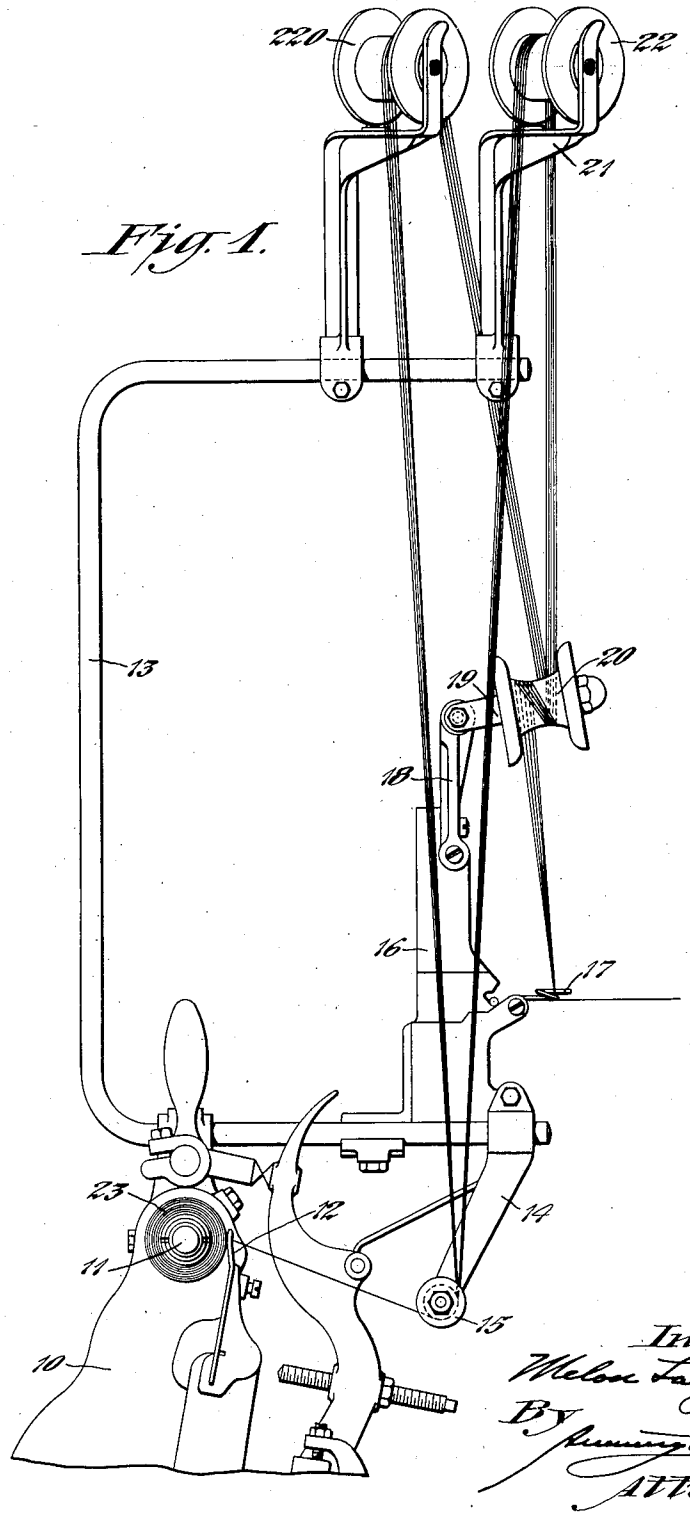
July 17, 1934. M. LANGSTRETH 1,966,507

MACHINE FOR WINDING YARN THREAD AND THE LIKE

Filed Nov. 13, 1931 2 Sheets-Sheet 1

Fig. 1.



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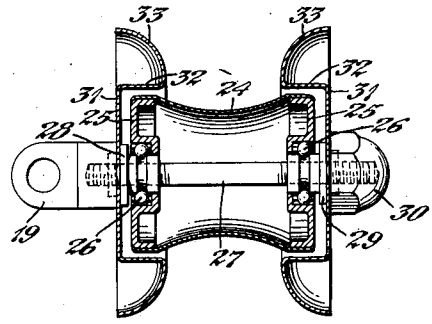

Fig. 3.

