Jan. 18, 1938. C. W. MUELLER 2,106,106

TOP FEED MECHANISM FOR SEWING MACHINES

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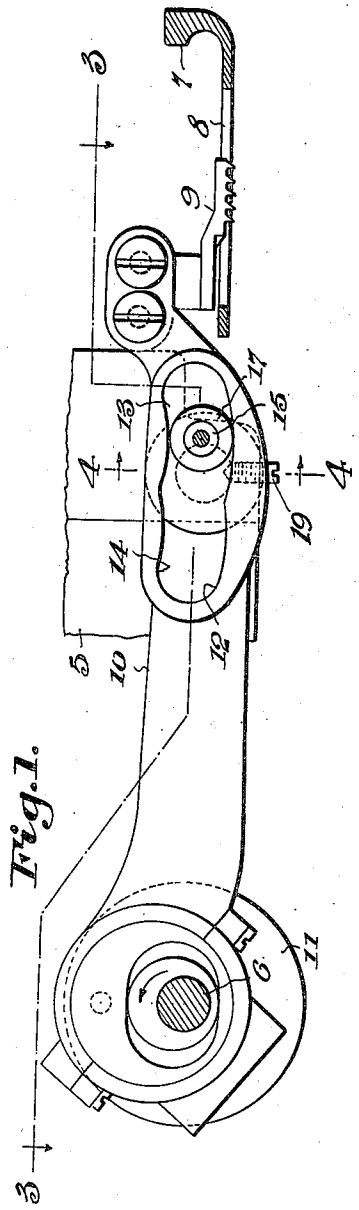


Fig. 1.

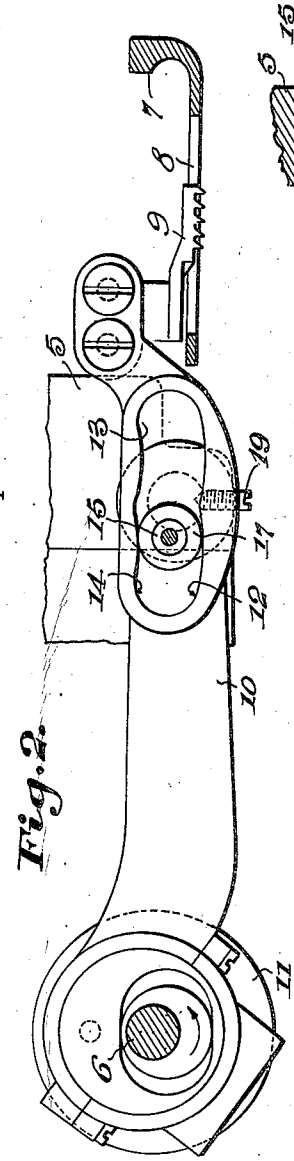


Fig. 2.

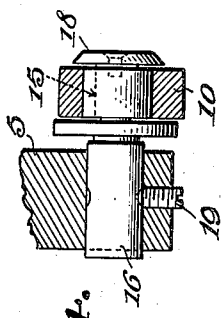


Fig. 4.

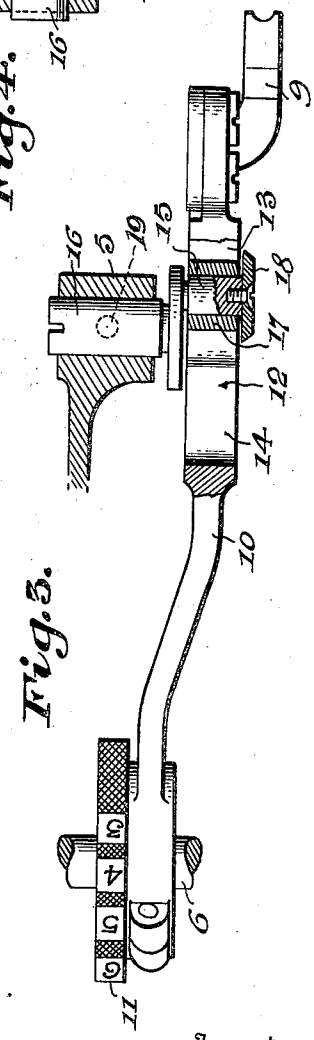


Fig. 3.

