Nov. 29, 1966 N. M. WEISS 3,288,622

METHOD TO IMPART SUPPLENESS TO MONOFILAMENT THREAD

Filed Oct. 2, 1964

Fig. 1.

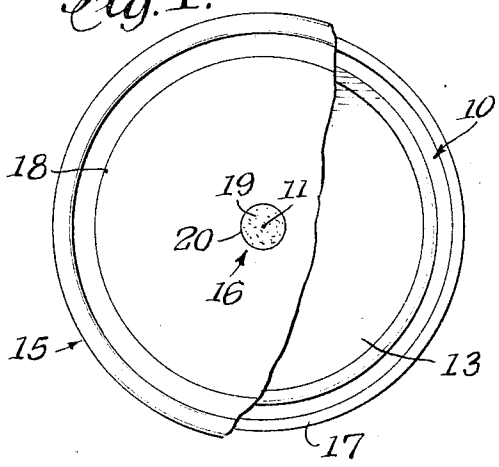


Fig. 3.

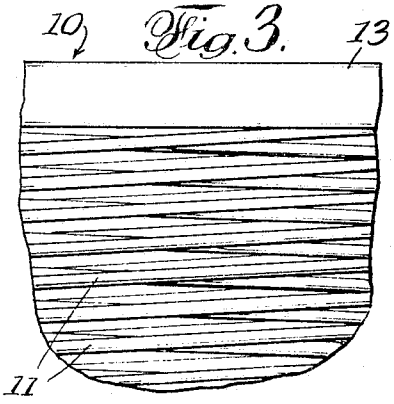


Fig. 4.

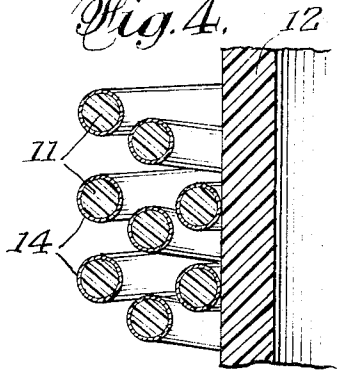


Fig. 2.

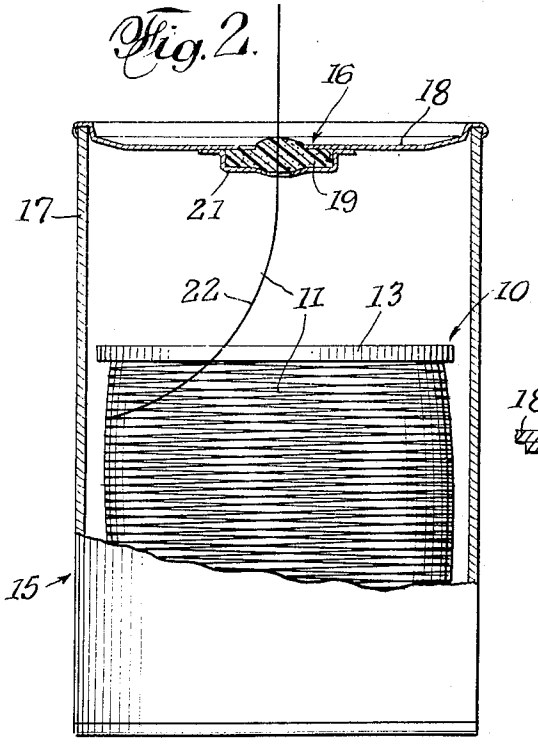
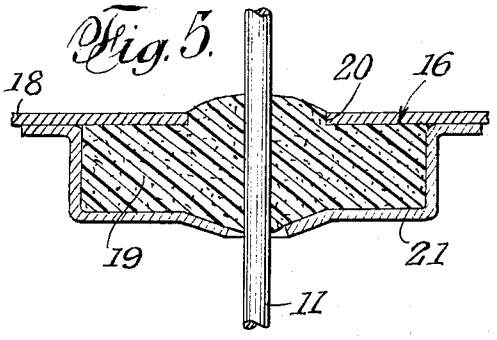


Fig. 5.



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United States Patent Office 3,288,622 Patented Nov. 29, 1966

3,288,622

METHOD TO IMPART SUPPLENESS TO MONOFILAMENT THREAD

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Filed Oct. 2, 1964, Ser. No. 401,189
4 Claims. (Cl. 117—7)

This application is a continuation-in-part of my application S.N. 264,101, issued as Pat. No. 3,152,351, dated Oct. 13, 1964.

This invention relates to a method for imparting suppleness to monofilament thread, especially nylon thread.

Monofilament nylon thread, used for machine stitching of upholstered items and items made of similar thick types of fabrics, presents many difficulties that are not present in multifilament thread. Such thread is ordinarily wound on spools or bobbins from which the thread is drawn off the end and then guided through eyes or apertures to a sewing machine. Such spools usually are not mounted to turn but rather are loosely held, even if supported on a spindle. Turning of the spool is of a casual nature.