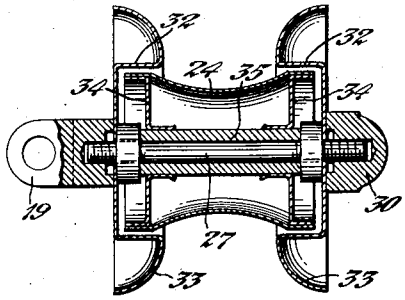

Fig. 4.

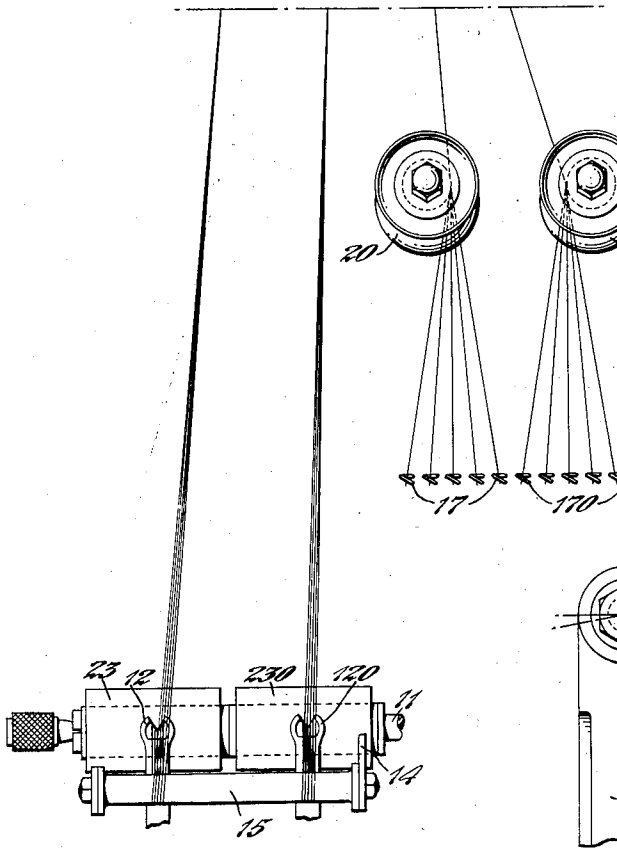

Fig. 2.

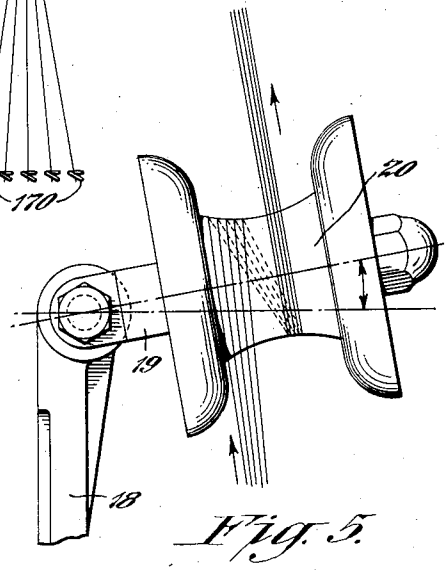

Fig. 5.

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UNITED STATES PATENT OFFICE

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MACHINE FOR WINDING YARN THREAD AND THE LIKE

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Application November 13, 1931, Serial No. 574,740
In Great Britain November 15, 1930

7 Claims. (Cl. 242—42)

This invention is for improvements in or relating to machines for winding yarn thread and the like, and is concerned with machines for laying a plurality of strands of yarn or the like side by side in closely related formation on a winding spindle. The invention has for one of its objects to ensure that when the strand material breaks there shall be readily available an adequate length of material for piecing up so as to avoid the need for reversing the wound package to discover the broken end. The invention also has for an object to prevent the formation of bunch knots.

According to the invention, there is provided between the yarn supplies and the winding spindle a tension-distributing device, and means for leading the strands under tension in separated formation from their separate supplies to said tension-distributing device and causing them so to traverse the latter that said strands take up a closely related formation in which formation the strands leave the said device and pass to the winding spindle. Conveniently the said tension-distributing device affords a circular surface for the strands, and the latter are given a complete turn or substantially complete turn therearound, and it is preferred that the said tension-distributing device shall have a conical or like surface (for example a concave surface) arranged to cause the strands to take up a closely related "tape" formation during passage over said surface.