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TOP FEED MECHANISM FOR SEWING MACHINES

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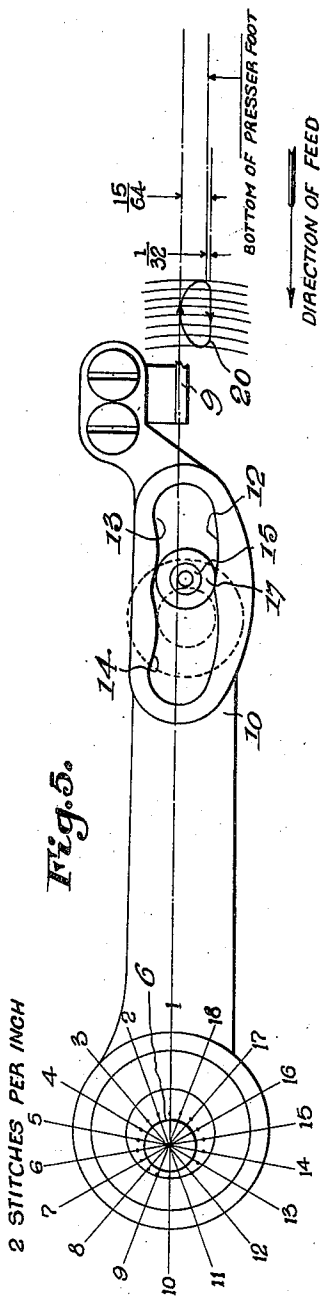


Fig. 5.

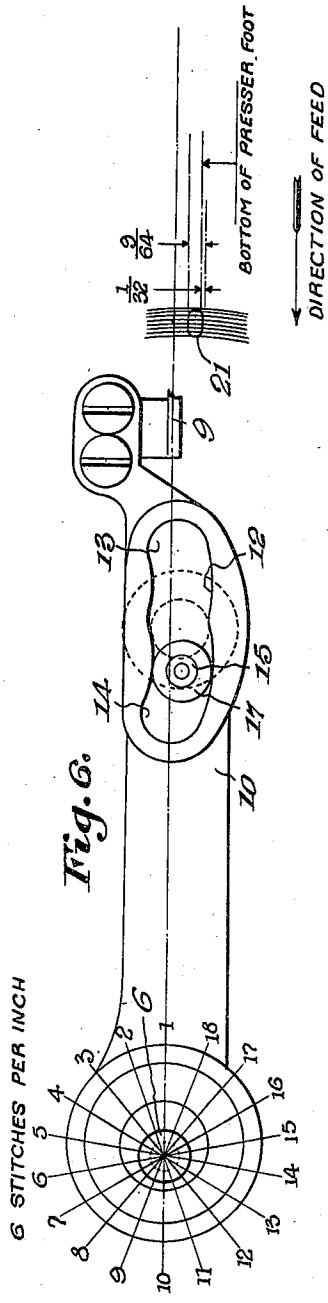


Fig. 6.

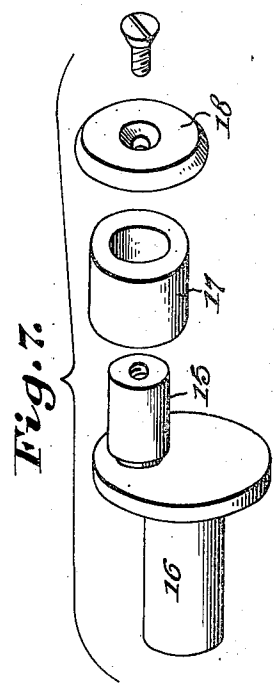


Fig. 7.

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UNITED STATES PATENT OFFICE

2,106,106

TOP FEED MECHANISM FOR SEWING MACHINES

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Application May 15, 1936, Serial No. 79,997

7 Claims. (Cl. 112—212)

This invention relates to new and useful improvements in sewing machines generally although more particularly to a top feed mechanism adapted for use in connection with blind stitch sewing machines of the single thread chain stitch type.

