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NEEDLE BAR JOGGING MECHANISMS FOR SEWING MACHINES

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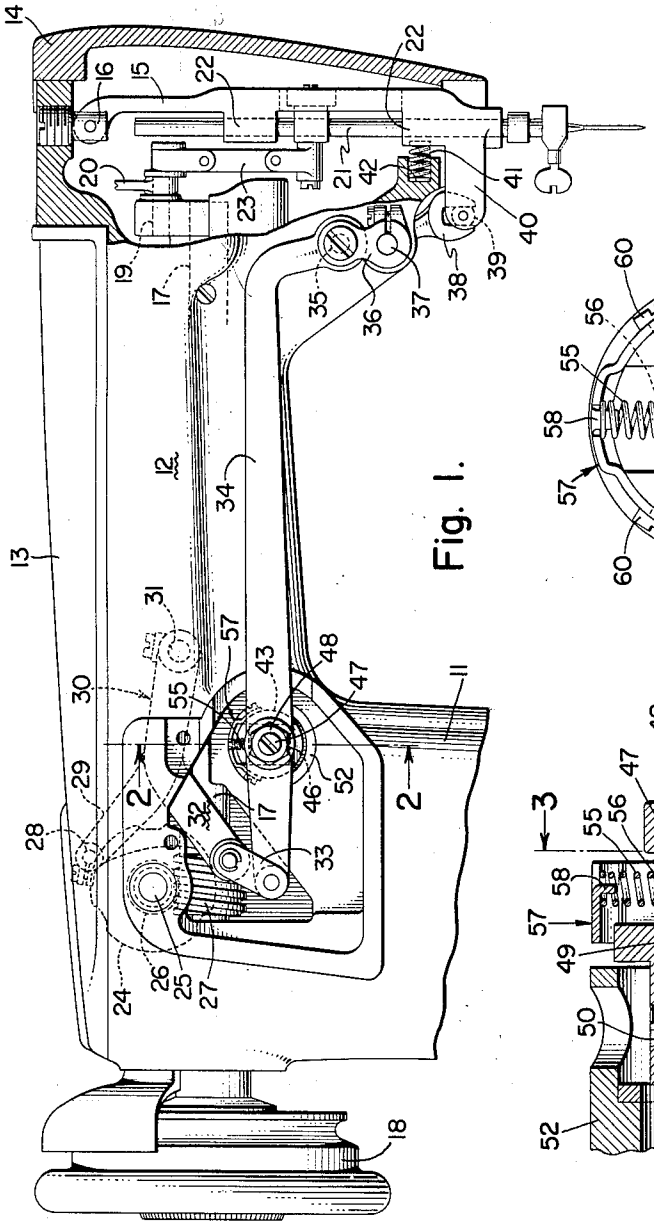


Fig. 1.

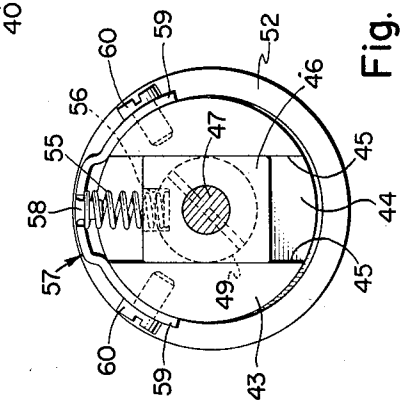


Fig. 3.

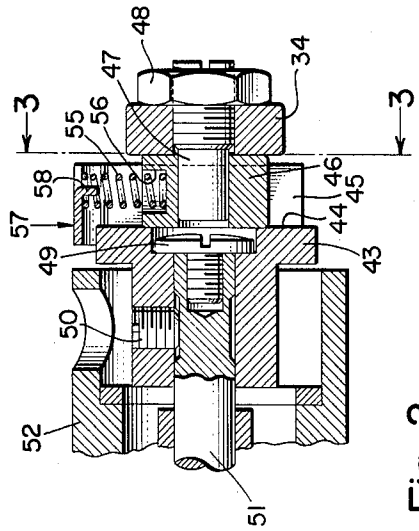


Fig. 2.

