Sept. 14, 1948. S. J. KETTERER 2,449,302

THREAD FEEDING DEVICE

Filed Nov. 15, 1946

Fig. 1.

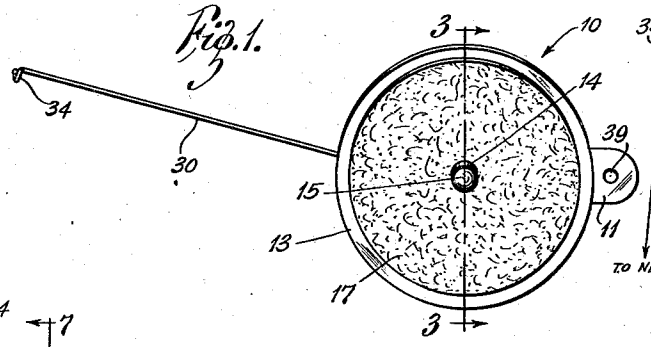


Fig. 8.

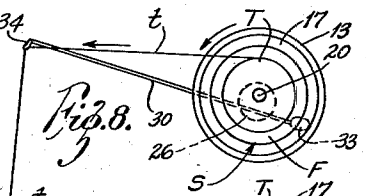


Fig. 9.

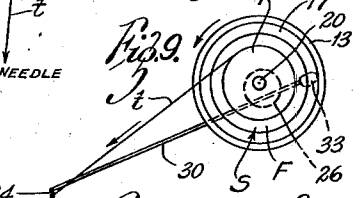


Fig. 2.

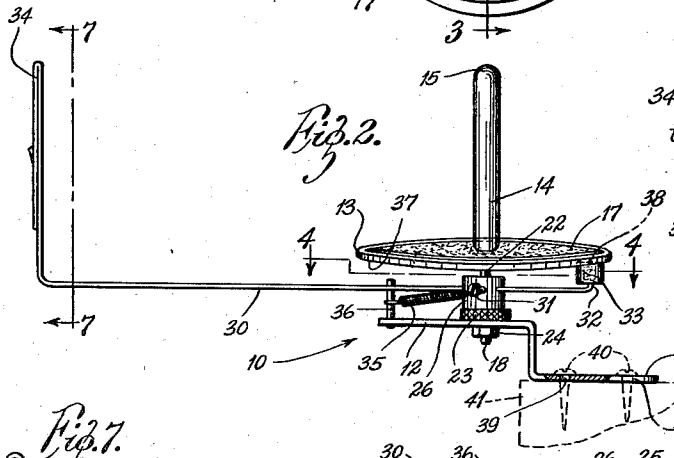


Fig. 10.

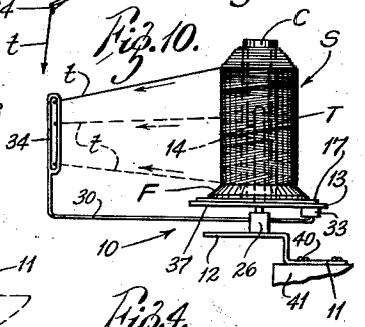


Fig. 7.

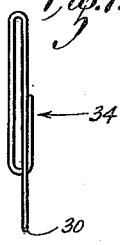


Fig. 4.

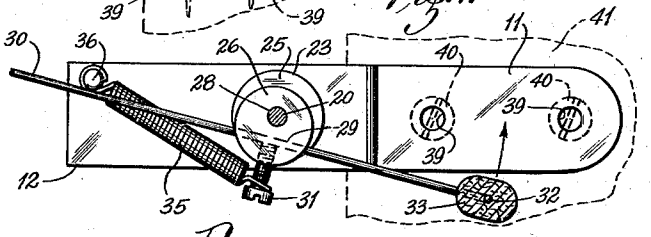


Fig. 3.

Fig. 5.

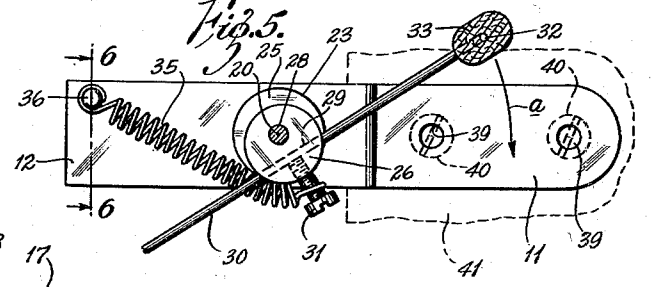
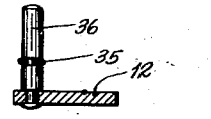


Fig. 6.



