

[54] **NEEDLE BAR MECHANISM FOR SEWING MACHINES**

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[22] Filed: **Oct. 8, 1971**

[21] Appl. No.: **187,715**

[52] U.S. Cl. **112/221**

[51] Int. Cl. **D05b 55/14**

[58] Field of Search **112/221, 220, 218 R**

[56] **References Cited**

UNITED STATES PATENTS

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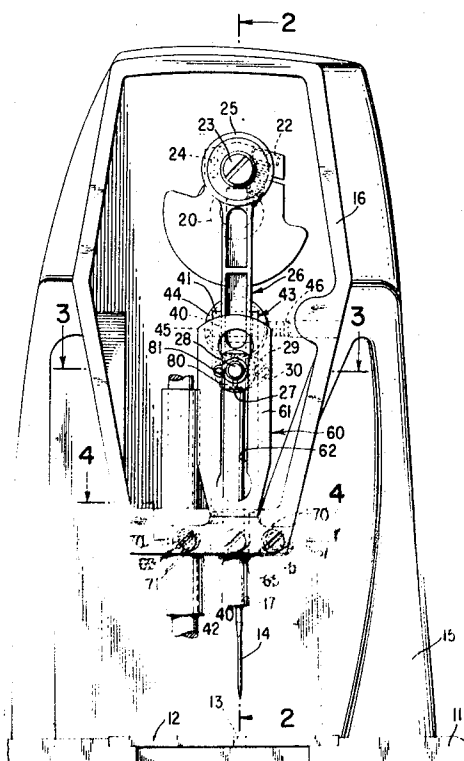
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[57] **ABSTRACT**

A mechanism for supporting a sewing machine needle bar for endwise reciprocation in which the needle bar is reciprocable in a gate which is adjustably secured in the machine frame by a slotted guide member which stabilizes the needle bar drive link. Fastening of the slotted guide member in the machine frame simultaneously effects alignment of the slotted guide with the needle bar and clamping of the needle bar gate relatively to the machine frame.

