METHOD OF PROVIDING VARIABLE CROSS-OVER GROOVING FOR CABLE SPOOLING DRUMS

Fig. 3

Fig. 4

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AGENT
METHOD OF PROVIDING VARIABLE CROSS-OVER GROOVING FOR CABLE SPOOLING DRUMS

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ABSTRACT OF THE DISCLOSURE

A method of providing a variable position for the pitch area of a cable spooling drum which comprises removably securing a cylindrical sleeve to a drum core, said sleeve having a continuous circumferential groove thereon including alternate helical and parallel sections, severing the cylindrical sleeve longitudinally for defining a parallel section between the cuts, severing the sleeve for defining helical sections between the cuts, interchanging the severed parallel and helical sections and securing the sleeve on the drum core, thus providing an altered position for the pitch area.

This invention relates to improvements in cable spooling apparatus and more particularly, but not by way of limitation, to a method and means for providing a continuously combined parallel and helical circumferential groove around the outer periphery of a cable spooling drum in a manner wherein the position of the pitch area or helical portion of the groove on the outer periphery of the drum may be varied.

In the spooling of multiple layers of cable or line onto a drum core, it is important to control the winding of the initial layers of cable wound on the drum to provide a true and even winding thereof in order to maintain any control whatsoever over the outer winds or layers of the cable. A counterbalanced cable spooling system for providing a true and efficient winding of multiple layers of cable on a drum core has been developed by Franklin L. Le Bus, Sr., as disclosed in various Le Bus prior art patents, such as United States Letters Patent No. 2,620-996, issued Dec. 9, 1952, entitled "Cable Winding Apparatus," No. 2,708,080, issued May 10, 1955, entitled "Hoisting Drum," and No. 2,732,150, issued Jan. 24, 1956, and entitled "Balanced Cable Spooling." and No. 2,734-695, issued Feb. 14, 1956, and entitled "Balanced Cable Spooling." The spooling system developed by the aforementioned patents has substantially eliminated the disadvantages of prior grooving systems and as a consequence the counterbalanced spooling has greatly advanced the cable spooling art and has met with wide acceptance in the hoisting industry of all types.

Under substantially all normal cable spooling operation conditions the Le Bus spooling system is extremely efficient and effective. However, in some instances it has been found desirable to alter or move the position of the pitch area of the grooving on the periphery of the drum to vary the position of the cross-over area of the outer layers of the cable. For example, in spooling operations wherein the distance between the drum and the first fixed sheave receiving the cable therearound is extremely great, it may be found that if the cross-over areas of the second and succeeding layers of cable are spaced evenly or in a regular pattern around the periphery of the drum, it may impart a harmonic motion to the cable. This harmonic motion may create a detrimental whip action in the cable during the spooling operations. The cable may be of an exceedingly great length and as a result be spooled onto the drum in a great many layers. As the cable is used, it may become stretched or otherwise pulled in such a manner that the diameter thereof may become reduced or changed. When this occurs, the cross-over area of the upper layers of the wound cable may move around the drum. There are usually two cross-over areas provided around the drum, and under certain conditions one of the cross-over areas may move or change position on the drum at a faster rate of speed than the other cross-over area. It will be apparent that this will create an off-balance condition, and in order to prevent this disadvantage it may be desirable or preferable to move the position of one of the pitch areas on the drum after the cable has been in use for a sufficient length of time whereby the cross-sectional configuration thereof may have become altered. In other words, it may be desirable to lengthen the distance between the pitch areas after the drum has been in field use for a spooling operation.

