June 12, 1934. W. E. WARDWELL 1,962,974

METHOD OF AND APPARATUS FOR UNWINDING STRAND MATERIAL FROM A SPOOL

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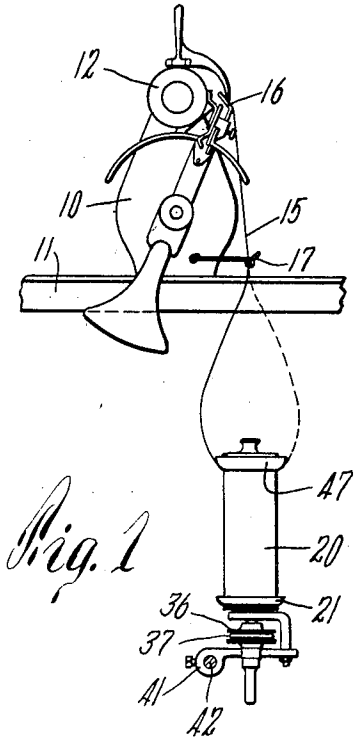


Fig. 1

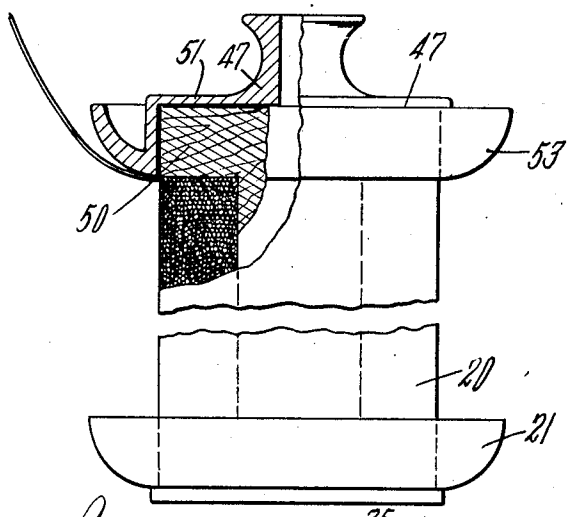


Fig. 2

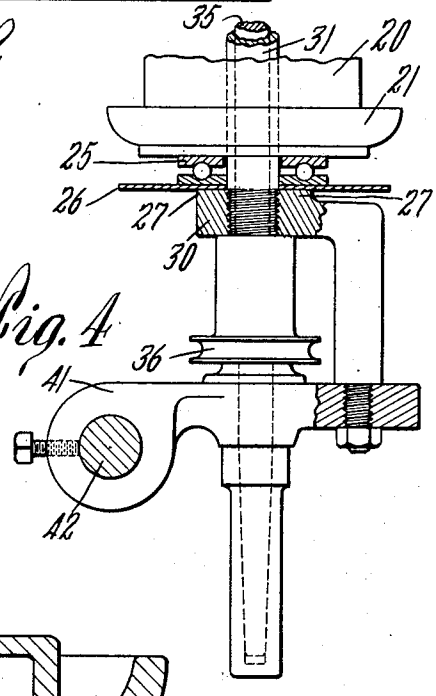


Fig. 4

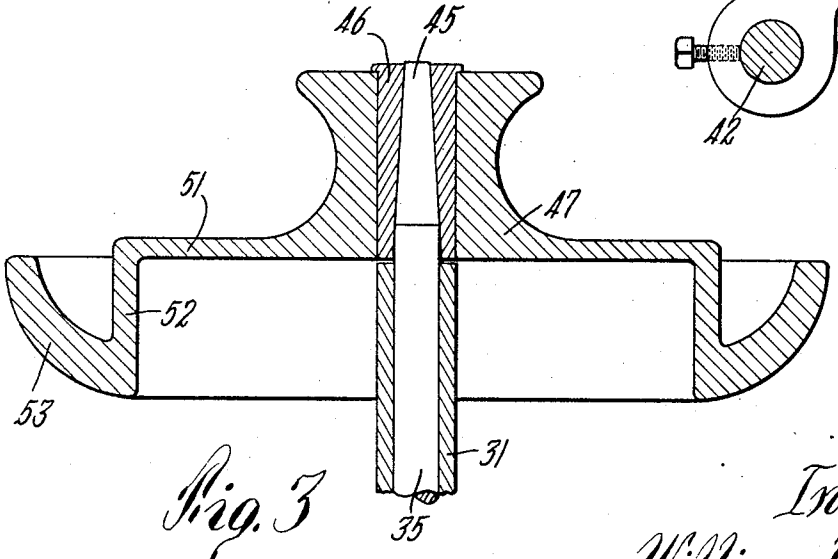


Fig. 3

Inventor
William E. Wardwell
by Wright, Brown, Quinby & May
attys

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METHOD OF AND APPARATUS FOR UNWINDING STRAND MATERIAL FROM A SPOOL

William E. Wardwell, Berlin, N. H., assignor to Brown Company, Berlin, N. H., a corporation of Maine

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4 Claims. (Cl. 117—23)

This invention relates to a method of and apparatus for unwinding strand material, more especially a strand of low tensile strength, from a headed spool on which it is wound. In conventional re-winding machines, it is customary to mount a headed spool on a vertical axis and to draw the yarn or threads therefrom upwardly to a winding mechanism in which a cop or cone is supported and rotated on a horizontal axis, the yarn being laid on the rotating cop or cone by means of suitable traversing mechanism. As the yarn is pulled upwardly from the spool, it swings outwardly and "balloons". This action of the yarn tends to keep it clear of the upper head of the spool. When turns of yarn closely adjacent to the upper head are being unwound, however, the yarn is liable to engage the inner surface of the spool and to break, especially if there is any roughness or irregularity at the periphery of the inner face of the upper head of the spool. Such breakage is especially liable to occur in the case of weak yarns