May 26, 1959 C. R. BACKLIN 2,887,970

THREAD TAKE-UP FOR SEWING MACHINE

Filed April 15, 1958 2 Sheets-Sheet 1

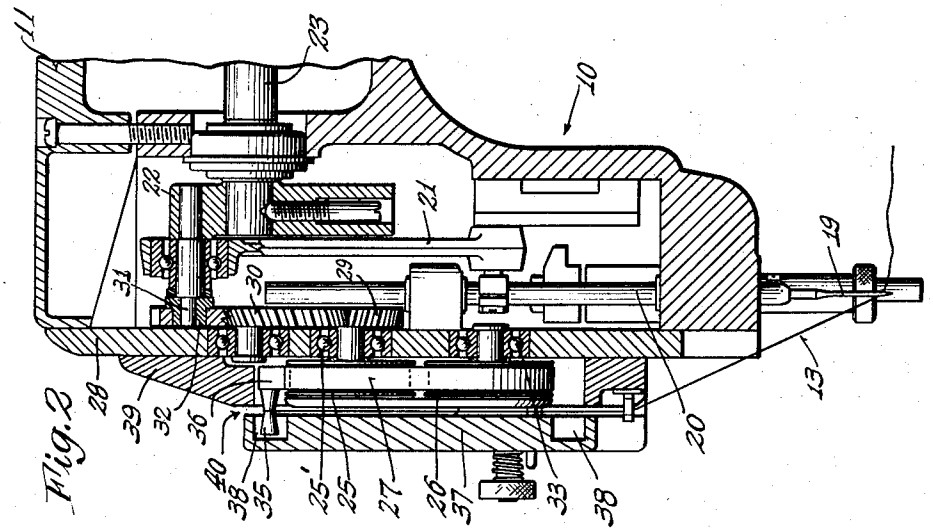


Fig. 2

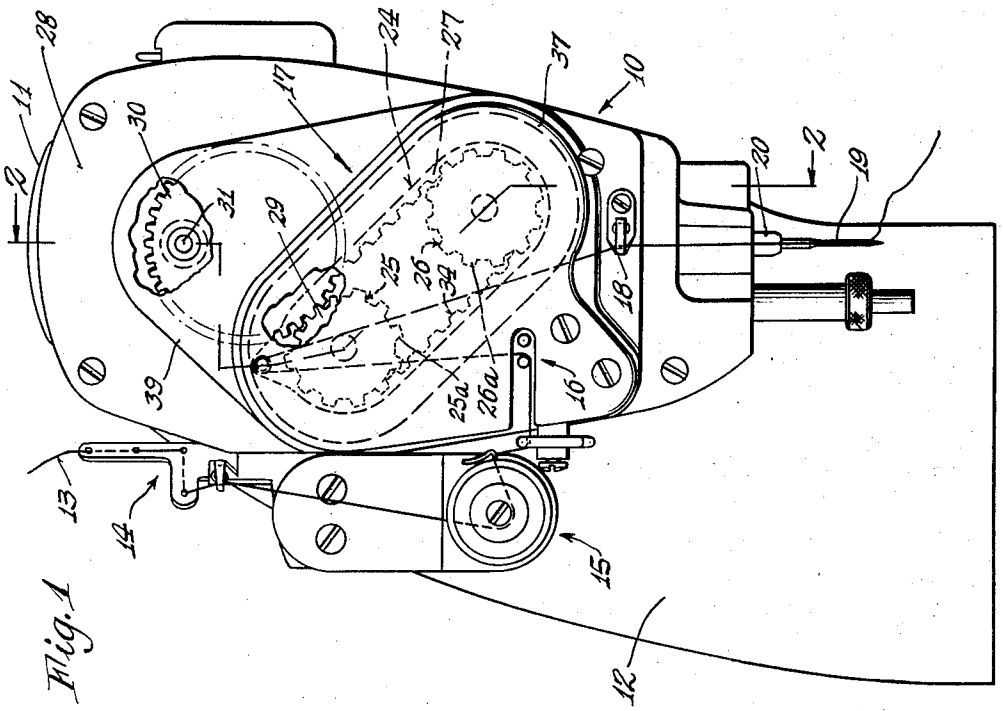


Fig. 1

INVENTOR.
Clarence R. Backlin
BY
Johnson and Kline
ATTORNEYS

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Fig. 6

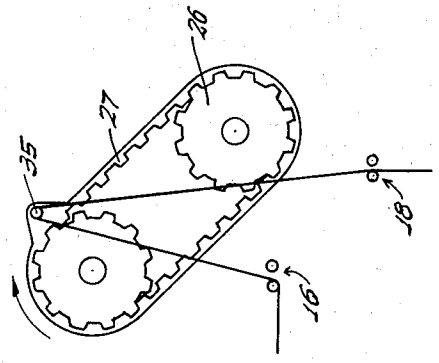


Fig. 5

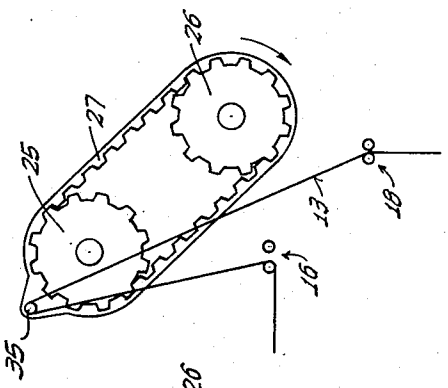


Fig. 4

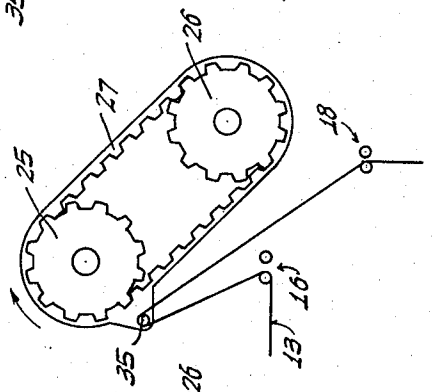


Fig. 3

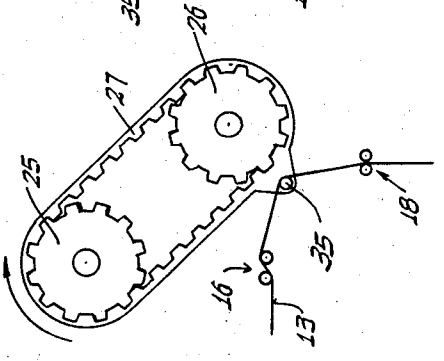


Fig. 8

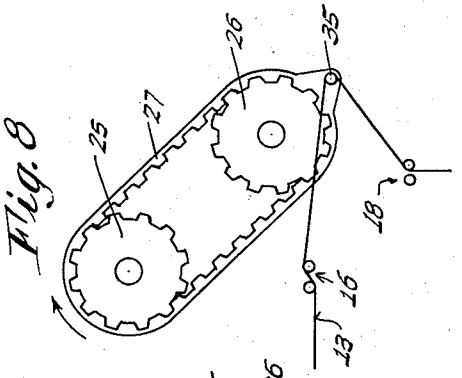
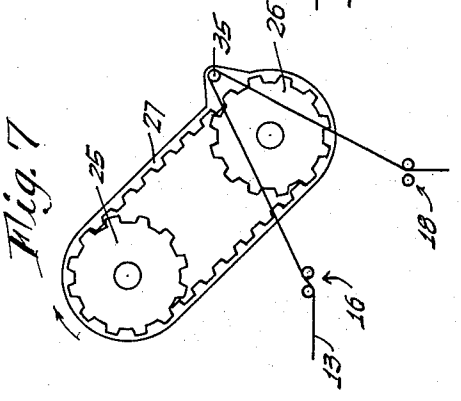


Fig. 7



INVENTOR.
Clarence R. Backlin
BY
Johnson and Kline
ATTORNEYS

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THREAD TAKE-UP FOR SEWING MACHINE

Clarence R. Backlin, Blauvelt, N.Y., assignor to Willcox & Gibbs Sewing Machine Co., New York, N.Y., a corporation of New York

Application April 15, 1958, Serial No. 728,670

10 Claims. (Cl. 112—248)

This invention relates to sewing machines and particularly to improved thread control means in the form of a rotary type take-up.

It is an object of the present invention to provide a rotary type take-up which has substantially the same action in the taking up of the thread during a stitch-forming cycle as is produced by the usual link take-up, however, without the objectionable features of the link take-up when operated at high speeds.

This is accomplished, according to the present invention, by providing flexible members, and more specifically, endless belts which are driven in timed relation to the operation of the needle bar during the stitch-forming cycle so as to control the take-up of the thread. While one or more flexible members may be used in conjunction with each other to produce the required take-up cycle, it is at present preferred to utilize a single endless flexible band or belt provided with one or more take-up members or pins for engaging the thread as it passes between a pair of fixed guides on the sewing machine.

A feature of the invention resides in the fact that the belt can be run at extremely high speeds and produce substantially the same take-up pattern as a link take-up without objectionable jars or shock encountered with the link take-up at the ends of its stroke.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawings in which:

Figure 1 shows an end view, partly broken away, of the machine with the take-up in position thereon.

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1.

Figs. 3–8 show diagrammatic views of the take-up in various positions in the stitch-forming cycle.

