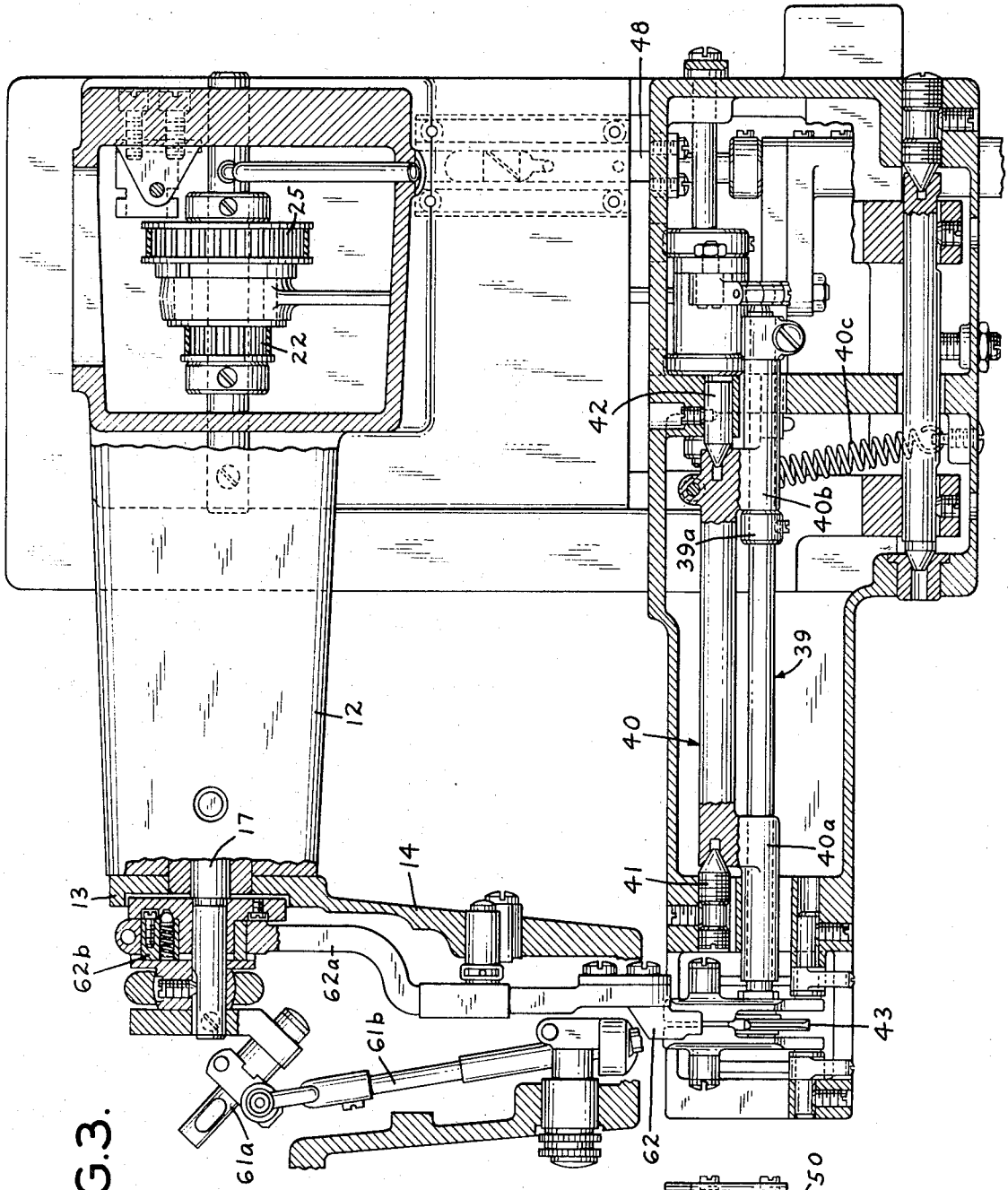



FIG.3.

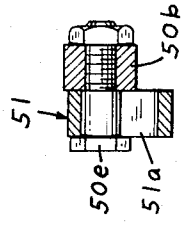



FIG.8.

