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[54] DEVICE FOR HOLDING A SPINDLE FOR DRAWING-OFF OF A YARN

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248/17, 18, 497, 498

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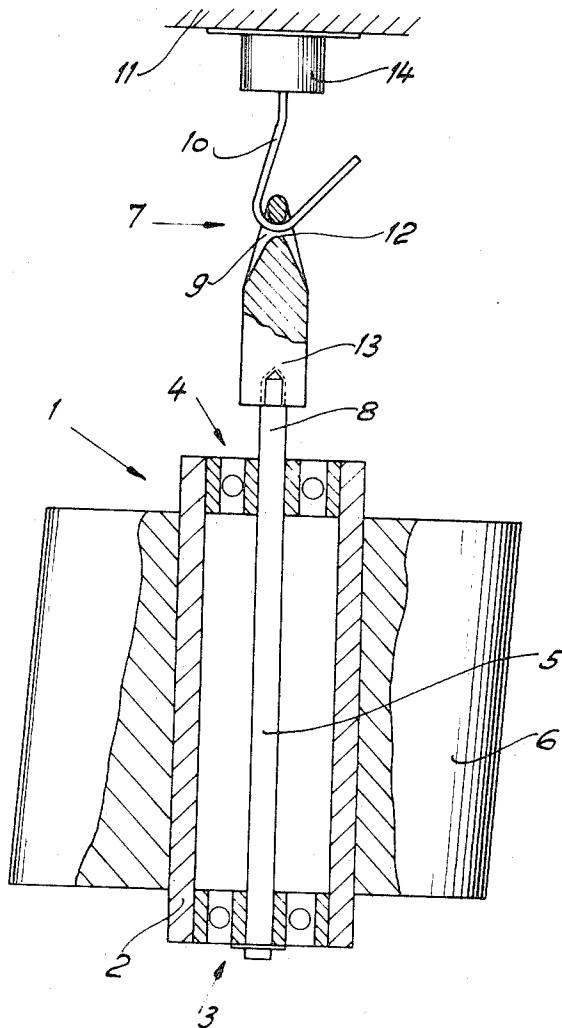
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ABSTRACT

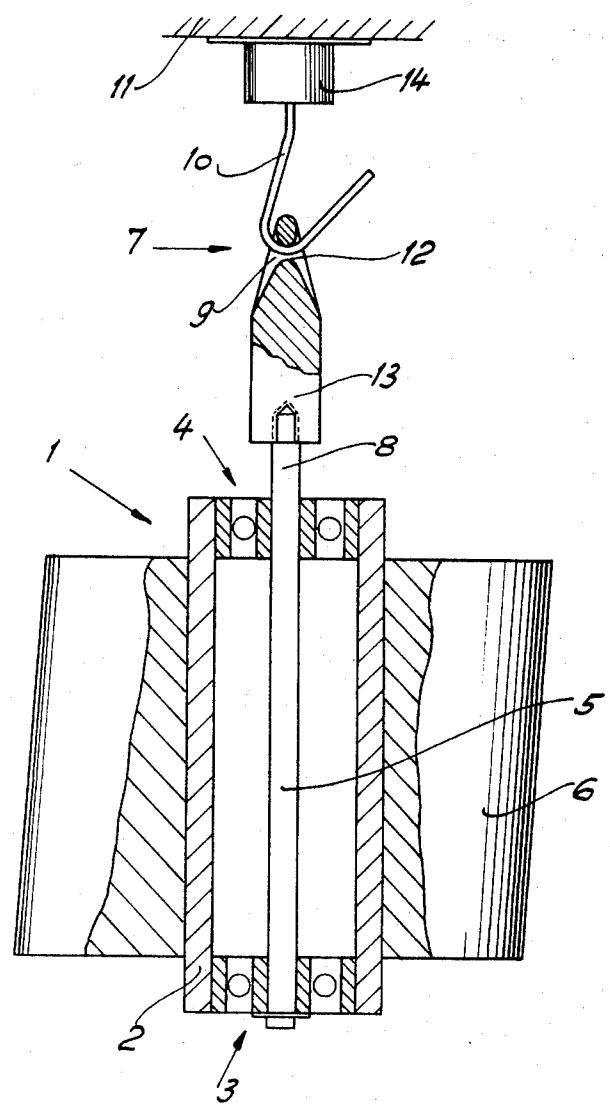
The spindle axle is disposed in vertical relation and is suspended at one end via an eye and hook so that the yarn is free to swing in a pendular manner. A damping means is also disposed between the hook and a fixed support point to damp vibrations.