such as those which are made of damp pulp fiber. It is an object of the invention to eliminate as far as possible such breakage. To this end, I provide an anti-friction support for the spool so that it is capable of free rotation in either direction on its vertical axis. I also provide a member with a guiding surface flaring outwardly and upwardly from the plane of the inner face of the upper spool head. This guide member is rotated at high speed during the unwinding of the yarn from the spool, the speed of rotation of this guide member being preferably about three times that of the cop or cone on which the yarn is being wound. The guiding surface curves upwardly from the periphery of the inner face of the upper spool head and is preferably made as smooth as possible. This rotating member not only provides a smooth guiding surface with an easy curve from the plane of the spool head to the upward direction of travel of the thread, but also, by its rapid rotation, creates air currents which assist in the proper ballooning of the loop of thread between the spool and the winding guide.

For a more complete understanding of the invention, reference may be had to the following description thereof and to the illustration of an embodiment thereof on the drawing, of which,—

Figure 1 is an elevation of re-winding mechanism including an embodiment of the invention.

Figure 2 is an elevation of a spool with a guiding cap or member thereover.

Figure 3 is a fragmentary sectional view of the guiding cap, a portion of the spindle on which it is supported, and a portion of the hollow pin or sleeve on which the spool is loosely mounted.

Figure 4 is an elevation, partly in section, of the support for the spool and the guide cap.