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THREAD FEEDING DEVICE

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9 Claims. (Cl. 242—156)

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The present invention relates to an improved thread feeding device particularly adapted for use in connection with sewing machines and the like in industry.

Thread for sewing machines in the shoe or clothing manufacturing industries, for example, is furnished on spools or reels, as is well known. These spools are adapted to be rotatably mounted on a vertical spindle or pin secured to a support, which may or may not be part of the sewing machine, but which is ordinarily located at a point some distance from the needle. In some instances, the spindle is dispensed with.

The mass of thread about the hollow core of the spool is usually wound in diagonal layers, the successive turns of which alternately cross each other from adjacent the top to the outstanding base flange of the spool, and vice versa, and the spool is mounted with the base flange thereof resting on a flat surface.

Assuming that the needle has been threaded and that a sewing operation is commenced, a sudden jerk is imparted to the length of unwound thread between the supply spool and the mechanism associated with the needle, the moment the slack has been taken up. Since the supply spool at this time is inert, the free length of thread has a tendency to snap, and frequently does. This hazard is present whenever the sewing machine, having been stopped, is again set in motion.

The principal object of the present invention is to overcome this disadvantage by the provision of means whereby a demand for more thread automatically imparts a rotary motion to the supply spool, while simultaneously maintaining a slight tension on the thread. In other words, at the start of each sewing operation, except the first, the length of thread between the supply spool and the needle mechanism is devoid of slack, and just as soon as the needle requires more thread, the supply spool is caused to rotate in unwinding fashion.

Another object of the invention is to automatically arrest the unwinding rotation of the supply spool immediately the demand for thread ceases. The absence of means to accomplish this in the normal manner of feeding thread results, as a rule, in forming a twist or series of convolutions in the length thereof between the supply spool and the needle.

Also, in cases where ordinarily the supply spool rests on a stationary base or stand and the thread is fed through an eyelet suspended above the spool, the latter does not revolve relative the base. However, thread taken off a spool in this manner

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has successive turns or convolutions imparted to its unwound portion as the feeding proceeds.

It is therefore also an object of this invention to provide means whereby this disadvantage in feeding is eliminated.

Also an object of the invention is the provision of means whereby the feed of thread from supply spools of various dimensions is facilitated and controlled from the initial mounting of the spool until its supply has been expended.

The foregoing objects and other features and advantages will be more fully set forth in the description to follow, reference being had also to the accompanying drawing in which is illustrated the preferred embodiment of my invention.

In said drawing:

Fig. 1 is a top plan view of my invention as it appears unattached to a support;

Fig. 2 is a front elevational view thereof attached to a stationary support indicated by broken lines;

Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 in Fig. 1 with the device attached, as indicated by the broken lines, to a stationary support;

Fig. 4 is an enlarged horizontal sectional view taken on the line 4—4 in Fig. 2;

Fig. 5 is a similar view with certain components in moved position;

Fig. 6 is a vertical sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is a similar view taken on the line 7—7 in Fig. 2;

Figs. 8, 9 and 10 are views of a diagrammatical nature designed to clarify the operation of the invention.

With particular reference to Figs. 1, 2 and 3, the device, generally indicated by the numeral 10, is shown to include a mounting bracket 11, an upwardly offset integral portion 12 of which is horizontally disposed and forms the supporting arm or base for a revolvable platform or turntable 13, preferably circular in form.

The turntable 13 is provided with an integral upwardly extending tubular portion 14 having a closed rounded upper end 15 in which, as shown, is seated a spherical bearing member 16. A disc 17, of felt or the like, is permanently secured to the upper surface of the turntable.

Rigidly supported on the longitudinal centerline of the arm 12 is a vertically disposed rod or spindle whose lower end 18 is threaded and whose upper extremity 19 is in contact with the ball bearing 16 embodied in the upper end of the tubular member 14.

The spindle comprises a portion 20 perpendicular to the horizontal arm 12, and a portion 21 angularly bent relative said perpendicular portion, the latter merging into the former at a point slightly below the lower face of the turntable, as indicated at 22 in Fig. 3.

As also best seen in Fig. 3, the upwardly extending portion 21 of the spindle slants toward the front of the device, and is maintained in such position by nuts 23 and 24 in engagement with the threaded lower end 18 thereof.

