May 28, 1935. H. Z. COBB ET AL 2,002,629

SPINDLE DRIVE MECHANISM

Filed Nov. 26, 1932

Fig. 1.

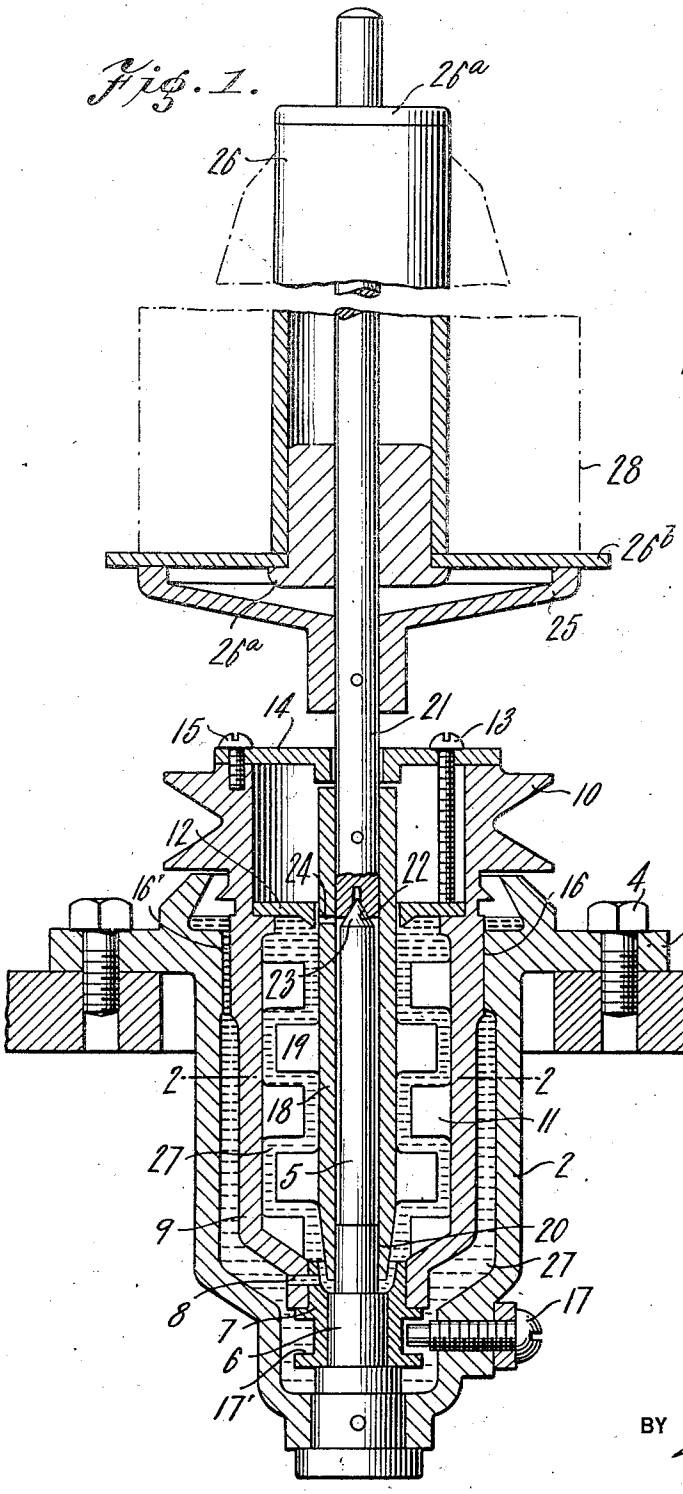
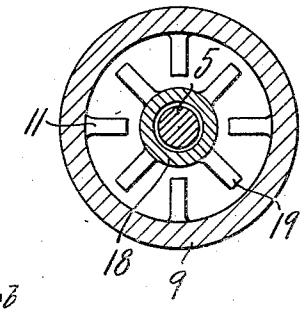


Fig. 2.



INVENTORS
HENRY Z. COBB
RAYMOND S. FRANCIS
BY
ATTORNEY

Patented May 28, 1935 2,002,629

UNITED STATES PATENT OFFICE

2,002,629

SPINDLE DRIVE MECHANISM

Henry Z. Cobb, Providence, and Raymond S. Francis, Rumford, R. I., assignors, by mesne assignments, to United States Rubber Company, New York, N. Y., a corporation of New Jersey

Application November 26, 1932, Serial No. 644,426

5 Claims. (Cl. 192—58)

This application relates to a spindle drive mechanism, more particularly to a spindle drive mechanism for a spooling or winding device.

In the winding or spooling of elastic yarns formed with an elastic core and a fibrous covering, more particularly with fine gauge yarns designed for knitting purposes, difficulty has been had in suitably spooling or winding the yarn prior to the knitting operation. It has been found that when elastic yarns are knitted, it is essential that the yarn be supplied to the knitting machine under little or no tension. By the drive mechanisms previously used in winding or spooling such yarns, it has been very difficult to wind or spool the elastic yarn without placing it under a variable and excessive degree of tension, and when spools of yarn so wound have been used for knitting purposes, trouble has occurred in the knitting operation because, as before stated, it is essential that the yarn be supplied to the knitting machine with practically no tension.

An object of our invention is to provide an improved winding or spooling mechanism.

Another object is to provide a winding or spooling mechanism for winding a filament, and more particularly an elastic filament, without tension.

Other objects will appear from a perusal of the detailed specification and the drawing, in which latter:

Figure 1 is a vertical section partly broken away of one form of our invention; and

Figure 2 is a horizontal section on the line 2—2 of Fig. 1.