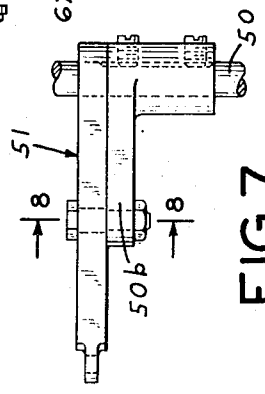
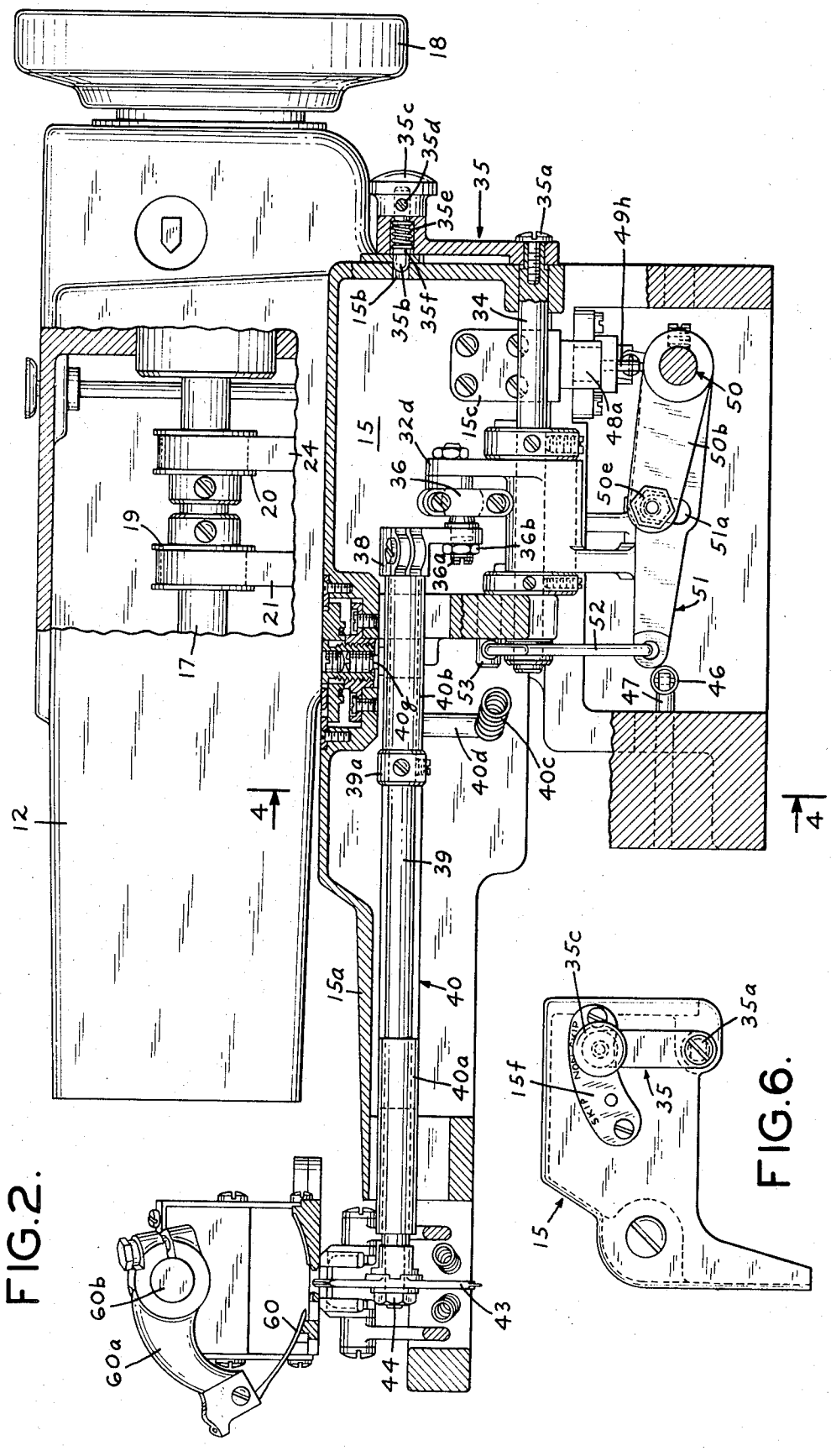



FIG.7.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35c
35d
35e
35
35a
49h
15b
35b
35f
34
48a
50
50b
15c
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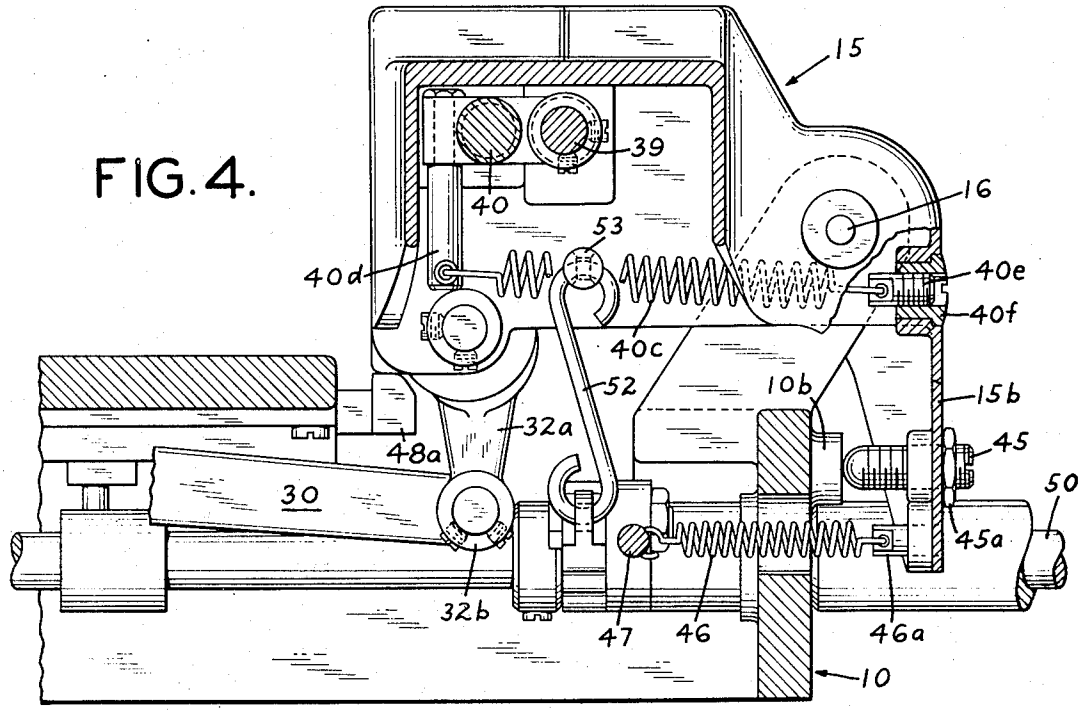
15
36
24
20
19
50e
51a
51
38
36b
36a
21
52
17
40b
53
47
46
40g
40d
40c
39a
4
4
12
39
15a
40
40a
60b
60a
60
44
43

FIG. 2.