The present invention contemplates a novel method and means for altering or changing the position of a pitch area in the grooving of a cable spooling drum, with the alteration being accomplished at the field location or site of the spooling operation. The cable spooling drum as originally offered or installed for a cable spooling operation comprises the usual drum having a cylindrical sleeve bolted or otherwise secured to the drum core with the sleeve being provided with the aforementioned Le Bus grooving on the outer periphery thereof. After the drum has been in use, if a condition should arise wherein it is considered desirable to alter the position of one or both of the cross-over areas, the grooved sleeve may be removed from the drum core and cut or severed in a longitudinal direction for removing one of the pitch areas therefrom. A second section may be severed or cut from one of the parallel sections of the grooving, with the parallel section corresponding in accurate dimension with the pitch section, or being of any desired accurate dimension. The grooved sleeve and severed sections of cable on a drum core has been developed by Franklin L. Le Bus, Sr., as disclosed in various Le Bus prior art patents, such as United States Letters Patent No. 2,620-996, issued Dec. 9, 1952, entitled "Cable Winding Apparatus," No. 2,708,080, issued May 10, 1955, and entitled "Hoisting Drum"; No. 2,732,150, issued Jan. 24, 1956, and entitled "Balanced Cable Spooling," and No. 2,734-695, issued Feb. 14, 1956, and entitled "Balanced Cable Spooling." The spooling system developed by the aforementioned patents has substantially eliminated the disadvantages of prior grooving systems and as a consequence the counterbalanced spooling has greatly advanced the cable spooling art and has met with wide acceptance in the hoisting industry of all types. The two segments may then be interchanged and replaced on the drum core. Of course, the end filler portions normally provided in combination with the grooving on the spooling drum may be appropriately reversed or rearranged in order to facilitate the guiding of the cable during the winding operation. The entire process for altering or changing the position of the pitch area may be readily accomplished at the site of the cable spooling operation without the necessity of returning the equipment to a manufacturing shop, or the like. Thus, substantially whatever or spacing of the cross-over areas may be provided as required by the particular circumstances of a cable spooling operation by rearranging the severed sections of the usual or standard grooved drum sleeve.
It is an important object of this invention to provide a method for providing substantially any desired spacing or arrangement of a pitch area for a grooved cable spooling drum.

It is another object of this invention to provide a grooved sleeve for a cable spooling drum which may be quickly and easily altered for varying the position of the pitch areas at the field or installation site.

Still another object of this invention is to provide a grooved sleeve for a cable spooling drum wherein the length of the parallel areas may be varied as desired subsequent to utilization of the drum and at a field installation site.

A further object of this invention is to provide a grooved sleeve for a cable spooling drum wherein the pitch area position may be varied as desired and which is simple and efficient in operation and economical and durable in construction.

Other and further objects and advantageous features of the present invention will hereinafter more fully appear in connection with a detailed description of the drawings in which:

FIGURE 1 is an end elevational view of a cylindrical sleeve for a cable spooling drum and provided with a suitable normal or standard Le Bus grooving thereon.

FIGURE 2 is a plan view of the spooling drum depicted in FIGURE 1.

FIGURE 3 is a view similar to FIGURE 1 depicting the sleeve subsequent to altering the position of a pitch area.

FIGURE 4 is a plan view of the spooling drum depicted in FIGURE 3.

FIGURE 5 is an evolved plan view of the spooling drum and sleeve depicted in FIGURES 1 and 2.

FIGURE 6 is an evolved plan view of the spooling drum and sleeve depicted in FIGURES 3 and 4.

Referring to the drawings in detail, and particularly FIGURES 1, 2 and 5, reference character 10 generally indicates a cable spooling drum comprising a cylindrical sleeve 12 preferably of any suitable inner diameter corresponding to the diameter of a drum core (not shown) and bolted or otherwise secured to the drum core between a pair of suitable drum flanges 14 and 16 as is well known. The sleeve 12 is provided with a plurality of parallel grooves 18 cooperating with a plurality of helical or tapered grooves 20 on the outer periphery thereof, which comprise a continuous combined parallel and helical groove around the sleeve 12 and extending from one of the flanges 14 to the other flange 16. As particularly shown in FIGURE 1, the parallel grooves 18 extend around the sleeve 12 in two separate sets A and B of parallel grooves 18 wherein groove set A is separated from set B by the two different sets of helical grooves 20 providing two separate control or pitch areas C and D. The parallel grooves 18 may extend around the circumference of the sleeve through any variable distance in accordance with the desired grooving system for the drum 10. The grooving may be of any suitable type as set forth in the aforementioned Le Bus patents.

Suitable oppositely disposed control bars or end fillers 22 and 24 are secured adjacent the inner face of the drum flanges 14 and 16, respectively, as is well known, for facilitating guiding of the cable into the grooving during the initial winding or layer of the cable around the sleeve 12.

Referring to FIGURE 5, it will be noted that the parallel grooves 18 of set A connect with the helical grooves 20 of set C at a point 26 which is the start of the lesser tapered surface 28 of the control bar 22. The helical grooves preferably of the set C preferably ends thereof at a point 30 with the parallel grooves 18 of set B. The opposite ends of the parallel grooves 18 of set B connect with the helical grooves 20 of set D at a point 32 which is the beginning of a second tapered surface 34, provided on the end filler or control bar 22.