Referring to the drawing, the numeral 1 designates a frame upon which the winding mechanism is mounted, and the latter comprises a hollow casing 2 provided with a flange 3 which may be secured to the frame 1 by the screws 4. Tightly fitted to the bottom of the casing and extending upwardly therein is a bearing spindle 5, which adjacent its lower portion is provided with a bearing surface 6 upon which rotates a bearing sleeve 7 which is secured by a pin or pins 8 to a rotatable hollow casing or fluid receptacle 9, the casing being provided at its upper end with any suitable form of drive means, which in the present instance is shown as a pulley 10. Projecting inwardly from the wall of casing 9 are vertically spaced series of vertical vanes 11, to assist the frictional drag of the wall in rotating the fluid. The casing is closed by a disc 12 held in place by a screw 13 passing through a second closure 14 disposed at the top of pulley 10 and secured thereto by screws 15. The upper end of the rotatable casing 9 has a bearing at 16 in the outer casing 2, and is provided with an oil groove 16' extending from the space between the outer casing 2 and casing 9 to a point above the bearing. Vertical movement of the casing 9 is prevented by a screw 17, the inner end of which fits within a groove 17' in bearing sleeve 7. Oil may be placed in casing 2 to lubricate bearing 16 and bearing sleeve 7.

Disposed around the bearing spindle 5 and within the rotatable casing 9 is a hollow spindle 18 provided with outwardly projecting vertically spaced series of vertical vanes 19, which vanes it will be noted are disposed in staggered relation to the vanes 11 on the wall of casing 9. The lower end of the hollow spindle 18 has a bearing at 20 on the spindle 5. An extension 21 of the spindle 18 projects within the upper end of the spindle 18 and is secured thereto in any suitable manner, or if desired it may be made integral therewith. At the lower end of the spindle extension 21 there is provided a coned bearing recess 22 which cooperates with the coned upper end 23 of the fixed bearing spindle 5 to form an upper bearing for the hollow spindle 18. An oil opening 24 is provided in the wall of the hollow spindle 18 adjacent the bearing 22—23.

Secured to the spindle extension or shaft 21 is a spool driving flange 25 upon which may be disposed a spool 26 upon which is to be wound the elastic yarn or other material. The spool is frictionally held by the engagement of its ends 26a with spindle extension 21, and by the engagement of its flange 26b with driving flange 25.

In operation the spaces between the outer casing 2 and rotatable casing 9 and between the latter and the hollow spindle 18 are filled with oil or other suitable liquid, a spool 26 placed upon the spool driving flange 25, and the pulley 10 is then driven by a belt from any suitable driving device. As the casing 9 rotates, the frictional drag of its inner wall and the vanes 11 causes the oil 27, or other liquid, to be rotated along with the casing. This rotating oil then acts upon the vanes 19 to rotate the hollow spindle 18, thereby rotating the spool 26 mounted upon the extension 21 of the spindle to wind the elastic yarn 28 on the spool 26.

It will be seen that by the above described mechanism, by varying the height of the oil or by using other liquids of varying viscosity, considerable variation may be made in the driving power imparted to the spindle extension 21, so that by proper regulation of these variables, the spool 26 may be rotated with just sufficient slip to wind the elastic yarn thereon with little or no tension.

It will be obvious that when winding an elastic yarn of very fine gauge, such as those formed by covering rubber cores of 1/100th or 1/125th of an inch, with fibrous material, the power required to drive the spool without placing the yarn under tension will be less than in the case of heavier yarn.

While the invention is particularly adapted for winding elastic yarn without tension, it is obvious that it is capable of other uses, for instance, for the winding of bare rubber thread and for any other purpose where a winding or spooling operation is to be carried out without placing the filament under tension.

While a specific embodiment of the invention has been shown and described, it is obvious that it is capable of numerous modifications, and it is not desired to limit the invention otherwise than as set forth in the appended claims.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

1. A drive mechanism comprising a fixed bearing spindle, a hollow driving member surrounding and having a bearing thereon, a hollow driven member surrounding and having a bearing on said spindle, said members providing between them a space for a driving fluid, and interfitting fluid driving and driven elements carried by said members and disposed in said space.

2. A drive mechanism comprising a casing rotatable on a vertical axis, a drive pulley for rotating the casing, vertically spaced series of vanes projecting inwardly of said casing, a fixed bearing spindle on which said casing is mounted, a hollow spindle rotatably mounted on said bearing spindle, said hollow spindle having series of outwardly directed vanes disposed in staggered relation to said first vanes, and a shaft carried by said hollow spindle.

3. A drive mechanism comprising a fixed bearing spindle, a hollow rotatable spindle disposed over and having a bearing on one end of said fixed spindle, a receptacle for driving fluid surrounding said hollow spindle, means for rotating said receptacle, and means carried by at least one of said rotatable parts for increasing the frictional area exposed to the driving fluid.

4. A drive mechanism comprising a fixed bearing spindle, a hollow rotatable spindle disposed over and having a bearing on one end of said fixed spindle, a receptacle for driving fluid surrounding said hollow spindle and having a bearing on said fixed spindle, means for rotating said receptacle, and projections on said hollow spindle and the wall of said receptacle for increasing the frictional area exposed to the driving fluid.

5. A drive mechanism comprising a fixed casing having a fixed bearing spindle therein, an inner rotatable casing for a driving fluid journaled on said fixed casing and bearing spindle, means for rotating said inner casing, a hollow rotatable spindle journaled on said fixed spindle within said rotatable casing, and driving-liquid engaging means carried by said hollow spindle and rotatable casing.

HENRY Z. COBB.
RAYMOND S. FRANCIS.