9 Claims, 1 Drawing Figure



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DEVICE FOR HOLDING A SPINDLE FOR DRAWING-OFF OF A YARN

This invention relates to a device for holding a spindle for drawing-off of a yarn, particularly a set yarn.

As is well known, not all yarn spools which can be set in a spool-machine for drawing-off can be pulled over-head in the usual way, because certain kinds of yarn, e.g. set yarns, can be removed only with difficulty from their spool. For this reason and for such yarns, use is generally made of the so-called rolling draw-off. In this case, the spool of yarn is rotatably mounted, and the threads are drawn off substantially perpendicularly of the longitudinal axis of the spool of yarn. As a result, the spool has to be rotatably mounted on a so-called unrolling or unwinding spindle.

Unrolling spindles were originally set horizontally, so that the spool of yarn rotated about a horizontal axis. The drawback to this was, however, the ever-present nonuniform distribution of masses in the spool of yarn, which became still more noticeable under the influence of centrifugal force which amplified the vibrations in the rigid axle-bearings or spindle-bearings used. As a result of these vibrations, the unwinding speeds had to be kept relatively low. Moreover, the transmission of these vibrations acted detrimentally on the machine frame in which the unwinding spindle was mounted, as well as on other machine elements installed in the frame. Such also led to increased noise.

In order to obtain greater unwinding speeds, the unwinding spindles have been mounted with their spindle axes substantially vertical so that the amplifying influence of the force of gravity is eliminated. As a result, the still-present vibrations are caused solely by centrifugal force. In order to diminish the influence of the vibrations, the spindle-bearing housing has been mounted in soft rubber.

Attempts have also already been made to hold the spool or roll of yarn stationary, and to arrange a so-called coaxial centrifugal plate at one side with a rim extending over the spool of yarn. In this case, the yarn is drawn off over the rim of the centrifugal plate substantially in the direction of the axis of rotation of the plate, or the longitudinal axis of the spool of yarn, so that the thread slides along the rim of the centrifugal plate and sets the plate rotating. However, the rim of the centrifugal plate is very easily damaged, and this, in turn, leads to damage of the yarn. Thus, this known arrangement does not lead to satisfactory results during the drawing-off of set yarns.

Accordingly, it is an object of the invention to obtain particularly high unwinding speeds with the maximum possible freedom from vibration from an unwinding spindle.

It is another object of the invention to provide a simple technique for unwinding set yarns from an unwinding spindle.

Briefly, in order to unwind a yarn, such as a set yarn, from a spool of yarn rotatably mounted on a spindle, the invention provides a suspension means for mounting the spindle in vertical disposition from a fixed point with a universal degree of motion to permit the spindle to pendulate during unwinding of the yarn from the spool. This suspension means includes an eye secured to the upper end of an axle of the spindle, which eye has a rim defining an opening, and a hook secured to a fixed point or to a machine frame above the spindle.

The hook is disposed in the opening of the eye in pivotal contact with the eye so that the eye can pivot in all directions below the hook under the influence of the spindle motion. In this way, a pendular motion of the unwinding spindle is possible in all directions.

The suspension means permits the suspended unwinding spindle and the spool of yarn thereon to form a freely pendulating suspended gyroscope which, during the rotation of its masses, automatically centers itself without being hindered in this effort by the mounting arrangement. To a great extent, this eliminates not only increased stressing of the spindle bearings because of vibrations, but also eliminates a transmission of such vibrations to the machine frame. The suspension means also eliminates troublesome noise.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawing in which:

The drawing illustrates a partial cross-sectional view of a suspension means according to the invention supporting an unwinding spindle in vertical disposition.