35c
35a
15f
35
15

FIG. 6.

FIG. 4.


15
39
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16
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40d
40e
40f
40c
52
10b
15b
32a
48a
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30
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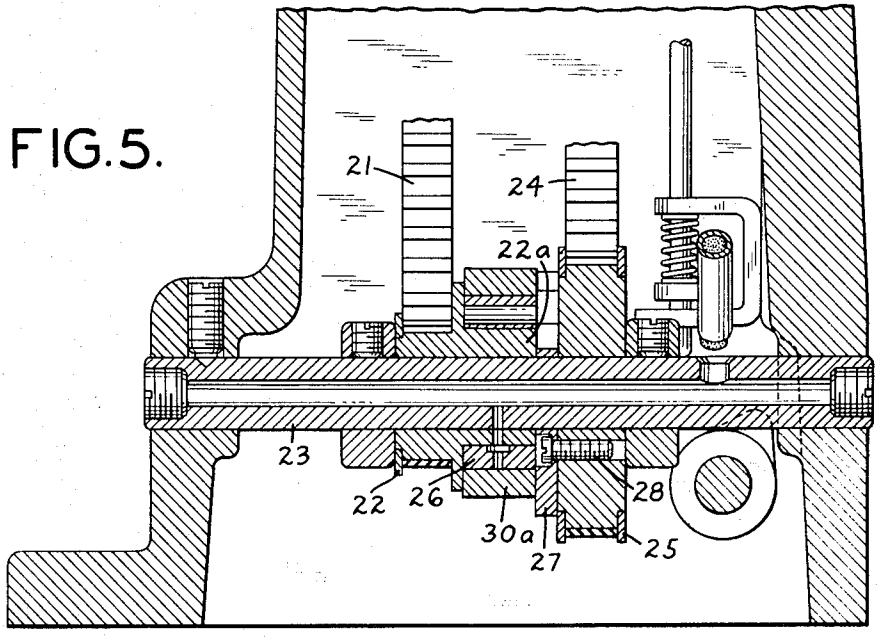
45a
32b
47
46
46a
10

FIG. 5.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26
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30a
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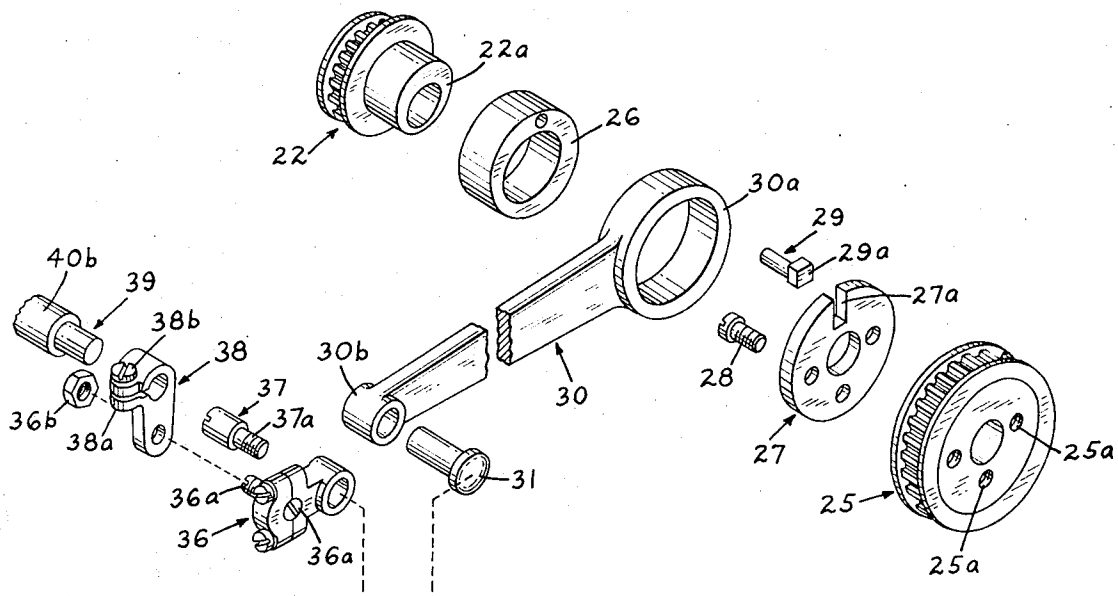



FIG.11.

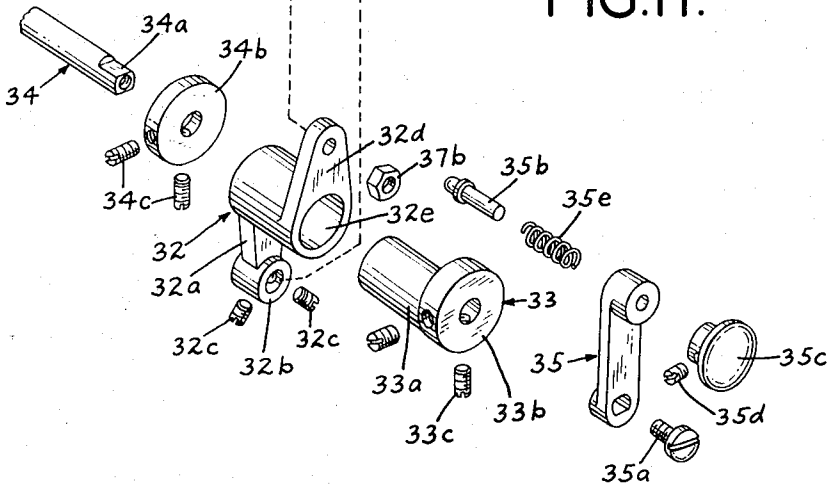



FIG.10.