While the take-up of the present invention may be located in various positions on the sewing machine, such as on the arm facing the operator, it is herein illustrated as being mounted on the end face of the sewing head **10** which is carried at the end of the usual arm **11** supported above the base by the usual pedestal **12**.

As shown in Fig. 1, a thread **13** being sewn passes from a supply (not shown) through the usual guides **14** to a tension device **15** and through a fixed guide **16** to the take-up means **17**, then through a second spaced fixed guide **18** to a needle **19** carried by a needle bar **20** mounted on the head so as to be reciprocated through a stitch-forming cycle by a link **21** connected to an eccentric or crank **22** mounted on the needle bar drive shaft **23** driven from the main drive (not shown) for the machine. With this arrangement, the take-up means acts on the thread **13** as it passes between the two fixed guides **16, 18** so as to control the thread during the stitch-forming operation. The fixed guides **16** and **18** may be adjustably mounted on end plate **28** to alter the thread lead relationship to take-up belt pin **35** for more or less thread take-up action as required.

While several flexible belts or bands may be employed

for carrying a thread-engaging member through the required cycle, the invention is herein illustrated as having the take-up means formed by a single flexible belt **24** mounted to extend around a pair of pulleys or sprockets **25, 26** so as to be driven in timed relation with the movement of the needle during the stitch-forming cycle. Although the belt may be made of articulated links, wires or bands of metal or the like, it is herein illustrated as comprising a continuous band **27** of rubber or plastic material which may or may not be provided with the usual wire or fabric reenforcement embedded therein.

In the herein illustrated form of the invention the sprocket **25** is the driving sprocket and the sprocket **26** is an idler sprocket. The driving sprocket is mounted in bearings **25'** fixed on an end plate **28** on the head and is connected to a gear **29** which meshes with a second gear **30** mounted on the end plate in line with the axis of the shaft **23** and driven from a crank pin **31** connected to the crank **22** of the needle-operating mechanism so that the gear **29** and sprocket are rotated in predetermined timed relation to the operation of the needle during a stitch-forming operation. Preferably, the connection of the gear **30** to the crank pin is made through a resilient bushing **32** to facilitate the drive of the gear even though slight misalignment between the crank pin and gear may be present. The idler sprocket **26** is mounted for free rotation by bearing **33** on the end plate **28** and supports the belt in extended position as shown.

The sprockets have teeth **25***a*, **26***a* projecting from the periphery thereof and the belt has formed on the inner face thereof a series of teeth **34** cooperating with the teeth on the sprockets to drive and control the movement of the belt. Because of the length of the belt in the illustrated form of the invention, the sprocket through its gearing is rotated at twice the speed of the rotation of the needle bar shaft **20** and the belt is provided with twice the number of teeth as the sprocket so that the belt will make a single cycle of movement for each movement of the needle bar shaft. Of course, with belts of other lengths, the gear ratio can be modified so as to produce a single complete movement of the belt for each cycle of the needle bar.

In order to control the thread during the take-up cycle, the belt, as shown in the drawings, is provided with at least one laterally projecting pin **35** which is adapted to engage the thread extending between the two guides **16, 18** and to form a take-up loop in the strand as required. Although the belt can be made of such a thickness that the end of the pin can be embedded therein, in the illustrated form of the invention an enlargement **36** is provided on the outer surface of the belt to receive and anchor one end of the pin to the belt. In order to obtain correct timing relationship of projecting pin **35** with needle bar movement, the driving sprocket is held on the shaft in bearings **25'** by means of a set screw so that the driving sprocket can be set either fast or slow with movement of the needle bar.

While the other end of the pin could be supported by a second belt running synchronously with the belt **24**, in the herein illustrated form of the invention a cover plate **37** is provided in spaced relation to the head so as to overlie the take-up, and is provided with a guide groove **38** into which the end of the take-up pin projects. This cover plate will maintain the thread on the take-up pin during the slack movement of the thread.

If desired, a guide plate **39** can be mounted on the end plate **28** to overlie the gears and to guide the thread into the space **40** in which the take-up loop is located.

The cycle of the operation of the take-up is shown in Figs. 3–8. As shown in Fig. 3, the pin **35** is starting to take up the slack in the usual thread loop which has been

formed and passed about a bobbin (not shown). It continues to take up the slack in Fig. 4 and when it is in the position of Figs. 5 and 6 it is tightening the stitch in the fabric. As it leaves the position of Fig. 6, it will tend to give up thread from the take-up loop so as to form the loop to be passed about the bobbin during the next stitch-forming operation. This giving up of the thread from the take-up loop continues as the pin passes from the position of Fig. 6 through the positions of Figs. 7 and 8 and back to the position of Fig. 3 wherein the take-up of the thread in the loop passed over the bobbin starts and the cycle is repeated.