Referring to the drawing, an unwinding spindle 1 has a spindle element 2 in the form of a hollow cylinder, which is mounted by means of two roller-bearings 3 and 4 so as to be able to rotate about and on a spindle axle 5. A spool or roll of yarn 6 is disposed on the spindle element 2. For purposes of clarity, the spool is shown with a nonuniform distribution of mass as indicated by a parallelogram-like outline.

Pivoting of the unwinding spindle 1 in all directions is made possible by the suspension of the upper end of the spindle axle 5, in such a way that the spindle 1 can pendulate freely. To this end a suspension means 7 is provided which consists of an eye 9 fastened to the upper end 8 of the spindle axle 5, and of a hook 10 fastened to a fixed point, in which hook the eye 9 is hung. The fixed point is advantageously disposed on the machine frame of the unwinding machine (not shown).

The eye 9 has an inner rim 12 which defines an opening to receive the hook 10. As can be seen from the partly sectioned view of the drawing, the longitudinal axis of the spindle axle 5 is disposed in the plane of the opening of the eye 9. Further, the inner rim 12 of the eye 9 is advantageously rounded off so that friction can be diminished during pendular motion of the spindle 1 and, thus, during pivoting of the eye 9 relative to the hook 10.

The eye 9 is disposed on a bushing 13, which can be screwed or threaded onto the upper end 8 of the spindle axle 5. Thus, the eye 9 can be fastened in a particularly simple way to the spindle axle 5 while at the same time being detachable from the axle 5.

The eye 9 and the bushing 13 may be made very simply in one piece and advantageously consist of one piece of synthetic material that, even without lubrication, slides particularly well on the material of the hook 10. Similarly, the hook 10 can have self-lubricating properties. Polyamide has proved particularly suitable as a synthetic material.

In order to damp any movements between the hook 10 and the machine frame 11 that may still be transmitted from the unwinding spindle 1 via the hook 10, a damping means 14 is disposed between the fixed point on the machine frame 11 and the hook 10.

As is easy to see, the invention allows the unwinding spindle 1 to be suspended in a position to make pendu-

lar movements in all directions. These pendular movements occur particularly at starting-up. With increased unwinding speed, a self-centering of the unwinding spindle 1 occurs which practically represents a gyroscope. Vibrations are no longer transmitted to the machine frame 11 so that, practically speaking, no noise occurs. Further, there is less stressing of the roller bearings 3 and 4.

What is claimed is:

1. In combination
a spindle axle;
a spool of yarn rotatably mounted on said axle;
suspension means for mounting said axle in vertical disposition from a fixed point with a universal degree of motion to permit said axle and said spool to pendulate during unwinding of the yarn from said spool; and
a damping means between said suspension means and said fixed point.
2. The combination as set forth in claim 1 wherein said suspension means includes an eye secured to an upper end of said axle with a rim defining an opening and a hook secured to said damping means, said hook being disposed in said opening in pivotal contact with said eye.
3. The combination as set forth in claim 2 wherein said axle has a longitudinal axis disposed in the plane of said opening of said eye.

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4. The combination as set forth in claim 2 wherein said rim is rounded.
5. The combination as set forth in claim 3 which further comprises a bushing threaded onto said axle, said bushing having said eye at an upper end thereof.
6. The combination as set forth in claim 5 wherein said eye and said bushing are made in one-piece.
7. The combination as set forth in claim 6 wherein said eye and said bushing are made of synthetic material.
8. The combination as set forth in claim 7 wherein said synthetic material is a polyamide.
9. In combination
a hook;
a damping means supporting said hook in a vertical dependent manner from a fixed point;
a spindle axle;
a spool of yarn rotatably mounted on said axle; and
an eye on said axle having a rounded rim defining an opening, said hook passing through said eye opening to suspend said axle and said spool in vertical disposition therefrom, said hook being in pivotal contact with said eye to permit universal pivoting of said eye and axle; said axle having a longitudinal axis in the plane of said eye opening.

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