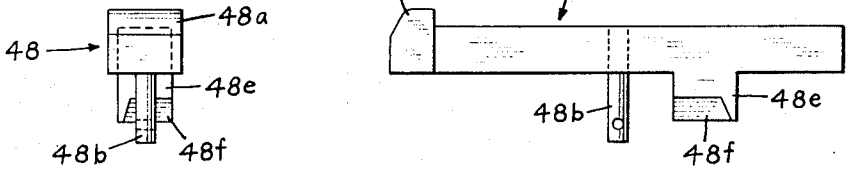



FIG.9.

FIG.14.

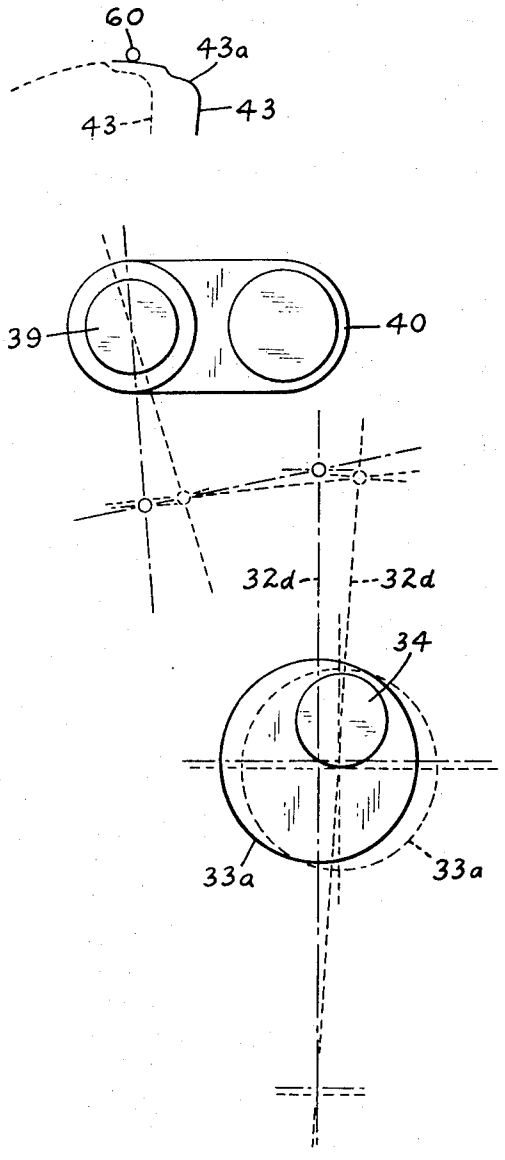



FIG.15.

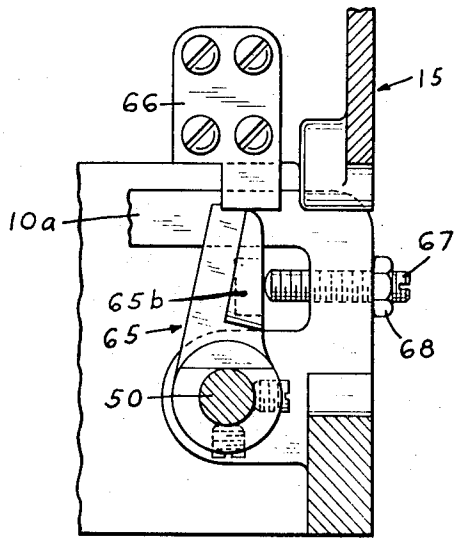
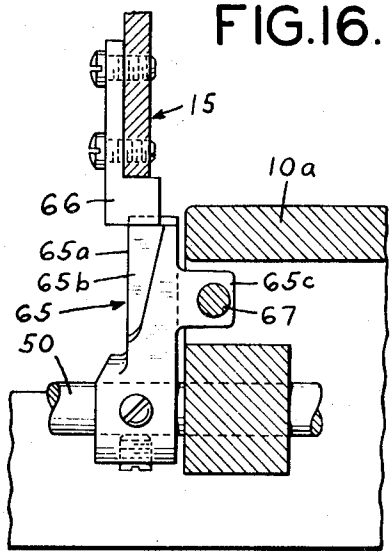



FIG.16.



# BLINDSTITCH SEWING MACHINE

This invention relates to certain improvements in the construction of a blindstitch sewing machine which enables it to be operated at high speeds, with the assurance that proper stitch formation will take place.

A feature of the invention is the provision of locking mechanism which serves to positively retain a rockable work-supporting member in a fixed position during stitching operations.

Another feature of the invention is the provision of means for varying the extent of oscillatory movement of a ridge former upon successive cycles of operation of the machine, so that the machine is adapted to produce skip stitches without requiring rocking movement of a work-supporting member. In this connection the node former is also adapted to be selectively placed in one or another of a plurality of positions in relation to the work being stitched, so that appropriate variation in the depth of the node formed in the work at the time a curved needle is passed through it may be made. This enables appropriate operation of the mechanism on work pieces of different thicknesses.

Other objects and features of the invention will become apparent in the course of the following detailed description of an illustrative embodiment of the invention.