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NEEDLE BAR JOGGING MECHANISMS FOR SEWING MACHINES

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2 Claims. (Cl. 112—158)

This invention relates to needle bar jogging mechanisms for sewing machines, and more particularly to a needle bar jogging mechanism of the type in which the extent, or the "bight" as it is often called, of needle jogging movement may be varied by angular adjustment of a set of control connections including a slotted guideway tracked by a slide block associated with the needle bar jogging mechanism.

It is an object of this invention to provide a needle bar jogging mechanism capable of quicker and more accurate and consistent response to a control pattern cam than has been heretofore possible.

A further object of this invention is to provide a spring arrangement for biasing a work jogging mechanism into operative engagement with a pattern cam in which the frictional forces developed between the parts of the needle jogging mechanism are minimized so as not to interfere with the response of the needle jogging mechanism to the pattern cam.

With the above and other objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment thereof in which:

Fig. 1 represents a rear elevational view of a portion of a sewing machine with parts of the machine frame broken away to expose the needle bar jogging mechanism having my invention applied thereto,

Fig. 2 is an enlarged cross sectional view taken substantially along line 2—2 of Fig. 1, and

Fig. 3 represents a cross sectional view taken substantially along line 3—3 of Fig. 2.

In the drawings, this invention is illustrated as applied to the needle bar jogging mechanism of a zigzag sewing machine of the type illustrated in the copending U. S. patent application Serial No. 386,684, filed October 19, 1953, now Patent No. 2,756,703, dated July 31, 1956, to which reference may be had for a complete description of these features of the sewing machine which are not directly related to this invention.

Referring to Fig. 1, the machine frame includes a vertical standard 11 and a hollow bracket arm 12 closed by a top cover plate 13 and by an end cover plate 14. A needle bar gate 15, which is pivotally secured to a carrying pin 16 depending within the bracket arm, is disposed to swing in a substantially vertical plane toward and away from the machine standard. Journaled lengthwise in the bracket arm is a main-shaft 17 having fast at one extremity a balance wheel pulley 18 and at the other extremity carrying a counterbalanced crank pin 19. The crank pin is embraced by a conventional needle thread take-up lever 20 and also serves to impart endwise reciprocatory movement by means of an articulated driving link 23 to a needle bar 21 slidably supported in bearing lugs 22—22 on a needle bar gate 15.

Jogging motion is imparted to the needle bar from the rotation of the main-shaft of the machine by way of a pattern cam disk 24 carried on a cam shaft 25

journaled in the bracket arm transversely of the main-shaft and driven at a predetermined fraction of the speed of the main-shaft by a worm wheel 26 on the cam shaft which meshes with a worm 27 fast on the arm shaft. The periphery of the pattern cam disk is tracked by a follower pin 28 carried on an upturned arm 29 of a follower frame 30 which is pivoted, as at 31, to the bracket arm 12 of the machine frame and is formed with a downturned arm 32. A short link 33 is pivoted to the downturned arm 32 and also to one extremity of an elongated driving member 34 which extends along the bracket arm and is connected by a pivot pin 35 at its opposite extremity to an upstanding rock arm 36 fast on a rock shaft 37 journaled across the bracket arm 12. A downwardly extending rock arm 38 fast on the rock shaft 36 is bifurcated to embrace a slide block 39 pivoted to an arm 40 extending from the needle bar gate 15. A coil spring 41 extends within a socket 42 in the bracket arm and bears against the needle bar gate and urges the needle bar gate toward the right as viewed in Fig. 1.