In Figure 1 a conventional winding machine 10 is shown supported on a machine frame 11 so as to be driven by any suitable means (not shown), to rotate a cop or cone 12. The yarn 15 is led through a traversing mechanism 16 to the cop or cone 12, this yarn being supplied through a convenient guide 17 from the thread body 20 on a spool 21. This spool rests on a suitable anti-friction support such as a ball-bearing unit 25. The ball-bearing unit rests on a tin disk 26 which is supported by a pair of lugs 27 on the upper face of a supporting member 30. A hollow pin or sleeve 31 rises vertically from the support member 30 and passes loosely through the bore of the spool 21 so as to maintain the spool in position on the ball-bearing member 25. Rotatable within the pin or sleeve 31 is a spindle 35 on which is mounted a suitable pulley 36 adapted to be driven by a belt 37. The lower end portion of this spindle is carried by a bearing member 40 which projects downwardly from a bracket 41, the latter being secured to a horizontal member 42 of the machine frame. The bracket 41 also carries the support member 30, as shown. The upper end portion of the spindle 35 may be tapered as at 45 to receive the hub portion 46 of a flyer or guide cap 47. This cap may be of any suitable shape, preferably fitting loosely over the upper head 50 of the spool 21. Thus the cap may have a disk portion 51 extending radially from the hub 46, and a cylindrical portion 52 extending downwardly so that its lower end is flush with the lower or inner face of the upper head 50 of the spool. A rim-guiding flange 53 projects outwardly and curves upwardly from the lower end of the cylindrical portion 52 of the cap. As shown in Figure 3, the guiding flange 53 presents a surface in the form of a portion of a torus, this surface being tangent to the plane of the inner face of the upper spool head 50 and curving outwardly and upwardly to substantial tangency with an imaginary cylinder equal in diameter to the extreme diameter of the guide cap. Thus if the yarn which is being drawn from the spool 21 engages the guiding surface of the flange 53, it is guided over an easy curve into the vertical position for upward travel to the guide 17 and the winding machine 10. The curved surface of the flange 53 also creates effective air currents when the cap is rotated rapidly, these currents being tan-

gentially directed and tending to augment the ballooning of the loop of yarn. The anti-frictional mounting of the spool leaves it free to rotate. In actual practice, there is only a slow rotation of the spool at the beginning of the unwinding operation. As the unwinding proceeds, the spool acquires more and more velocity, but not sufficient to cause any objectionable variation in the number of twists to the inch in the re-wound strand. The spindle 35 and flyer 47 are preferably driven to rotate at a speed approximately three times the speed of rotation of the winding cop or cone 12, but this speed can be varied within a considerable range. As a result of such structure and practice, very weak yarns can be re-wound at high speed with little danger of breakage.

It is evident that various modifications and changes may be made in the invention herein described and claimed without departing from the spirit or scope thereof.

I claim:—

1. Apparatus of the class described, comprising a support for a headed spool, a ball-bearing on said support on which the lower head of a spool may rest, a hollow pin projecting upwardly from said support, a rotatable spindle extending through said pin, a flyer mounted on the upper end of said spindle, said flyer consisting of a cap fitting loosely over the upper head of the spool and provided with a peripheral flange having a smooth surface curving outwardly and upwardly from the lower plane face of the upper head of the spool, and means for rotating said spindle and flyer.

2. A flyer for unwinding mechanism, comprising a cap-shaped member having a hub portion adapted to engage on the end portion of a vertical spindle, a circular portion extending outwardly from said hub, a cylindrical portion depending from said circular portion and adapted to fit loosely therewith over the head of a spool so that the lower edge of said cylindrical portion is substantially in the plane of the lower or inner face of the upper head of said spool, and a flange projecting outwardly and upwardly from the lower edge of said cylindrical portion to present a smooth surface curving outwardly and upwardly from the plane of the inner face of the upper head of said spool.

3. A method of re-winding strand material from a headed spool onto a cop or the like, which comprises supporting said spool vertically for free rotation in either direction, drawing yarn upwardly from a spool thus supported, rotating about the upper head of the spool and independently thereof a guiding surface flaring outwardly and upwardly from the plane of the lower face of said upper head, in the direction of swing of the strand about the spool head as it is pulled upwardly.

4. Apparatus of the class described, comprising means for supporting a headed spool for face rotation on a vertical axis, a spindle projecting up through said supporting means and adapted to extend through the bore of a spool resting on said supporting means, a flyer mounted on the upper end portion of said spindle to rotate therewith, said flyer being positioned above a spool on said support means and having a guiding surface curving outwardly and upwardly from the plane of the lower plane face of the upper head of said spool, and means for rotating said flyer.

WILLIAM E. WARDWELL.