The nut 23 is preferably circular and provided with a smooth upper bearing face 25. It may be provided with knurling about its peripheral edge to facilitate its manipulation in the proper positioning of the spindle. The nut 24 is drawn up tightly against the undersurface of the arm 12. Obviously, with this arrangement, said spindle may be rigidly secured to the bracket arm in desired position.

From the foregoing it should be manifest that the arrangement is such that the turntable is freely revolvable about and supported by said spindle, although angularly disposed relative the horizontal, as shown.

Beneath the turntable 13, and spaced therefrom, is a cylindrical collar 26, having a smooth lower bearing face 27 in contact with the bearing surface 25, the collar resting upon and being supported for rotary movements by the nut 23. The collar 26 has a vertical bore 28 formed therein eccentrically to the vertical axis thereof. The perpendicular portion 20 of the spindle passes freely through said bore so that the collar may be rotated easily.

Referring now more particularly to Figs. 4 and 5, the collar 26 is seen to have formed therein a horizontal aperture 29 through which passes a relatively slender rod 30 secured in place by a setscrew 31.

One end of said rod terminates in an upwardly bent vertical portion 32 to which is permanently secured a pad 33 of leather or the like.

The opposite end of said rod terminates in an upwardly extending elongated loop or thread-guiding portion 34 of the configuration portrayed especially in Fig. 7.

The principal advantage inherent in the elongated loop construction is that it permits the thread to be withdrawn from the supply spool in the same manner as it was originally wound thereon, that is, successively from top to bottom or vice versa, as is understood. Also, to readily accommodate the output of supply spools of varying heights.

Reverting now to Figs. 4 and 5, and with reference also to Fig. 6, a tension spring 35 is seen to be fastened at one end to the setscrew 31 and at the other end to a vertical post or pin 36 rigidly secured in the arm 12. The post 36 extends upwardly to a plane above the horizontal plane of the rod 30, which in turn lies above the plane of said spring.

The spring 35 tends at all times to bias the rod 30 in a clockwise direction about the perpendicular spindle portion 20, so that, when the device is not in use, the pin 36 serves as an abutment to arrest further clockwise movement of said rod. Consequently, the position of the element 33 relative the underside 37 of the turntable is such that, in the Figs. 3 and 4 position, its upper surface 38 is in intimate contact therewith.

As will be explained in the description of operation, the member 33 has a dual function, in that it serves as the means for automatically causing the turntable to revolve at the start of a sewing operation, and as the means for automatically causing the turntable to come to a standstill at the end of a sewing operation.

Any suitable manner of mounting the device in proper spaced relation to the needle mechanism of a sewing machine may be selected. Preferably, the bracket 11 is provided with two or more apertures 39 which may receive screws or the like 40, shown in broken lines, through the medium of which it may be rigidly secured to a selected support 41, also shown fragmentarily in broken lines.

The operation of the mechanism will now be described, attention being directed particularly to Figs. 3, 4, 5, and to the schematic illustrations of Figs. 8, 9 and 10.

In the last-named view there appears in elevation a conventional spool of thread S in position on the turntable, the base flange F of which rests upon the felt disc 17. This disc plays an important role, as will appear. The hollow core C of the spool, about which the mass of thread T is wound, surrounds the tubular portion 14 of the turntable. The free end of the manually unwound length of thread *t*, having been passed through the loop guide 34, is assumed to have been properly inserted in the eye of the sewing machine needle, as is understood. An indefinite amount of slack in the unwound length of thread ordinarily exists at this time, and the parts are in the position diagrammatically portrayed in Fig. 8 and fully illustrated in Fig. 4.

Assuming that a sewing operation is now begun, the demand for thread quickly takes up the slack. Thereupon, the guide loop 34, on one end of the rod 30, is pulled forwardly, that is, in a counterclockwise direction, against the resistance of the spring 35. Simultaneously, the leather pad 33, in engagement with the underside of the forwardly inclined platform 13 moves rearwardly, that is, in a counterclockwise direction, also against the resistance of the spring.

Since the pad rotates in a horizontal plane, and the platform is tilted forwardly, the underside of the latter remains in firm contact with the former during approximately forty degrees of travel, so that the turntable is impelled to revolve counterclockwise also.

When the pad reaches the position shown in Figs. 5 and 9, that is, after it has traveled approximately forty degrees from its Fig. 4 position, its upper surface 38 loses contact with the tilted platform, and the turntable continues to revolve in response to the demand for thread until the demand ceases at the end of the sewing operation, at which time the brake means is applied, as will be explained.