Up to the stage of reaching the tension-distributing device each strand is separately tensioned and receives no assistance from its neighbours in withstanding the tension, but in the closely related formation the tension is distributed over and shared by all of the strands collectively because of the passage of the strands around the tension-distributing device. The latter may be said to serve to divide the individually-tensioned portions of the yarn from the collectively-tensioned portions thereof. Thus if a break occurs, it will occur before the strand in question leaves the tension-distributing device and therefore, since the path of the material from the tension-distributing device to the winding spindle may readily be made devious or long, an adequate length of loose strand material will be available. The mechanism, according to the present invention, will ensure that strands liable to break will do so at a predetermined point in the length of passage from the supply to the package being wound, which point is situated well away from the winding spindle. It is of course preferable that no breaks should occur, but as this ideal is not obtainable, it is the next best thing to have those breaks occur at a convenient spot. This is achieved by the present invention.

The tension-distributing device may be a roller, and certain features of the present invention are concerned with constructions of roller suitable for the present purpose. Other features of the invention are concerned with the mounting of the tension-distributing device and its location with respect to other parts of the machine, these features being more particularly described hereinafter.

For a more complete understanding of the invention, there will now be described, by way of example only and with reference to the accompanying drawings, certain constructions of mechanism according to the invention. It is to be understood, however, that the invention is not restricted to the precise constructional details set forth.

In these drawings—

Figure 1 is an end elevation of the upper part of a winding machine to which mechanism, according to the present invention, has been added;

Figure 2 is a front elevation of certain of the parts shown in Figure 1;

Figure 3 is an enlarged longitudinal sectional view of one form of tension-distributing roller according to the invention;

Figure 4 is a corresponding view of another form of tension-distributing roller according to the invention, and

Figure 5 is a detail view of certain of the parts shown in Figure 1, but on a larger scale.

Like reference numerals indicate like parts throughout the drawings.

Referring first to Figures 1, 2 and 5, there is shown at 10 the upper portion of the main frame of a winding machine. The winding spindle is shown at 11 and the traversing yarn guide at 12, all these parts being of well-known construction. Supported from the top of the machine frame 10 is a bracket 13 which, at its lower end, carries a downwardly-extending arm 14 supporting a yarn-guiding roller 15. The bracket 13 also carries at its lower end a mounting 16 on which are supported a number of breakage levers or stop-motion feelers 17. These levers 17 are arranged in group formation, as is clearly seen from Figure 2, and there is one breakage lever for each of the strands of yarn being dealt with by the machine. At the upper end of the mounting 16 there is an angularly adjustable arm 18 carrying, also in an angularly adjustable fashion, the spindle-extension 19 of a tension-distributing roller 20. At the upper end of the bracket 13

there is secured a mounting 21 for a yarn-guiding roller 22.

In the construction shown in the drawings certain parts of the mechanism are duplicated. That is to say, there are two groups of breakage levers, namely 17 and 170, two tension-distributing rollers, namely 20 and 200, and two upper yarn-guiding rollers, namely 22 and 220 so that the machine will wind on the winding spindle 11 two yarn packages, namely 23 and 230. For this purpose of course there must be two traversing yarn guides 12 and 120 but a single lower yarn-guiding roller 15 can be made to serve for both yarn packages.

Referring to Figures 1 and 5, it will be seen that the tension-distributing roller 20 is shown as having end cheeks and a concave barrel. The roller may be made in a variety of ways, of which two are shown in Figures 3 and 4.

In the construction shown in Figure 3 the concave barrel 24 is formed from sheet material supported at its ends by internal flanges 25 which run on ball-bearings 26 on a central spindle 27 which carries the aforesaid spindle-extension 19. The spindle 27 carries collars 28, 29 and between these collars and the extension 19 and a nut 30 stationary cheeks 31 are received. These cheeks are formed from sheet material and are shaped at 32 to overlie closely the ends of the barrel 24 and are shaped at 33 to extend from the barrel in flared contour. Thus the cheeks facilitate placing the strand material in position on the roller and also provide a guard or control to prevent the strand material from becoming displaced.

In the construction shown in Figure 4 the concave barrel 24 is formed from sheet material supported at its ends by internal flanges 34 which are received on the surface of a self-lubricating wooden or like bushing 35 carried by the central spindle 27. In other respects the construction shown in Figure 4 is similar to that shown in Figure 3.