The invention is shown as applied to a blindstitch sewing machine of the character disclosed in the Roth et al. U.S. Pat. No. 3,288,094 granted on Nov. 29, 1966. However, various changes have been made in the construction disclosed in said patent to bring about the improved mode of selecting and carrying out the production of either skip stitches or nonskip stitches during the operation of the machine at high speeds. Reference may be had to said Roth et al. patent and to Mueller et al. U.S. Pat. No. 2,632,416 granted Mar. 24, 1953 and Mueller U.S. Pat. No. 2,679,814 granted Jun. 1, 1954 for certain details of the construction which will not be described herein.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a view partly in elevation, as seen from the right side of the machine, and partly in vertical section through the machine;

FIG. 2 is a view partly in elevation, as seen from the front of the machine, and partly in vertical section, with other parts broken away;

FIG. 3 is a view partly in plan and partly in horizontal section through the machine;

FIG. 4 is a vertical sectional view through a portion of the machine taken along the line 4–4 of FIG. 2;

FIG. 5 is a vertical sectional view through the machine taken along the line 5–5 of FIG. 1;

FIG. 6 is a detail view, showing the work-supporting member of the machine in side elevation;

FIG. 7 is a detail view, showing in plan certain elements of the machine;

FIG. 8 is a cross-sectional view through the parts shown in FIG. 7, along the line 8–8 of said figure;

FIG. 9 is a side elevational view of a locking member embodied in the machine;

FIG. 10 is a view of said locking member as seen from the left in FIG. 9;

FIG. 11 is an exploded perspective view of certain driving elements for imparting movement to certain parts of the mechanism within the machine;

FIG. 12 is a plan view of a part carried by the frame of the machine in which the locking member is slidable;

FIG. 13 is an end view of the part shown in FIG. 12;

FIG. 14 is a schematic view showing the relationship of the node former, its supporting and operating shaft and various related parts;

FIG. 15 is a view, partly in vertical section, showing a modified form of mechanism for locking the work-supporting member in its active position; and

FIG. 16 is a view, partly in elevation and partly in vertical section, showing the elements of FIG. 15 as seen from the right of FIG. 15.



As has been stated, the invention is disclosed herein as applied to a modified form of the machine shown in the Roth et al. U.S. Pat. 3,288,094. It embodies a frame structure which serves to enclose most of the operating mechanism of the machine. The frame comprises a base portion **10** from which a vertical standard **11** rises toward the rear of said base. At the upper end of the vertical standard **11** there is provided a horizontally extending, overhanging arm **12** at the left end of which (Fig. 3) there is provided a head **13** from which extends forwardly an arm **14**. As shown in FIG. 1, this forwardly extending arm has its free, forward end disposed above, and in cooperative relation with, a work-supporting member **15**. The latter has sidewalls which are journaled upon and rockable about a fixed shaft **16**.

A main drive shaft **17** is suitably journaled in the frame and extends longitudinally of the arm **12** and outwardly through the sidewall of the vertical standard **11**. At its outer end, this shaft is provided with a combined pulley and handwheel **18** through which the main drive shaft may be driven. Within the upper portion of the vertical standard **11**, the shaft **17** is provided with a pair of toothed pulleys **19** and **20** suitably secured to the shaft for rotation therewith. Cooperating with toothed pulley **19** is a toothed belt **21** which extends downwardly through the vertical standard to the base portion of the frame in which it cooperates with a toothed pulley **22** mounted for free rotation about a fixed shaft **23**. The pulley **22** has a laterally extending eccentric portion **22***a*. Similarly the pulley **20** is connected by a toothed belt **24** with a toothed pulley **25** mounted for rotation about the fixed shaft **23** in the base of the frame. Toothed pulley **25** is of twice as large a diameter as the toothed pulley **20**, so that it will be rotated only one revolution for two revolutions of the shaft **17**. On the other hand the pulley **22** is of the same diameter as the pulley **19**, so that pulley **22** will be rotated at the same angular speed as the shaft **17**.

As best shown in FIGS. **5** and **11**, the pulley **22** has a laterally extending eccentric portion **22***a* upon which is mounted an eccentric element **26** that is connected for rotation with the toothed pulley **25**. For this purpose, the pulley **25** has a disc **27** secured to one face thereof by one or more screws **28** cooperating with threaded openings **25***a* in the pulley. A pin **29** is secured to the eccentric member **26** and has its head portion **29***a* cooperating with a radially extending slot **27***a* in the disc **27**. Through these connections, it is apparent that the eccentric member **26** will be rotated at half the angular speed at which the eccentric **22***a* is rotated. Accordingly the eccentricity of the outer surface of the member **26** in relation to the axis of the supporting shaft **23** will vary during the operation of the machine. At times the eccentricity of member **26** will be added to that of eccentric **22***a*, while at other times in the operation of the machine its eccentricity will be subtracted from that of eccentric **22***a*. Such changes will occur on alternate revolutions of the main drive shaft **17**.

Cooperating with the eccentric member **26** is a pitman **30** having a strap portion **30***a* surrounding said eccentric. The outer end **30***b* of the pitman **30** is connected by a pin **31** with an oscillatable member **32**. The pin **31** cooperates with the opening through a sleevelike portion **32***b* at the lower end of an arm **32***a* of the member **32** (FIG. 11). Pin **31** is retained in fixed relation to the portion **32***b* by screws **32***c*. Through the connections described, the member **32** will be rocked upon each reciprocation of the pitman **30**. The distance through which the pitman will be reciprocated will vary upon successive revolutions of the main drive shaft. Hence the extent of the rocking movement **32** will vary from one revolution of the drive shaft to the next. Member **32** has an upwardly extending arm **32***d* which, as will be later described, is connected with the ridge-forming mechanism.