2 Claims, 4 Drawing Figures



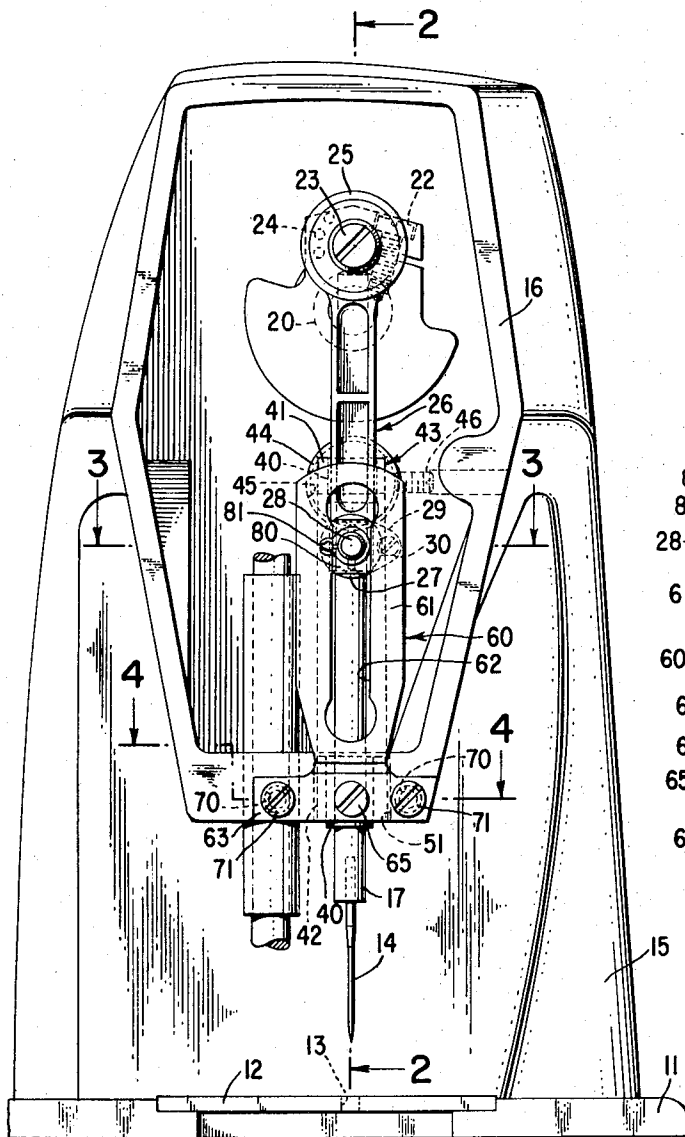


Fig. 1

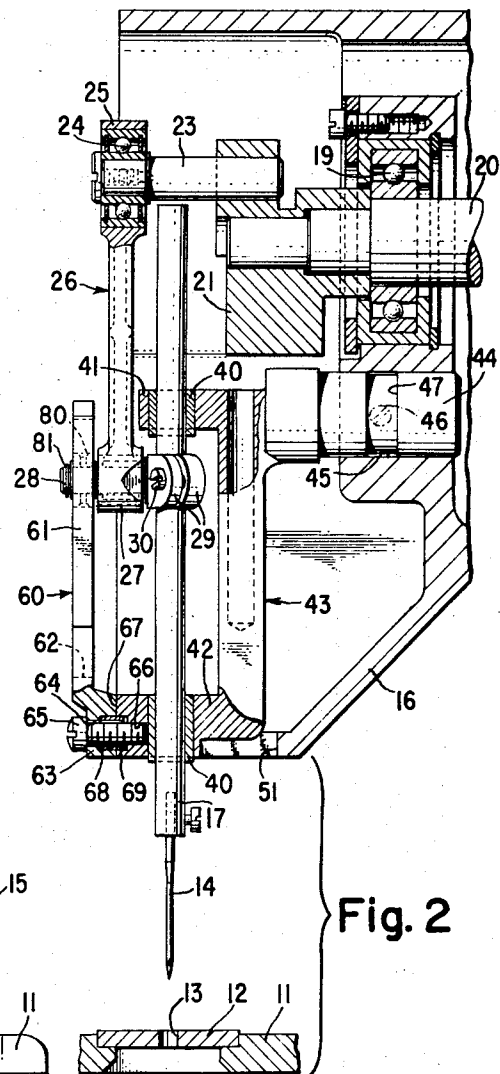


Fig. 2

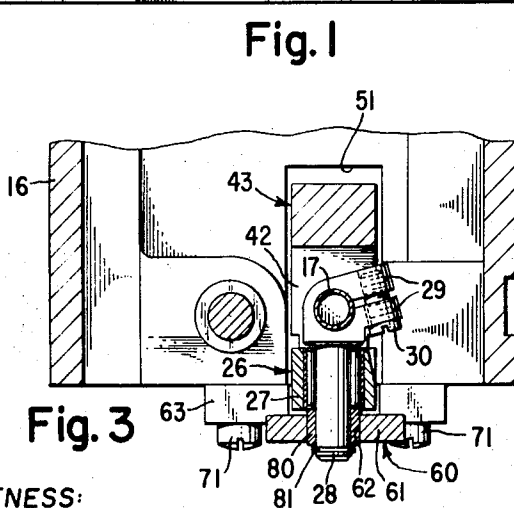


Fig. 3

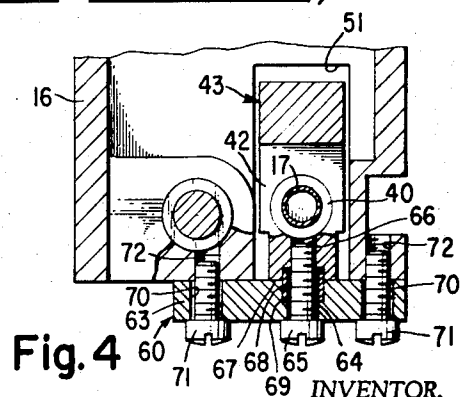


Fig. 4

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NEEDLE BAR MECHANISM FOR SEWING MACHINES

BACKGROUND OF THE INVENTION

It is conventional in the sewing machine art to provide a slotted guide member for the needle bar drive link which is formed as part of the machine frame or which is secured to the machine frame independently of the needle bar support.

If the guide slot is formed as a part of the machine frame, no adjustment is possible and the entire machine frame and needle bar mechanism must be fabricated with that high degree of accuracy which will ensure a proper fit and alignment of parts.