It will be seen that the parts of the machine are so arranged that the strand material passes from the breakage levers 17 upwardly to the tension-distributing roller 20 which is located almost immediately above and fairly close to the levers 17. The material takes a complete turn or substantially a complete turn around the circular surface of the roller 20 and then passes upwardly to the roller 22 and then down to the roller 15 from which it leads to the winding spindle 11. Suitable tension means, not shown, are provided to maintain the yarn substantially taut during its passage from the supplies to the winding spindle. From the supplies through the levers 17 to the roller 20 the strands are separated and individually tensioned. The passage around the concave surface of the roller 20, however, causes the strands to take up a closely related "tape" formation and from the roller 20 to the winding spindle 11 the strands reinforce each other against the pull or tension thereon. Hence if a break is to occur it will do so before the strands leave the roller 20.

With the concave roller barrel shown the yarn will have an automatic tendency to climb up the portions of larger diameter and this will tend to increase the pitch of the spiral path of the material around the roller and so prevent the yarn from fouling on the roller. This climbing movement, in addition to preventing fouling, is also of advantage as it causes the multiplicity of separate strands to take up "tape" formation as distinct from "bundle" formation. The setting of the roller 20 in relation to the other parts of the machine is of importance in order to secure the full effect of the roller, and it is for this purpose that the parts 18 and 19 are arranged to be adjustable relatively to the mounting 16.

It is to be understood that the invention is not restricted to the precise constructional details set forth.

I claim:

1. In a machine for winding multiple strands of yarn or the like in tape formation, the combination with a winding spindle and a supply of plural strands of yarn or the like delivering under individual tension, of a tension roller arranged between the supply and the winding spindle, said roller having a concave peripheral surface and the several strands being arranged to pass completely therearound in a helical course whereby they tend to ride outwardly toward the ends of the roller to maintain them in laterally extended relationship in the form of a substantially flat tape with the tension applied collectively to all of the strands.

2. In a machine for winding multiple strands of yarn or the like in tape formation, the combination of a winding spindle and means for delivering a plurality of strands under individual tension to adapt them to be wound on the spindle in tape formation, of a tension-distributing device intermediate the source of supply of the strands and the winding spindle, said device comprising a rotatable element having a substantially concave periphery of considerably greater width than the width of the group of strands, the strands being passed around the rotatable element with a complete turn whereby they tend to ride out toward the ends of the element to assume a helical course to cause them to remain in spaced relationship in a substantially flat tape-like formation without bunching.

3. In a machine for winding multiple strands of yarn or the like in tape formation, the combination of a winding spindle, yarn-guiding means located remote from said spindle, and a tension-distributing device located remote from the said yarn-guiding means and comprising a roller having a concave peripheral surface of sufficient width to adapt the strands to make a complete turn therearound in a spiral course to maintain the strands in separate relationship in the form of a flat tape.

4. In a machine of the type indicated, the combination of a winding spindle, a series of yarn guides for directing a plurality of strands from their supplies under individual tension, a second yarn-guiding means arranged remote from the first yarn guides, and a tension-distributing device disposed intermediate said yarn-guiding means and yarn guides comprising a roller having a concave periphery around which the strands make a complete turn in a spiral course to maintain them in separate parallel relationship in the form of a flat tape or band.

5. In a machine of the type indicated, the combination of a winding spindle, yarn-guiding means arranged remote from said spindle, a second yarn-guiding means arranged remote from the first yarn-guiding means, and a tension-distributing device disposed intermediate said yarn-guiding means in substantial alinement therewith and comprising a roller mounted to rotate on an axis inclined to the path of the yarns leading between the two guiding means.

6. In a machine of the type indicated, the combination of a winding spindle, means for trav-

ersing a plurality of strands on the spindle in tape formation, a guiding roller arranged remote from the winding spindle, means for delivering a plurality of strands at a point remote from the guiding roller, and a tension roller arranged intermediate the guiding roller and the supply of strands and formed with a concave periphery around which the strands make a complete turn to dispose them in parallel relationship in the form of a flat tape while collectively tensioning the strands as they pass to the guiding roller.

7. In a machine of the type indicated, the combination of a winding spindle, means for traversing a plurality of strands to wind them in tape formation on the spindle, yarn-guiding means disposed remote from the spindle, a second yarn-guiding means arranged remote from the first guiding means, and a rotatable roller disposed between the two guiding means substantially in line therewith and inclined to the path of the strands to adapt them to pass completely around the roller in a helical course to maintain them in parallel relationship in flat tape-like formation.

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