Member **32** is mounted on an eccentric portion **33***a* of an element **33** which has a central opening arranged to receive the end of a stationary but angularly adjustable, shaft **34**. In referring to FIG. **11**, it will be understood that the shaft **34** extends through an opening in a washer or spacing element **34***b* which, when the parts are properly assembled, is held in fixed

position on the shaft by setscrews 34*c*. The eccentric portion 33*a* of member 33 also receives the shaft 34 with said eccentric being disposed within the bore 32*e* of member 32. Member 33 has its enlarged portion 33*b*, which is concentric with the shaft 34, secured to the latter by screws 33*c*. Member 32 is retained on the eccentric portion 33*a* of member 33 by the enlarged portion 33*b* on one side and by element 34*b* on the other side. The end portion 34*a* of the shaft 34 has flattened surfaces, as shown in FIG. 11, and this portion extends to the right beyond the right-hand face of the member 33 and it has mounted thereon a member 35 which is firmly retained on said shaft by a screw 35*a*. As best shown in FIGS. 2 and 6, the member 35 carries at its upper end a pin 35*b* having a knob 35*c* secured thereto by a set screw 35*d*. Surrounding the pin 35*b* is a spring 35*e* which cooperates with a shoulder 35*f* on the pin and with a surface within the opening through the member 35. This spring serves to urge the end of the pin into one or another of a pair of openings 15*b* provided in the adjacent wall of the work support 15 and an index plate 15*f* secured to said wall. When the pin 35*b* is engaged with the left-hand opening 15*b*, designated SKIP in FIG. 6, the mechanism will be adapted to produce skip stitches. On the other hand when the pin 35*b* is in the position shown in FIG. 6, with its end engaged with the other opening 15*b*, the mechanism will be placed in a nonskip condition so that no skip stitches will be formed.

Returning now to the member 32, this has an upwardly extending arm 32*d* (FIGS. 1, 2 and 11) which has connected therewith a link 36. The latter is arranged for pivotal movement about a pin 37 having a screw threaded portion 37*a* arranged to receive a nut 37*b* for retaining the member 36 on the arm 32*d*. A split head portion of the link 36 retains a ball and stud element 36*a* arranged for free turning movement in relation to the link 36, and having its free end extending through an opening in a clamping element 38. At the opposite side of the latter there is provided a nut 36*b* which serves to retain the parts 36 and 38 in assembled relation. The element 38 is provided with a split clamp portion 38*a* adapted to receive the end of a ridge former shaft 39. A screw 38*b* is provided to firmly clamp the element 38 upon the ridge former shaft. This shaft has a collar 39*a* (FIG. 2) secured thereto to retain the shaft against axial movement in relation to a member on which it is mounted. This is a cradle 40 which, as best shown in FIG. 3, is mounted for rocking movement in relation to the work support by means of pins 41 and 42 having conical ends cooperating with openings or cavities in the end portions of the main body of the cradle. The cradle has offset portions 40*a* and 40*b* which serve to provide bearings for the ridge former shaft 39.

As will be clear from the description to be hereinafter given, the shaft 39 turns in relation to the cradle 40, through the connections described above, to impart rocking movements to a node former 43, secured to the left end of the shaft as shown in FIG. 2. As disclosed in the Roth et al. patent mentioned above, the node former is preferably provided with two segments 180° $_{D}$art which may be selectively placed in the operative position. One of these segments is for dealing with relatively soft fabrics and the other for dealing with relatively hard fabrics. The node former is retained on the end of the shaft 39 by means of a nut 44 cooperating with screw threads on the end of the shaft.

As best shown in FIG. 4, the cradle 40 is provided with a downwardly extending pin 40*d* which is suitably retained in a portion of the cradle which extends toward the left in FIG. 4. The lower end of this pin receives one end of a spring 40*c* the opposite end of which is connected with a screw threaded pin 40*e* which has threaded engagement with an element 40*f*. The latter is retained within an opening in a downwardly extending skirt portion 15*b* of the work-supporting member of the machine. By turning the nut 40*f* in one direction to exert a pull toward the right on the pin 4*e* the amount of tension applied to the spring 40*c* may be increased, while by turning the nut 40*f* in the opposite direction the tension of the spring 40*c* may be reduced. The purpose of the spring is to impart an appropriate turning force to the cradle 40. The position in which the cradle is normally held by the spring 40*c* may be varied by adjusting a screw 40*g*, FIG. 2. The lower end of this screw engages a point of the top surface of part 40*b* of the cradle. For further details as to this feature, reference may be made to the Mueller et al. U.S. Pat. No. 2,632,416, granted on Mar. 24, 1953.

A spring 46 is connected at one end with a pin 46*a* suitably mounted in the downwardly extending skirt portion 15*b* of the work support, the opposite end of this spring being connected with a pin 47 carried by a portion of the base of the frame of the machine. This spring is passed through an opening in another portion of the frame of the machine shown in FIG. 4. Also mounted in the downwardly extending skirt 15*b* of the work support is an adjustable screw 45 the inner end of which is adapted to engage a projection 10*b* on the base 10 of the machine frame. By the proper adjustment of the screw 45 and the locking of it in a set position by a nut 45*a*, the work support 15 is retained in the desired position, in which it is locked by a member to be described. If the wear of certain parts, through long operation of the machine, should prevent the elements 15*c* and 48 from holding the work support locked in its desired position, the screw 45 may be readjusted to insure such locking action.