The advantages inherent in this novel arrangement are apparent. The function of the felt disc 17 is to prevent rotation of the spool relative to the turntable. In other words, the friction obtaining between the bottom face of the flange F and the stationary surface it contacts during feeding operations in the conventional set-up is eliminated by the use of the present device. Here, the spool rotates with the turntable and is given a rotary impulse the instant the slack is taken up. All jerking is eliminated and breaking of the thread is obviated.

Further, while a sewing operation is in progress, the pull on the thread *t* is such as to counteract the tension of the spring 35, whereby the pad 33 is held clear of the platform 13. Thus the turntable is freely rotatable, and the unwinding of the thread from the spool is facilitated. The

guide loop 34 is elongated to permit up and down travel of the thread therein during feeding, as indicated in Fig. 10. Thus any tendency of the thread to twist is minimized.

Assuming now that the sewing operation has been completed and pull on the thread *t* ceases, the spring 35 immediately pulls the rod 30 and the pad 33 thereon in a clockwise direction, as indicated by the arrow *a* in Fig. 5. At once, the top 38 of the pad engages the rotating undersurface of the platform 13, automatically bringing the turntable to a standstill, and at the same time taking up any slack that may exist in the unwound length of thread between the spool and the needle mechanism.

It is thus manifest that the element which initially imparts a rotary motion to the turntable acts also as a brake in subsequently arresting further rotary motion thereof. It should also be obvious that the cycle described may be repeated intermittently until the thread on the supply spool has been depleted. Thereupon the bare spool may be easily removed and replaced with a loaded one.

While the invention has been described in connection with a sewing machine, it is understood that its use in conjunction with other apparatus requiring the feeding of thread, string, or the like is also contemplated.

Furthermore, it is to be understood that the precise mechanism illustrated and described is subject to modification without departing from the spirit of my invention.

What is claimed is:

1. A device for feeding thread to a sewing machine from a supply spool comprising a bracket adapted for mounting on a stationary support, an upwardly offset horizontally disposed arm integral therewith, a vertically disposed spindle rigidly secured to said arm, said spindle having a lower perpendicular portion merging into an upper angularly disposed portion, a turntable supported by and freely rotatable about the upper portion of said spindle, means for alternatively starting and stopping the revolution of said turntable automatically at the beginning and end respectively of a sewing operation, and a thread guide comprising an elongated loop member formed on one end of a horizontal rod included in said turntable starting and stopping means.

2. A device for feeding thread to a sewing machine from a supply spool comprising a bracket adapted for mounting on a stationary support, an upwardly offset horizontally disposed arm integral therewith, a vertically disposed spindle rigidly secured to said arm, said spindle having a lower perpendicular portion merging into an upper angularly disposed portion, a turntable supported by and freely rotatable about said upper portion of the spindle, said turntable including a platform portion and an integral upwardly extending tubular portion having a closed rounded upper end in which is seated a spherical bearing member, means for alternatively starting and stopping the revolution of said turntable automatically at the beginning and end respectively of a sewing operation, and a thread guide in the form of an elongated loop formed on one end of a horizontally disposed relatively slender rod included in said turntable starting and stopping means.

3. A device for feeding thread to a sewing machine from a supply spool comprising a bracket adapted for mounting on a stationary support, an upwardly offset horizontally disposed arm integral therewith, a vertically disposed spindle rigidly secured to said arm, said spindle having a lower perpendicular portion merging into an upper angularly disposed portion, a turntable supported by and freely rotatable about the latter portion of said spindle, said turntable including a platform portion and an integral upwardly extending tubular portion having a closed rounded upper end in which is seated a spherical bearing member, and a thread guide in the form of an elongated loop formed on one end of a horizontally disposed relatively slender rod whose opposite end is provided with means adapted to automatically engage the underside of the platform of said turntable at the beginning and at the end of a sewing operation.

4. A device for feeding thread to a sewing machine from a supply spool comprising a bracket adapted for mounting on a stationary support, an upwardly offset horizontally disposed arm integral therewith, a vertically disposed spindle rigidly secured to said arm, said spindle having a lower perpendicular portion merging into an upper angularly disposed portion, a turntable supported by and freely rotatable about the latter portion of the spindle, said turntable including a platform portion and an integral upwardly extending tubular portion having a closed rounded upper end in which is embedded a spherical bearing member in contact with the upper extremity of said spindle, a disc of felt or the like secured to the upper surface of the turntable platform, and a thread guide in the form of an elongated loop formed on one end of a horizontally disposed relatively slender rod whose opposite end is provided with means adapted to automatically engage the underside of the platform of said turntable at the beginning and at the end of a sewing operation.