The helical grooves 20 of set D extend into connection with the parallel grooves 18 of set A at a point 36.

The end filler 22 does not extend beyond the point 36 and this portion of the filler 22 is usually provided with a port or opening 38 (shown in dotted lines in FIGURE 5) for receiving the free end of the cable (not shown) therein in order to fasten or secure the cable to the drum 10 at the beginning of the spooling operation, as is well known.

The end filler or control bar 24 is substantially identical to the control bar 22, but is oppositely disposed therefrom. The control bar 24 is provided with a first lesser tapered surface 40, disposed within the pitch area C and oppositely disposed with respect to the tapered surface 28. A second tapered surface 42 is provided on the control bar 24 and oppositely disposed within the pitch area D with respect to the tapered surface 34. It is usually not necessary to provide a cable anchoring port in both of the control bars.

As hereinbefore set forth, the drum 10 as depicted in FIGURES 1, 2 and 5 is the usual standard cable spooling drum provided with the Le Bus grooving thereon. In most cable spooling operations, the grooving as herein described provides an efficient and effective control of the cable. However, if it becomes desirable to alter or vary the position of either or both of the pitch areas C and D at some time after the field installation of the drum 10, the sleeve 12 may be readily altered at the installation site to provide substantially any desired spacing therefrom.

Referring now to FIGURES 3, 4 and 6, the drum 10 as depicted therein comprises the flanges 14 and 16 having a sleeve 12a interposed therebetween. The sleeve 12a is constructed by an alteration of the sleeve 12 subsequent to removal thereof from the drum core and in the manner as will be hereinafter set forth.

One of the pitch areas, for example the section C, may be severed from the removed sleeve 12 by cutting the sleeve 12 longitudinally in any well known manner. A similar section, as indicated at E in FIGURE 6, may be severed from the section B of the sleeve 12, with the section E being of substantially the same accurate configuration or dimension as the severed section C. The sleeve may then be secured to the drum core with the positions of the severed sections E and C reversed whereby the pitch area C will be so positioned in the circumference of the sleeve 12a that the circumferential length of the parallel section A thereof is extended by the dimension of the section E with respect to the parallel section A of the original sleeve. The parallel section B of the sleeve 12a will be correspondingly shorter in circumferential length than the parallel section B of the sleeve 12, since the parallel section E has been removed therefrom.

It will readily be apparent that the end fillers 22a and 24a of the drum 10 must be altered in accordance with the alteration of the spacing of the parallel and helical sections of the sleeve 12a. In order to accomplish this, the portion of the end filler 22a provided in the section E may be removed from the original position thereon adjacent the flange 14 and placed at the opposite side thereof adjacent the flange 16, where the removed portion of the end filler 22a may be incorporated into the end filler 24a, as shown at 44 in FIGURE 6. Thus, the sleeve 12a may be quickly and easily converted into the sleeve 12a without the necessity of returning the drum 10 to a manufacturing shop or the like.

Of course, whereas the particular embodiment depicted herein shows the severed sections C and E as being of substantially equal circumferential diameter so that it may be understood that the section E may be of substantially any circumferential length in order that the section C may be moved around the circumference of the sleeve 12a to substantially any desired position therefor.
both pitch areas C and D may be similarly moved around the circumference of the sleeve, if desired.

In order to provide a parallel grooved sleeve 12 longitudinally prior to the original installation thereof on the drum core. In this instance the parallel sections A and B may be severed longitudinally, such as indicated by the lines 50, 52, 54 and 56 in FIGURE 5, to provide a plurality of arcuate portions or segments. Of course, the pitch areas C and D may also be severed from the sleeve 12. The segments may be of substantially any desired circumferential or arcuate length, and, of course, the greater the variety of arcuate segment lengths, the greater the possible variety of arrangement of the segments around the drum core.

For the initial or orginal installation, the independent arcuate segments may be bolted or otherwise secured around the drum core and so arranged as to provide a continuous combined parallel and helical groove as hereinafter referred to as a Le Bus grooving system. If it becomes desirable to alter the position of the sleeve, severing the appropriate independent arcuate segments of the sleeve 12 may be unbolted or removed from the drum core and rearranged or interchanged to alter the position of the pitch area. This eliminates the necessity for removing the entire sleeve 12 from the drum core during the pitch area altering operation.