Heretofore, in blind stitch sewing machines of the type specified the top feed dog has been mounted on the front end of a lever which is mounted on the main frame of the machine for sliding pivotal movements and is actuated by an eccentric cooperating with the rear end of the lever. In this construction the fulcrum point for the lever is fixed and consequently the feed dog is given an elliptical 4-motion movement in which the feeding stroke of the dog follows an arcuate path, and in which the up and down movement of the dog is variable in proportion to the throw of the eccentric. The throw of the eccentric has heretofore been changed either by substituting a different eccentric or by providing a radially adjustable eccentric. With this construction it has been found that when short feed strokes are imparted to the feed dog the up and down movement of the feed dog is correspondingly diminished and consequently the feed dog would not clear the fabric especially if a heavy fabric is being stitched. It has also been found in feed mechanisms of this type that when the feed travel of the feed dog has been considerably increased the up and down movement to the feed dog will be correspondingly increased and the feed dog in its upward movement will be moved to such an extent as to interfere with the looper which cooperates with the needle in the usual way in forming the chain stitches.

The principal object of this invention is to provide a 2-point adjustable fulcrum for the lever whereby the proper height of the feed dog will be obtained when the feed is set for either long or short stitches and whereby the feeding stroke of the dog will follow a straight or horizontal path whereby the material will be fed properly during each cycle.

With the above and other objects in view which will more fully appear, the nature of the invention will be more clearly understood by following the description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation showing a top feed mechanism embodying the subject matter of my invention, and showing the adjustable fulcrum for the lever in one extreme position of adjustment,

Figure 2 is a similar view but showing the fulcrum in its other extreme position of adjustment,

Figure 3 is a horizontal section taken on the line 3—3 of Figure 1,

Figure 4 is a detail section taken on the line 4—4 of Figure 1,

Figure 5 is a side elevation of the mechanism but showing more or less diagrammatically the path of movement of the feed dog when the adjustable eccentric is set for 2 stitches per inch and the fulcrum is in its farthest position of adjustment from the eccentric,

Figure 6 is a similar view but showing the eccentric set for 6 stitches to the inch and the fulcrum located nearest the eccentric, and

Figure 7 is a perspective view of the adjustable fulcrum pin.

Like reference numerals designate corresponding parts throughout the several figures of the drawings.

In the drawings, 5 designates a part of the main frame of a blind stitch sewing machine and 6 the main shaft which is rotatably journaled therein. Disposed in front of the main shaft and rigidly attached to the main frame by any suitable means, not shown, is the usual presser foot 7 which is provided with a longitudinal feed slot 8. A feed dog 9 which is located above the presser foot is fixedly secured to the front end of a feed lever 10, and is adapted to operate in the slot 8 to feed the fabric rearwardly. An adjustable throw eccentric 11 is operatively connected to the rear end of the feed lever 10 in the usual manner and inasmuch as the construction of this eccentric is well known, it is thought unnecessary to specifically show or describe the same. The major axis of the feed lever 10 is disposed in a substantially horizontal plane.

Formed in the lever 10 adjacent the forward end thereof is a longitudinally extending fulcrum slot 12 comprising front and rear arcuate cam portions 13, 14 which are arranged in tandem and in open communication with each other. The arc of each cam portion is struck from a center located above the slot.

A fulcrum stud or pin 15 which is positioned in the slot 12, is eccentrically mounted on a pivot pin 16 which is mounted in the frame 5 for angular set adjustments. An anti-friction roller 17 is rotatably mounted on the fulcrum pin 15 for contact with the walls of either portion 13 or 14 of the fulcrum slot 12, and is held thereon by a disc 18 attached to the outer end of the fulcrum stud or pin 15.

The pivot pin 16 is adapted to be rotated 180° so as to position the fulcrum stud 15 in either the front cam portion 13 or the rear cam portion 14, and is adapted to be secured in either extreme position by a set screw 19 which is threadably mounted in the frame 5.

By reason of the arcuate cam portions 13 and 14 being each struck from a center located

thereabove, the feed dog is given a flat horizontal path of travel during its feeding stroke.