As has been previously stated, the machine contemplated by the present invention involves the retention of the work-supporting member 15 in a fixed position throughout a particular stitch-forming operation. It is held locked in this position by a special member 48 (FIGS. 1, 4, 9 and 10). This has an upwardly extending portion 48*a* at one end adapted to cooperate with a rigid portion of work support member 15. For this purpose, as best shown in FIG. 1, there may be secured to the downwardly extending portion of the work support at the right side thereof, as seen in this FIG., a member 15*c* which is retained on said member by screws 15*d*. This enables slight vertical adjustment of the member 15*c* to bring about the locking of the work support in the desired angular relation to its supporting shaft 16. As will be explained hereinafter, means are provided for shifting the locking element 48 into an inactive position to enable the work support 15 to be rocked clockwise so as to facilitate introduction and removal of workpieces.

For retaining the locking element 48 on the underside of a horizontally extending portion 10*a* of the frame of the machine, there is provided a member 49, which is shown in detail in FIGS. 12 and 13. As will be seen from FIG. 13, it is substantially U-shaped in form as viewed from the left in FIG. 12. The side portions 49*a* and 49*b* are provided with openings 49*c* through which screws 49*d* may be passed to retain said member in fixed position on the under surface of part 10*a* of the base of the machine frame. The locking element 48 is mounted for sliding movement along a channel portion 49*e* provided between the upper portions 49*a* and 49*b*. A relatively large opening 49*f* is provided in the portion 49*e* to permit the downward passage therethrough of a downwardly extending block 48*e* carried by the locking element. The opening 49*f* extends into a narrower opening 49*g* which provides a passage for a downwardly extending pin 48*b* carried by the locking element.

As shown in FIGS. 1 and 9, the downwardly extending pin 48*b* carried by the locking element has connected to it one end of a spring 48*c*. The other end of said spring is connected with a pin 49*h* extending downwardly from the retaining member 49. Spring 48*c* normally urges the locking element into the position shown in FIG. 1, but it is shifted toward the right in FIG. 1 upon the actuation of a knee press member or the like. For this purpose the locking element is provided with a downwardly extending block 48 *e* having an inclined surface 48*f* against which an element to be described is pressed to cam the locking element toward the right (FIGS. 1 and 9).

For shifting the locking element in the manner described above there is provided in the machine a conventional rock

shaft **50** having secured to its outer end, toward the left in FIG. **1**, a downwardly extending lever arm **50***a* to which is connected a conventional knee pad through which the operator is adapted to turn the shaft **50** through a suitable angle. Secured to the rock shaft **50** is a block **50***c* having an upwardly extending pin **50***d*. This is adapted to cooperate with the surface **48***f* on the locking member **48** when the rock shaft **50** is turned in a counterclockwise direction by the action of the knee press. This will cam the locking element toward the right and enable the operator to swing the work support **15** downwardly about its supporting shaft **16** to facilitate removal of the stitched workpiece and the introduction of a new workpiece to be stitched.

Referring now to FIG. **2**, it will be seen that upon the rocking of the shaft **50** by the action of the knee press, an arm **50***b* having a collar portion at one end secured to the shaft will be rocked downwardly. After the shaft has been rocked sufficiently to cause the pin **50***d* to cam the locking member **48** in the manner explained, a bolt **50***e* carried by the arm **50***b* will have reached the bottom of an arcuate opening **50***a* extending through a lever **51** which is pivotally connected with the rock shaft **50**. Further downward movement of the arm **50***b* will then cause the lever **51** to rock downwardly. Adjacent the outer end of said lever, as shown at the left in FIG. **2**, it has an opening to receive a hooked end of a link **52**. The upper end of this hooked link is connected with a pin **53** extending from a wall forming an integral part of the work support **15**, as shown in FIGS. **2** and **4**. Thus the actuation of the knee press will not only release the work support for swinging movement but will also impart such swinging movement to the work support.

The illustrative machine disclosed herein is provided with suitable stitch forming mechanism and work feeding mechanism. This may be of the character disclosed in the above-mentioned Roth et al. patent. Briefly stated, it includes a curved needle **60** carried by an arm **60***a* mounted on a shaft **60***b* which is oscillated back and forth during each cycle of operation of the machine, through connection of the character disclosed in the Roth et al. patent and partly shown herein. Cooperating with the needle in the formation of a line of stitching is a looper **61** (FIG. **1**) which is operated in a conventional manner by suitable connections from the main drive shaft **17**, including a special crank member **61***a* and a reciprocating and oscillating rod **61***b* (FIG. **3**). For advancing the work step-by-step in the course of forming a line of stitches, a feed dog **62** (FIGS. **1** and **3**) may be provided, this being carried by a bar **62***a* which is driven in a conventional way by an adjustable eccentric **62***b* connected with the main drive shaft **17**.

As will be understood from the foregoing, when the arm **35** is in the position shown in FIGS. **2** and **6**, the machine will operate to produce a stitch going through two or more layers of fabric upon each stitch-forming cycle. FIG. **14** schematically illustrates this by showing that the path of the needle indicated at **60** is always over the high portion of the node former **43**. This is due to the fact that the rocking of the node former by the pitman **30** will not carry the low surface **43***a* into the path of the needle even when the eccentric **26** increases the eccentricity of eccentric **22***a* on every other revolution of the main drive shaft. It will be understood that in one revolution of the drive shaft the eccentricity of the member **26** will be added to that of the eccentric **22***a*, whereas on the next cycle of operation the eccentricity of member **26** will be subtracted from that of **22***a*. The latter has a greater eccentricity than the member **26** so that on each revolution of the main shaft of the machine some longitudinal movement will be imparted to the pitman **30**, but the extent of such movement will alternate between two different amounts.