The extent of needle jogging movement or "bight" as it is also called, may be varied by the angular adjustment of a guide element 43 formed with a slot 44 having opposite side walls 45—45 which act to constrain the motion of a slide block 46 disposed in the slot 44 and pivotally secured to the link 34 as by a pivot pin 47 threaded into the link and fastened by a lock nut 48 as best illustrated in Fig. 2. The guide element 43 is secured, as by a locating screw 49 and a set screw 50, to an adjusting shaft 51 which is carried in a tubular housing 52 fixed transversely in the bracket arm 12.

The above noted copending U. S. patent application Ser. No. 386,684 may be referred to for a disclosure of a manually operable means for effecting a change in the angular position of the adjusting shaft 51 and with it the guide element 43, as well as for maintaining these parts in the selected angular position relatively to the machine frame. Any other equally suitable means may, however, be used for effecting such angular adjustments.

Objectionable binding caused by friction and by the harsh action of the slide block 46 in the slot 44 of the bight and neutral position control means has been a problem presented when the above described type of needle bar jogging mechanism is used. In the present invention, however, the objectionable binding is eliminated by the use of a small coil spring 55 which is seated at one extremity in a socket 56 formed directly in one end of the slide block 46. The coil spring 55 is constrained in compression and disposed so as to act upon the slide block substantially parallel to the side walls 45—45 of the slot 44 by means of a spring constraining abutment member 57 formed with an inturned finger 58 adapted to extend within the coils of the spring 55 and formed with support limbs 59—59 adapted to be secured by fastening means 60—60 to the guide element 43 so as to support the spring constraining abutment member 57 in a position spanning one extremity of the slot 44.

As is best illustrated in Fig. 1, the pattern cam 24 is adapted to drive the cam follower frame 30, and therefore, the drive member 34 positively in only one direction. The coil spring 55 is disposed to act on the slide block 46 in a direction opposite to that in which the drive member 34 is positively driven by the pattern cam. The spring 55, therefore, acts to provide the return movement for the needle bar jogging mechanism and to maintain the cam follower in contact with the pattern cam.

Since with this construction, the spring 55 is disposed to act directly upon the slide block 46 in a direction parallel to the guide slot 44, binding of the slide block in the guide slot is minimized, and consequently, a far smaller return spring 55 can be used than has been here-

tofore necessary without sacrifice of the consistency of response of the needle jogging mechanism to the pattern cam.

Having thus set forth the nature of the invention, what I claim herein is:

1. In a needle jogging mechanism for a sewing machine having a frame, a needle bar gate pivoted in said frame, a driving member for said needle bar gate, operative connections between said driving member and said needle bar gate including a movable pivotal support for one extremity of said driving member, means driven by said sewing machine for oscillating said driving member about said pivotal support, interengaging control elements including a slide block and a guide member formed with a block accommodating slot for translating oscillatory movements of said driving member into endwise needle bar jogging movements, one of said control elements being carried by said sewing machine frame and the other being secured to said driving member, and a spring means confined between said guide member and said slide block and disposed to act in a direction substantially parallel to said block accommodating slot.

2. In a needle jogging mechanism for a sewing machine having a frame, a needle bar gate pivoted in said frame, a driving member for said needle bar gate, operative connections between said driving member and said needle bar gate including a movable pivotal support for one extremity of said driving member, a cam follower supported for vibratory movements and operatively connected to impart oscillatory movements to said driving member, cam means driven by said sewing machine and arranged in engagement with said cam follower to shift said driving member positively in one direction, interengaging control elements including a slide block and a guide member formed with a block accommodating slot for translating oscillatory movements of said driving member into endwise needle bar jogging movements, means for pivotally supporting one of said control elements on said sewing machine frame, means for securing said last mentioned control element rigidly with respect to said frame in any selected one of a range of angular positions thereon, said range totaling less than one half revolution of said control element, means pivotally securing the other of said control elements to said driving member, and a spring anchored on said guide member and in engagement with said slide block, said spring, in any angular position of said control members, being disposed to act substantially parallel to said block accommodating slot and in a direction substantially opposite that in which said cam shifts said driving member.

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