If the slotted guide member is independently secured to the machine frame, assembly of the machine will entail tedious adjustment or reworking of the guide member in order to establish the proper alignment and freedom from binding.

BRIEF SUMMARY OF THE INVENTION

It is an object of this invention to provide a sewing machine needle reciprocating mechanism in which the guide means for the needle reciprocating drive link and the needle bar support means which determines the path of needle reciprocation may be aligned and adjusted simultaneously. The object of this invention is attained by a needle bar construction in which the needle bar is reciprocable in a gate adjustable in the machine frame and in which a slotted guide member for the needle bar drive link is secured to the needle bar gate and serves also as a clamp means to fasten the needle bar gate in selected position of adjustment.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings of a preferred embodiment:

FIG. 1 is a front elevational view of a sewing machine bracket arm with the end cover plate and the sewing machine presser mechanism removed more clearly to illustrate the needle bar mechanism of this invention,

FIG. 2 is a vertical cross sectional view taken substantially along line 2—2 of FIG. 1,

FIG. 3 is a horizontal cross sectional view taken substantially along line 3—3 of FIG. 1, and

FIG. 4 is a horizontal cross sectional view taken substantially along line 4—4 of FIG. 4.

As shown in the drawings this invention is applied to a sewing machine having a bed 11 fitted with a throat plate 12 having an aperture 13 through which a needle 14 is adapted to reciprocate. The machine frame includes a standard 15 rising from the bed and supporting a bracket arm 16 which overhangs the bed. The needle bar 17 which is supported in the bracket arm by the arrangement of this invention, carries the needle. Also journaled in a bearing 19 in the bracket arm is a main drive shaft 20 to which a counter balanced crank 21 is secured as by a clamp screw 22. A crank pin 23 in the counter balanced crank is embraced by an antifriction bearing 24 carried in the upper extremity 25 of a needle bar drive link 26. The lower extremity 27 of the drive link embraces a lateral stud 28 secured by a split clamp 29 and a clamp screw 30 to the needle bar.

The needle bar 17 is not endwise movable directly in the bracket arm as is conventional in sewing machine construction, but instead, in this invention the needle bar is endwise reciprocable in bushings 40 which are secured in spaced arms 41 and 42 on a needle bar frame 43. A cylindrical mounting stud 44 on the needle bar frame is accommodated in a cylindrical bore 45 formed in the bracket arm 16 beneath the main drive shaft. One or more set screws 46 in the bracket arm are arranged to engage in a shallow annular recess 47 in the mounting stud 44 to locate and secure the needle bar frame in the bracket arm.

The lower arm 42 of the needle bar frame 43 extends into a clearance slot 51 formed in the bracket arm and, therefore, provides limited clearance for adjustment of the position of the needle in any direction. When the set screw 46 is loosened the path of reciprocation of the needle may be adjusted very accurately in relation to the needle aperture 13 in the throat plate. After the desired position of the needle path of reciprocation is attained, the set screw 46 may be tightened to preserve this setting. The set screw 46, however, would not be sufficient to maintain the needle path of reciprocation during machine operation. The construction of the present invention serves to augment the set screw 46 in clamping the needle bar frame in selected position of adjustment as well as to stabilize the lateral stud 28 on the needle bar to prevent the needle bar from turning, as will now be described.

A guide member 60 is provided having an upstanding arm 61 formed with a guide slot 62. At the bottom, the guide member 60 is formed with a transverse arm 63 protruding laterally on each side of the upstanding arm 61 as shown in FIG. 1, and offset slightly as shown in FIG. 2.

The transverse arm 63 of the guide member 60 is formed with a hole 64 for a fastening screw 65 which is threaded in a tapped hole 66 formed in an exposed face 67 of the lower arm 42 of the needle bar frame 43. Both the tapped hole 66 in the needle bar frame and the hole 64 in the guide member 60 are formed with slightly enlarged counter bores 68 to accommodate a small bushing 69 upon which the guide member may be turned relatively to the needle bar frame 43. The tapped hole 66, moreover, is formed on an axis intersecting the lengthwise axis of the needle bar 17 in the needle bar frame 43, and the bushing 69 is constrained in the transverse arm 63 of the guide member 60 so as to locate the fastening screw 65 equally spaced between parallel planes containing the side walls of the guide slot 62.