It will be noted that the thread will be accurately controlled by the take-up during the stitch-forming cycle and, furthermore, that at the time that the greatest tension is placed on the thread when the stitch is being tightened as shown in Figs. 5 and 6, the pin is fully supported by the sprocket wheel so as to exert an unyielding force in the tightening of the stitch.

The take-up of the present invention can be run at high speeds, in the neighborhood of needle speeds of 5,000–6,000 stitches per minute, without undue shock to the machine since the motion is a rotary motion rather than a reciprocating motion.

Preferably, the belt is held relatively taut between the sprockets and provides a smooth uniform movement. While guides can be provided to engage the outer surface of the belt in the straight stretch of the belt extending between the sprockets or pulleys to prevent whipping of the unsupported belt at this point, it has been found that such guides may be omitted when a reenforced, relatively inextensible belt is used.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a sewing cycle thereof, the improvement wherein said thread take-up means includes at least one elongate flexible member movable longitudinally and in a closed path and having thereon at least one thread engaging member to engage the thread disposed between said fixed guide means.

2. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a sewing cycle thereof, the improvement wherein said take-up means comprises an endless flexible belt having at least one thread engaging member carried thereby to engage the thread disposed between said fixed guide means, and means to drive said belt through a complete cycle for each sewing cycle of the needle.

3. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a stitch-forming cycle thereof, the improvement wherein said take-up means includes a flexible belt movable in a predetermined closed path and having thereon at least one thread engaging member positioned to engage the thread disposed between said fixed guide means, and means for driving said belt to cause said member to move through one complete cycle for each stitch-forming cycle.

4. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a sewing cycle thereof, the improvement wherein said take-up means includes at least one driving sprocket and a second sprocket spaced therefrom, and a flexible member supported by said sprockets and having means cooperating with said driving sprocket to move said flexible member in a closed path, said member having thereon at least one thread engaging member to engage the thread disposed between said fixed guide means.

5. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a sewing cycle thereof, the improvement wherein said thread take-up means includes at least one driving sprocket and an idler sprocket spaced therefrom, and a flexible belt supported by said sprockets and having means cooperating with said driving sprocket to move said belt thereby, said belt having thereon at least one thread engaging member, said member being in engagement with the thread disposed between said fixed guide means and being moved in a closed path for one complete cycle for each cycle of the sewing needle.

6. In a sewing machine having a thread take-up means disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a sewing cycle thereof, the improvement wherein said take-up means includes at least one driving sprocket having teeth on the periphery thereof and a rotatable idler spaced therefrom, and a flexible belt supported by said sprocket and idler and having teeth on the inner face thereof cooperating with the teeth on the driving sprocket to move said belt in a closed path, said belt having thereon a thread engaging member projecting from one side thereof to engage the thread disposed between said fixed guide means and to move said thread as required during said sewing cycle.

7. In a sewing machine having a thread tension device, thread take-up means disposed in predetermined relation to fixed spaced guide means and located between said tension device and a sewing needle and to be driven in timed relation with the movement of the sewing needle during a stitch-forming cycle thereof, the improvement wherein said thread take-up means includes one driving sprocket and a second sprocket spaced therefrom, and an endless flexible belt supported by said sprockets and having means cooperating with said driving sprocket to drive said belt in timed relation to the movement of said needle, said belt carrying a thread engaging member in position to engage the thread disposed between said fixed guide means during movement of said member through a closed path to cause said thread to move through a predetermined take-up cycle during each stitch-forming cycle.

8. A thread take-up means for a sewing machine adapted to be disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a stitch-forming cycle thereof comprising an endless flexible belt having at least one thread engaging member carried thereby in a predetermined path to engage the thread disposed between said fixed guide means, and means for driving said belt in predetermined timed relation to the stitch-forming cycle.

9. A thread take-up means for a sewing machine adapted to be disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a stitch-forming cycle thereof comprising an endless flexible belt having at least one thread engaging member carried thereby, means including a drive sprocket for supporting and driving said belt to move said member in a predetermined path to engage the thread disposed between said fixed guide means, and means for driving said sprocket in predetermined timed relation to the stitch-forming cycle.

10. A thread take-up means for a sewing machine adapted to be disposed in predetermined relation to fixed spaced guide means and driven in timed relation with the movement of a sewing needle during a stitch-forming cycle thereof comprising an endless flexible belt having

at least one thread engaging member carried thereby, driving and idler sprocket means supporting said belt, said belt having means cooperating with the driving sprocket to drive the belt and move the member carried thereby in a predetermined path to engage the thread disposed between said fixed guide means, and means

for driving said driving sprocket in predetermined timed relation to the stitch-forming cycle.

References Cited in the file of this patent

UNITED STATES PATENTS

2,358,493 Graesser ---------- Sept. 19, 1944