Monofilament thread, fed from a spool in this manner, forms curlicues or spirals, as the same is unwound from the spool, this manner of feed causing the thread to crimp or kink, frequently snarling and knotting the thread and often causing breakage of needles and other damage. Also, thread tension cannot be properly controlled since crimping does not occur uniformly but varies widely, especially as the size of the convolutions of thread on the spool reduces, as the spool is being depleted.

The primary reason that monofilament thread presents these difficulties is that the same does not have the flexibility nor limpness of multifilament, twisted thread. Also, monofilament thread cannot untwist, as do multifilament threads, and feed off the spool as limber and supple as do multifilament threads.

Another object of the invention is to provide a method for feeding monofilament thread with smooth-feeding and coiling properties during rapid passage to and through a sewing machine from a spool.

Another object of the invention is to provide a method for feeding monofilament thread that provides suitable lubrication to soften the thread and obviate kinking thereof, and removing excess lubrication at the time of its feed to a sewing machine. Thus, the thread is kept well lubricated while being stored so the suppleness thereof is effectively obtained, and the thread is cleaned of excess lubricant so the same reaches the sewing station in a supple condition, yet wiped free of accumulations of lubricant. The method, therefore, provides for a clean sewing operation with a kink-free monofilament thread.

My invention also has for its object to provide a novel, economical and convenient method or process of superior utility.

The invention also comprises novel combinations of method steps, which will appear more fully in the course of the following description of the present process or method. The following specification merely discloses one embodiment of the present invention for carrying out the method and the same is given by way of example only.

In the drawing, like reference characters designate similar parts in the several views.

FIG. 1 is a top plan view, partly broken, of means for holding a spool of monofilament thread for feed thereof from the spool, the same illustrating a preferred means for carrying out the method of the invention.

FIG. 2 is a vertical sectional view thereof, the lower portion being shown in elevation.

FIG. 3 is an enlarged fragmentary side view of a spool of monofilament thread as wound according to the invention.

FIG. 4 is a still further enlarged cross-sectional view of the spool as in FIG. 3.

FIG. 5 is an enlarged sectional view of thread-lubricating means shown in FIG. 2.

The drawing shows a spool **10** of monofilament thread, the thread **11** being wound on a core **12** and retained between spool ends or flanges **13**. It is common practice to tight-wind multifilament thread, a practice that has been carried over to the transfer of monofilament threads from a bulk spool or bobbin to the spool **10**. Tightly wound monofilament thread is not only susceptible to kinking, as above explained, but the same also becomes compressed or indented due to mutual compression of the convolutions.

The monofilament thread **11**, as the same is transferred from a bulk spool, may be coated with a non-staining oily material which comprises a thread-softening and -lubricating solution, as hereinafter described. This coating is shown at **14**. This lubricant and softener may be applied to the thread by passing the latter through a porous mass saturated with said solution to pick up a thin coating that constitutes both a lubricant and thread-softener. The amount of solution that coats monofilament thread in the size range between No. 9 and No. 14 thread (such sizes representing thread diameter in thousandths of an inch), has been found to increase the weight of the thread by about two and one-half percent.

The desired solution comprises:

Petroleum mineral oil, approximately 85%.
Silicone—SF–97(100), approximately 10%.
Methyl alcohol, approximately 5%.

The mineral oil constitutes the carrier of the solution and is non-staining.

The silicone ingredient is a fluid marketed by General Electric Co. under the trade name SF–97(100). It is necessary only that this lubricating ingredient have a viscosity suitable for homogenization or blending with the mineral oil carrier. SF–97(100) silicone is noted as of No. 20 viscosity. The silicone fluid may be reduced in its proportion in the formula, and may be omitted in cases where the mineral oil provides desired lubricating.

The methyl alcohol is the nylon-softening agent and is preferred because of its low volatility.

Another feature is to wind the coated monofilament thread on the spool **10** in an open helical wind that minimizes contact among the thread convolutions, as shown best in FIGS. 3 and 4, thereby insuring that the coated convolutions of thread will have minimum contact and the coating **14** be retained with little impairment. FIG. 2 shows a spool **10** with the thread thereof coated, as in FIG. 4, and wound on the spool, as in FIG. 3.

As can be seen from a close inspection of FIGURES 2, 3, and 4, the thread **11** is wound with a plurality of helical turns or convolutions which are spaced apart over the entire height of the spool and define a helical space between adjacent convolutions. In FIGURE 3 it will be seen that this space is continuous from bottom to top of the spool and as shown in FIGURE 4, the successive layers of helically wound thread are pitched in opposite directions, the helical space in each layer of thread being similarly pitched so that the convolutions of one winding layer are angularly related to the convolutions of the winding layers immediately therebeneath and thereabove.