At each side of the hole 64 in the transverse arm of the guide member 60, a clearance hole 70 is formed through each of which passes a fastening screw 71 threaded into tapped holes 72 formed in the bracket arm 16 of the machine frame. The clearance holes 70 thus provide for limited angular adjustment of the guide member 60 about the bushing 69 to align the guide slot 62 parallel to the path of needle reciprocation in which position of alignment the fastening screws 65 and 71 can be tightened to secure the parts.

A rectangular slide block 80 journaled on the lateral stud 28 is constrained thereon by a spring clip 81 on the stud. The slide block is arranged slidably in the guide slot 62, which thus constrains the needle bar 17 from

turning and stabilizes the movement of the lower extremity 27 of the needle bar drive link 26.

When the sewing machine of this invention is to be assembled, or when the parts must be realigned after repair or replacement, the screws 65 and 71 are loosened to free the guide member 60 and the set screw 46 is loosened to permit the needle bar frame to be shifted until the needle is properly oriented relatively to the needle aperture 13 in the throat plate.

The set screw 46 is then tightened to secure the needle bar frame in desired position and the fastening screw 65 is turned lightly to draw the transverse arm 63 of the guide member 60 toward the exposed face 67 of the arm 42 on the needle bar frame 43 but not enough to interfere with free turning of the guide member 60 about the small bushing 69. The main shaft 20 is then rotated until the needle bar is elevated into the upper dead center position as shown in FIGS. 1 and 2. In this raised position of the needle bar, the slide block 80 on the lateral stud 28 will rise in the guide slot 62 and automatically turn the guide member 60 into a position until the guide slot 62 is parallel to the path of reciprocation of the needle bar 17. The fastening screws 65 and 71 are then fully tightened to clamp the guide member 60 to the sewing machine bracket arm and to the needle bar frame 43. The guide member 60 thus locks the needle for movement in a path properly aligned with the needle aperture, and also locks the guide member slot 62 in alignment with the path of needle reciprocation.

Having set forth the nature of this invention, what is claimed herein is:

1. A needle bar mechanism for a sewing machine having a machine casing including a work support with a needle hole and a bracket arm with a drive shaft, and needle reciprocating mechanism operated by said drive shaft, said needle reciprocating mechanism comprising a needle carrying bar with a lateral drive stud thereon, drive means operatively connecting said lateral drive stud with said drive shaft, a needle bar frame endwise slidably accommodating said needle bar and means shiftably supporting said needle bar frame in said

bracket arm for adjustment of the path of needle reciprocation in relation to said needle hole, a guide member for said lateral drive stud, means pivotally supporting said guide member on said needle bar frame on an axis intersecting the path of needle bar reciprocation, a guide slot formed in said guide member for slidably accommodating said lateral drive stud on said needle bar, said guide slot having spaced walls parallel to a line radiating from the axis of said pivotal support for said guide member on said needle bar frame, fastening means for securing said guide member to said bracket arm to lock said needle bar frame in selected position of adjustment of the path of needle reciprocation in relation to the needle hole, and means for clamping said guide member relatively to said sewing machine bracket arm in selected angular position of adjustment about the axis of said means pivotally supporting said guide member on the needle bar frame to align said guide slot with the path of reciprocation of said lateral drive stud.

2. A needle bar mechanism for a sewing machine having a machine casing including a work support with a needle hole and a bracket arm with a drive shaft, and needle reciprocating mechanism operated by said drive shaft, said needle reciprocating mechanism comprising a needle carrying bar with a lateral drive stud thereon, drive means operatively connecting said lateral drive stud with said drive shaft, a needle bar frame endwise slidably accommodating said needle bar, needle bar frame supporting means for securing said frame in said machine casing, said last named means including a mounting stud projecting outwardly from said needle bar frame and fastening means adjustably securing said mounting stud to said machine casing, a guide member disposed to cooperate in guiding relationship with said lateral drive stud and secured to said needle bar frame at a point spaced from said needle bar frame mounting stud, and means for adjustably fastening said guide member to said machine casing to lock said needle bar frame in selected position of adjustment of the path of needle reciprocation in relation to the needle hole.

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