When it is desired to form long stitches, say two stitches per inch, the eccentric 11 is adjusted accordingly, the fulcrum pin 16 is positioned in the front cam portion 13 of the fulcrum slot 12, as shown in Fig. 5, and as a result the fed dog 9 will follow the path of movement indicated by the numeral 20 in Fig. 5. It will be noted that the feed lift will be $\frac{15}{64}$ inch, and that the path of travel of the dog during its feeding stroke will be flat and in a horizontal plane located $\frac{1}{32}$ inch below the foot.

When it is desired to form short stitches, say six stitches per inch, the eccentric 11 is adjusted accordingly, the fulcrum pin 16 is positioned in the rear cam portion 14 of the fulcrum slot 12, as shown in Fig. 6, and as a result the feed dog 9 will follow the path of movement indicated by the numeral 21. It will be noted that the feed lift will be $\frac{9}{64}$ inch, and that the path of travel of the dog during its feeding stroke will be the same as in the Fig. 5 adjustment, that is, it will be flat and in a horizontal plane located $\frac{1}{32}$ inch below the foot.

From the foregoing, it will be observed that when forming long stitches the feed dog will not interfere with the looper, that when forming short stitches the feed dog will clear the fabric, and that the feed dog in its feeding stroke will move in a flat horizontal plane.

It is of course to be understood that the details of structure and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim:

1. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and swingable about a fixed axis, means connected to the other end of the lever for imparting up and down and back and forth movements to the feed dog, and means for securing said fulcrum pin in an adjusted position.

2. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, said slot including two arcuate cam portions arranged in tandem and in open communication with each other, the arc of each portion being struck from a center located above the slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and movable relatively thereto to engage in either of said arcuate portions of said slot, means connected to the other end of the lever for imparting up and down and back and forth movements to the feed dog, and means for securing the fulcrum pin in either of its adjusted positions.

3. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, said slot including two arcuate cam portions arranged in tandem and in open communication with each other, the arc of each portion being struck from a center located above the slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and swingable about a fixed pivot to thereby engage in either of said arcuate portions of said slot, means connected to the other end of the lever for imparting up and down and back and forth movements to the feed dog, and means for securing the fulcrum pin in either of its adjusted positions.

4. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and swingable about a fixed axis, means connected to the other end of the lever and including an adjustable eccentric for imparting up and down movements to the feed dog and for imparting shorter or longer back and forth movements to the feed dog, means for pivotally mounting said fulcrum pin whereby the latter may be adjustably positioned towards or from the feed dog, and means for securing said fulcrum pin in an adjusted position.

5. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, said slot including two arcuate cam portions arranged in tandem and in open communication with each other, the arc of each portion being struck from a center located above the slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and movable relatively thereto to engage in either of said arcuate portions of said slot, means connected to the other end of the lever and including an adjustable eccentric for imparting up and down movements to the feed dog and for imparting shorter or longer back and forth movements to the feed dog, and means for securing the fulcrum pin in either of its adjusted positions.

6. A 4-motion top feed mechanism for sewing machines comprising the combination with a feed lever having a longitudinally extending fulcrum slot, said slot including two arcuate cam portions arranged in tandem and in open communication with each other, the arc of each portion being struck from a center located above the slot, of a feed dog connected to one end of said lever, a fulcrum pin located in the slot of the lever and swingable about a fixed pivot to thereby engage in either of said arcuate portions of said slot, means connected to the other end of the lever and including an adjustable eccentric for imparting up and down movements to the feed dog and for imparting shorter or longer back and forth movements to the feed dog, and means for securing the fulcrum pin in either of its adjusted positions.

7. A 4-motion top feed mechanism for sewing machines comprising the combination with a frame, of a main shaft journaled in said frame, a feed lever having a longitudinally extending fulcrum slot, said slot including two arcuate cam portions arranged in tandem and in open communication with each other, the arc of each portion being struck from a center located above the slot, a feed dog connected to one end of said lever, a pivot pin rotatably mounted in the frame and having a fulcrum pin eccentrically fixed thereto and engageable in the fulcrum slot of the lever, means mounted on the frame for retaining the pivot pin in either one of two positions of angular adjustment whereby the fulcrum pin will operate in either one of the arcuate cam portions of the slot, and an adjustable eccentric mounted on the main shaft for cooperation with the end of the lever opposite the feed dog.

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