5. A device for feeding thread to a sewing machine from a supply spool comprising a bracket adapted for mounting on a stationary support, an upwardly offset horizontally disposed arm integral therewith, a vertically disposed spindle rigidly secured to said arm, said spindle having a lower perpendicular portion merging into an upper angularly disposed portion, a turntable supported by and freely rotatable about said upper portion of the spindle, said turntable including a platform portion and an integral upwardly extending tubular portion having a closed rounded upper end in which is embedded a spherical bearing member in contact with the upper extremity of said spindle, a disc of felt or the like secured to the upper surface of said turntable platform, and a thread guide in the form of an elongated loop formed on one end of a horizontally disposed relatively slender rod whose opposite end is provided with a pad of leather or the like adapted to automatically cause the turntable to revolve at the start and to automatically cause the turntable to come to a standstill at the end of a sewing operation.

6. In a device for feeding thread from a supply spool to a sewing machine, a stationary bracket, an upwardly extending spindle rigid with an integral horizontal arm of the bracket, said spindle including a perpendicular portion and an angularly disposed portion, a turntable freely rotatable about and supported by the angularly disposed portion of said spindle, a collar spaced from and beneath the underside of the turntable freely rotatable about the perpendicular portion of said spindle, and means associated with the collar to automatically engage the underside of

the turntable at the start and at the end of each sewing operation.

7. In a device for feeding thread from a supply spool to a sewing machine, a stationary bracket, an upwardly extending spindle rigid with an integral horizontal arm of the bracket, said spindle including a perpendicular portion and an angularly disposed portion, a turntable freely rotatable about and supported by the angularly disposed portion of said spindle, a collar spaced from and beneath the underside of the turntable freely rotatable about the perpendicular portion of said spindle, and means associated with the collar to automatically engage the underside of the turntable at the start and at the end of each sewing operation, said means including a relatively slender horizontally disposed rod passing through an aperture in said collar, a setscrew to secure said rod in place, an upwardly bent vertical portion forming one end of the rod, a pad of leather or the like permanently attached thereto, an upwardly extending elongated loop portion forming the other end of the rod, an upwardly extending vertical pin terminating in a plane above the horizontal plane of said rod rigid with said bracket arm, and a tension spring extending in a plane below the horizontal plane of the rod with one end attached to said vertical pin and the opposite end thereof attached to said setscrew.

8. In a device for feeding thread from a supply spool to a sewing machine and including a tilted platform rotatively mounted on an angularly disposed portion of a spindle supported in a stationary bracket, means whereby rotary movement of said platform is initiated and subsequently arrested, said means including a cylindrical collar, a vertical bore formed therein eccentrically to the axis thereof, a horizontal aperture also formed therein, a relatively slender rod extending through said aperture, a setscrew to secure the rod against movement relative the collar, an upwardly bent vertical portion on one end of the rod, a pad of leather or the like secured thereto, an elongated upwardly extending

thread guide formed on the opposite end of said rod, and tension means secured at one end to said setscrew and at the opposite end to a member rigid with said spindle supporting bracket.

9. A device of the character described including a bracket adapted to be rigidly secured to a stationary support, an upwardly offset laterally extending arm integral with the bracket, a vertically disposed spindle having a lower perpendicular portion passing through said arm and an upper angularly disposed portion, threads formed on the lower extremity of said perpendicular portion, a nut in engagement therewith below said arm and a nut in engagement therewith above said arm, a smooth upper bearing surface on the latter nut, a collar provided with a smooth lower bearing surface in engagement with the upper bearing surface of said nut rotatively mounted on the non-threaded perpendicular portion of the spindle, a horizontally disposed slender rod passing through an aperture in said collar and secured therein by a setscrew, one end of said rod terminating in an upwardly extending thread guide in the form of an elongated loop, the other end of said rod terminating in an upwardly bent vertical portion, a pad of leather or the like secured to the latter, a vertical pin secured to the bracket arm adjacent one corner thereof, a tension spring having one of its ends secured to said pin and its other end secured to the setscrew, a turntable comprising a circular platform portion and an upwardly extending tubular portion having a closed rounded upper end, a spherical bearing seated therein, and a disc of felt or the like secured to the upper surface of said platform.

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The following references are of record in the file of this patent:

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