From the foregoing it will be apparent that the present invention provides a novel grooved sleeve for cable spooling operations which may be readily altered at the cable spooling site for varying both the position and length of either one or both of the pitch areas in the event such becomes desirable during a cable spooling operation. The novel grooved sleeve may be severed longitudinally whereby the pitch area to be altered may be reversed or interchanged with a parallel area. The position of the pitch section may be readily altered to substantially any desired spacing around the periphery of the drum between the pitch areas, thus providing a drum for substantially any cable spooling condition which may arise at the site of the drum installation. The novel sleeve and method of alteration is simple and efficient in operation and economical and durable in construction.

Changes may be made in the combination and arrangement of parts hereunto set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims without departing from the spirit of the invention.

What is claimed is:

1. A method of providing a variable position for a pitch area of a cable spooling drum which comprises providing a cylindrical sleeve for a drum core, said sleeve having a continuous circumferential groove thereon including alternate helical and parallel sections, severing the grooved sleeve longitudinally to define a helical grooved section between a pair of severing cuts, removing the helical grooved section, and severing the grooved sleeve longitudinally to define a parallel grooved section between a pair of severing cuts, said parallel grooved segments substantially corresponding in arcuate dimension with the severed helical section, removing the parallel grooved segment from the grooved sleeve, and interchanging the position of the severed helical grooved section and parallel grooved segment in the sleeve to provide an altered position for the pitch area on the drum core.

2. A method of altering the pitch area of a cable spooling drum which comprises providing a cylindrical sleeve for a drum core, said cylindrical sleeve having a continuous circumferential groove thereon including alternate helical and parallel sections, severing the sleeve by no more than two severing lines to define at least a portion of one helical grooved section between a pair of severing cuts, removing the sleeve by no more than two severing lines to define a parallel grooved segment between a pair of severing lines, and interchanging the severed helical grooved portion and parallel grooved segment in the grooved sleeve to provide an altered pitch area for the drum core.

3. A method of providing a variable position for a pitch area of a cable spooling drum which comprises removably securing a grooved cylindrical sleeve to a drum core, said grooved sleeve being provided with alternate parallel sections and pitch sections, removing the grooved sleeve from the drum core, severing the grooved sleeve longitudinally by no more than two severing cuts to define at least one pitch section between a pair of severed cuts, removing the severed pitch section from the sleeve, severing the grooved sleeve by no more than two severing cuts to define a parallel segment between a pair of severed cuts, removing the parallel segment from the sleeve, interchanging the helical and parallel segments in the sleeve, and securing the sleeve and interchanged section and segment to the drum core to provide an altered position for at least one pitch area on the drum core.

4. A method of providing a variable position for a pitch area of a cable spooling drum having a drum core and oppositely disposed drum flanges and which comprises providing a grooved cylindrical sleeve having an inner diameter substantially corresponding to the diameter of a drum core, said grooved sleeve having a continuous circumferential groove including alternate parallel sections and helical sections thereon, removably securing the grooved sleeve around the drum core, providing end fillers for the grooved sleeve for facilitating guiding of a cable in the initial layers wound around the grooved sleeve, removing the sleeve and end fillers from the drum core, severing the sleeve longitudinally by no more than two severing cuts to define a helical grooved segment between a pair of severing cuts, removing the helical grooved segment and corresponding end filler portions from the sleeve, severing the sleeve longitudinally by no more than two severing cuts to define a parallel grooved segment between a pair of severing cuts, removing the parallel grooved segment and corresponding end filler portions from the sleeve, reversing the position of the severed helical and parallel segments in the circumference of the sleeve, rearranging the positions of the removed and end filler portions, and securing the altered sleeve and end filler portions to the drum core to provide an altered position for at least one pitch area thereon.

5. A method providing a variable position for a pitch area of a cable spooling drum which comprises removably securing a plurality of arcuate segments around the outer periphery of a drum core, said segments being collectively provided with a continuous circumferential groove having alternate helical and parallel sections and extending around the outer peripheries of the segments with at least one of said segments defining a helical grooved section and a plurality of said segments defining parallel grooved sections, and interchanging the position of the helical grooved section with a selected parallel arcuate segment of substantially the same arcuate dimension around the drum core to provide an altered position for the pitch area on the drum core.

References Cited

UNITED STATES PATENTS

2,734,695 2/1956 Le Bus - 242-117

GEORGE F. MAUTZ, Primary Examiner.