When the lever **35** is shifted into the skip position, the eccentric **33***a* will be shifted from the full line position, the eccentric **33***a* will be shifted from the full line position shown therein at the time in a cycle when the eccentricity of member **26** is added to that of **22***a* during the engagement of the needle with the work. Thus the limits of movement of the node former **43** will be changed, so that on every other operation of the machine the node former will not be shifted into a position in which its portion of greatest radius is active in producing a node in the workpiece at the time the needle is being swung to form a stitch. This of course results in the production of a skip stitch. However, on each succeeding cycle of operation of the machine the node former will be shifted far enough to carry its outermost edge into the region in which the needle is operated. Therefore in such alternate operations of the machine the needle will be passed through more than the upper layer of the work being stitched.

In FIGS. **15** and **16** there is shown a modified form of mechanism for locking the work support table in a fixed position during stitch-forming operations. This is substituted for the locking means shown in FIGS. **1**, **4** and **9**. In lieu of the slide member **48**, there is provided a swingable locking member **65**. As best shown in FIG. **15**, this locking member is in the path of a member **66**, similar to the part **15***c* of FIG. **1**, secured to a rear vertical wall of the work support. The cooperation of the bottom of member **66** with the top of locking member **65** will prevent rocking of the work support during the operation of the machine. However, when the machine is not operating the knee press member secured to the arm depending from the shaft **50** may be urged toward the right, and the shaft will be rocked in a counterclockwise direction to carry the upper end of locking member **65** out of the path of the member **66**. This will permit the work support **15** to be rocked through the connections from the shaft **50**, as previously described. The front surface **65***a* of locking member **65** is cut away in the region indicated at **65***b*. This provides a clearance for the downward movement of member **66** when the work support table is being lowered. A screw **67** threaded into the base of the frame of the machine, and locked in place by a nut **68**, cooperates with an extension **65***c* of the member **65** to adjust the normal position of the member **65** and the knee press carrying shaft **50**.

While two embodiments of the invention have been described in the foregoing, it will be understood that various changes may be made within the scope of the invention as defined by the appended claims.

I claim:

**1**. In a blindstitch sewing machine having a main frame and a work-supporting member, means rockably mounting said work-supporting member on said main frame, work-feeding and stitch-forming mechanism mounted for operation above said work-supporting member to provide stitches in work advanced along said member, a node former, means rockably mounting said node former in said work support, means for locking said work support in a fixed position in relation to said frame during operation of the machine for producing a line of stitching, and means operable by the operator for disabling said locking means and thereafter rocking said work-supporting member downwardly away from said work-feeding and stitch-forming mechanism to facilitate the introduction and removal of workpieces to be stitched.

**2**. In a blindstitch sewing machine as set forth in claim **1**, means for varying the extent of rocking movement of said node former upon alternate cycles of operation of the machine.

**3**. In a blindstitch sewing machine as set forth in claim **2**, manually adjustable means for changing the location of the arc through which said node former is rocked, to thereby selectively produce either skip stitches or nonskip stitches as desired.

**4**. In a blindstitch sewing machine as set forth in claim **2**, said means for varying the extent of rocking movement of said node former comprising an eccentric having two relatively rotatable components, the eccentricity of one of said elements being added to or subtracted from the eccentricity of the other of said elements during different revolutions of the main drive shaft.

5. In a blindstitch sewing machine as set forth in claim 1, said locking means comprising a slidable member which is carried by the main frame of the machine and is spring urged into engagement with a shoulder on said work support.

6. In a blindstitch sewing machine as set forth in claim 1, said locking means comprising a rockable member which is normally spring urged into a position in which a shoulder thereon cooperates with a shoulder on said work support.

7. In a blindstitch sewing machine as set forth in claim 1, spring means urging said work support in one direction in relation to the axis about which said support is rockable, adjustable means for limiting the rocking movement of said work support in said one direction, and shiftable means normally retained in a position to prevent rocking movement of said work support in the opposite direction.

8. In a blindstitch sewing machine as set forth in claim 7, said means operable by the operator comprising a rock shaft and a lever assembly connected therewith, connections from said shaft for shifting said shiftable means to enable rocking movement of said work support in said opposite direction, and connections from said lever assembly for then imparting such rocking movement to said work support.

9. In a blindstitch sewing machine as set forth in claim 8,



said lever assembly comprising a plurality of parallel levers rockable about the same axis, one of said levers being secured to said rock shaft, another of said levers being pivotally connected with said shaft, and a connection between said levers whereby said one of said levers after being rocked to a predetermined extent will cause rocking of said other of said levers to impart a rocking movement to said work support.

10. In a blindstitch sewing machine as set forth in claim 8, said rock shaft having connected therewith a depending member adapted to be engaged by the operator's knee for rocking said shaft.

11. In a blindstitch sewing machine as set forth in claim 5, said means for disabling said locking means comprising a shaft rockable by the operator, means extending radially from said shaft, and a cam surface on said slidable member in the path of said radially extending means.

12. In a blindstitch sewing machine as set forth in claim 5, said means for disabling said locking means comprising a shaft rockable by the operator, a pin extending radially from said shaft, and a cam surface on said slidable member which is disposed at an angle to and disposed at an angle to and disposed within the path of movement of said pin.