Instead of coating the thread as the same is being wound on the spool **10**, the same may be coated with the above-described solution after being wound on the spool. It may be desirable to provide a coating substantially in excess of that which will effectively soften the thread, thus guarding against drying out if storing of the device is longer than ordinary. Such excess is

beneficial in that it insures softening of the thread but much of this excess should be removed before the thread reaches the sewing station to enable a clean sewing operation.

The present thread-feeding means is shown as a container **15** in which the spool **10** is fixedly housed, and means **16** through which the thread **11** is drawn as the same is removed from the spool on its way to a sewing machine.

The container **15** houses the spool **10** which is affixed to the container bottom and is spaced from the container wall **17**. A removable cover **18** closes the container. It is through the cover that the thread **11** is preferably fed.

The means **16** is carried by said cover **18** and is here shown as a porous mass of material **19** that is preferably expanded polyethylene, a sponge-like material in the pores of which the above-described solution is retained by capillary attraction. Other compressible porous synthetic sponge material may be used, as well as felted (fibrous) material, providing the same will retain porosity, be compressible, and resist setting or compacting. Any suitable means may be used to hold the mass of material **19** across a hole **20** in the cover **18**. In this case, a retainer cup **21** is shown for this purpose.

It will be evident that the thread **11** on the spool **10** may be passed through the body of the means **16** on its way to a sewing machine and that the same will be subjected to tension imposed by the light friction of the sponge therearound and lubricating contact with said sponge. This additional coating imparts additional suppleness to the thread. Thus, as the thread unravels from the spool, the spiral curlicues, as exemplified at **22**, become straightened and the thread proceeds toward the sewing machine much limper or supple than it originally was, and with little or no tendency to crimp or kink.

The sponge **19**, or its equivalent, may be un-saturated, i.e. dry of solution, especially in cases where excess amounts of coating are applied to the wound thread. Such a sponge, as before, will provide tension on the thread and will also wipe excess coating from the thread. The sponge will, itself, become lubricated by this wiped off excess, during drawing of the thread from the spool. The sponge may become dry in cases of long non-use of the present means, but the excess of lubricant on the turns of thread on the spool will soon re-lubricate it once a sewing operation is started.

While I have illustrated and described what I now contemplate to be the best mode of carrying out my invention with respect to the apparatus, the same is, of course, subject to modification without departing from the spirit and scope of my invention. Therefore, I do not wish to restrict myself to the particular method steps or combination or sequence of steps described, but desire to avail myself of all equivalents or modifications of method and apparatus that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The method of feeding monofilament thread from a spool thereof that consists in

(a) coating said thread with a solution consisting essentially of a liquid lubricant and softening agent,

(b) open-winding the coated thread on the spool from which the same is to be fed to form helical spaced convolutions defining a continuous and uninterrupted helical space between adjacent convolutions that extends continuously over the height of the spool, the convolutions of one winding layer being angularly related to the convolutions of the winding layers immediately therebeneath and thereabove, and

(c) lubricating and softening the coated thread to render it supple as the same leaves the spool.

2. The method according to claim **1** in which the two lubricating and coating steps are carried out by passing the thread through a solution incorporating a softener and a lubricating agent in a stain-proof oil carrier.

3. The method of rendering a monofilament nylon thread supple to lessen its tendency to crimp during feed from a spool thereof, said method consisting in

(a) coating the monofilament thread in a solution of
petroleum mineral oil, approximately 85%,
silicone oil, approximately 10%,
methyl alcohol, approximately 5%,

(b) then open-winding said coated thread on the spool from which the same is to be fed to form helical spaced convolutions defining a continuous and uninterrupted helical space between adjacent convolutions that extends continuously over the height of the spool, the convolutions of one winding layer being angularly related to the convolutions of the winding layers immediately therebeneath and thereabove, and

(c) during feed of the thread from the spool, again coating the same in the mentioned solution.

4. The method of feeding monofilament thread to a sewing machine that consists in:

(a) open-winding a monofilament thread on a spool to minimize contact among the thread convolutions to form helical spaced convolutions defining a continuous and uninterrupted helical space between adjacent convolutions that extends continuously over the height of the spool, the convolutions of one winding layer being angularly related to the convolutions of the winding layers immediately therebeneath and thereabove,

(b) applying a coating consisting essentially of a solution of a lubricating and softening material to the thread while on the spool to coat the convolutions thereof,

(c) enclosing the spool of coated thread in a container and affixing the spool to the bottom of the container, and

(d) drawing the end of the thread through a resilient mass of material carried by the container to apply light tension on the thread as the same is unwound from the spool.

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