Aug. 21, 1951 E. D. MEADOWS 2,565,389

TEXTILE SPINDLE

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FIG. 1.

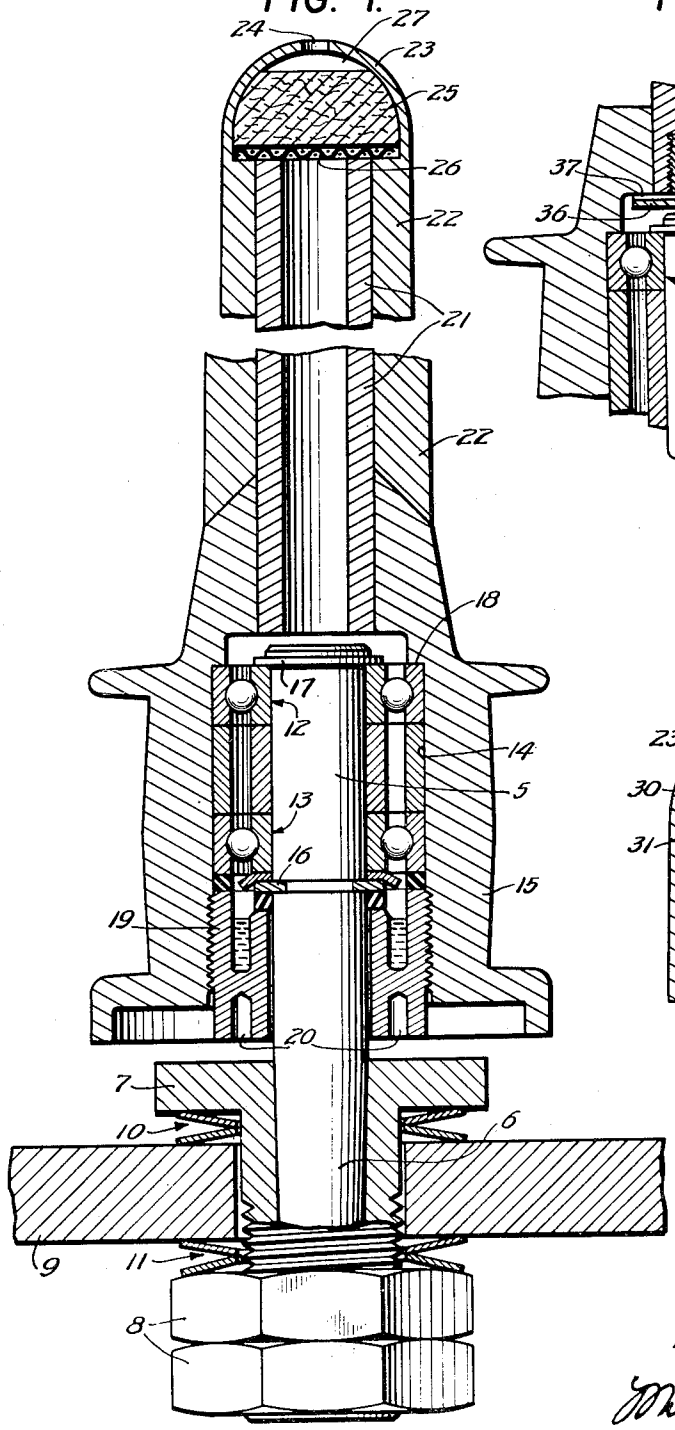


FIG. 3.

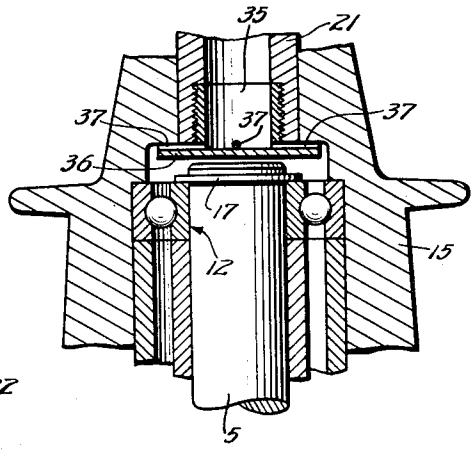
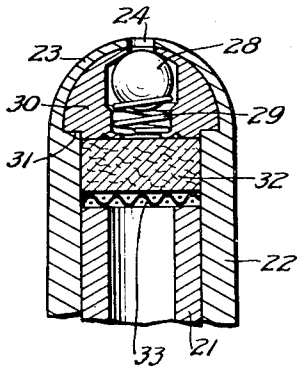


FIG. 2.



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FIG. 4.

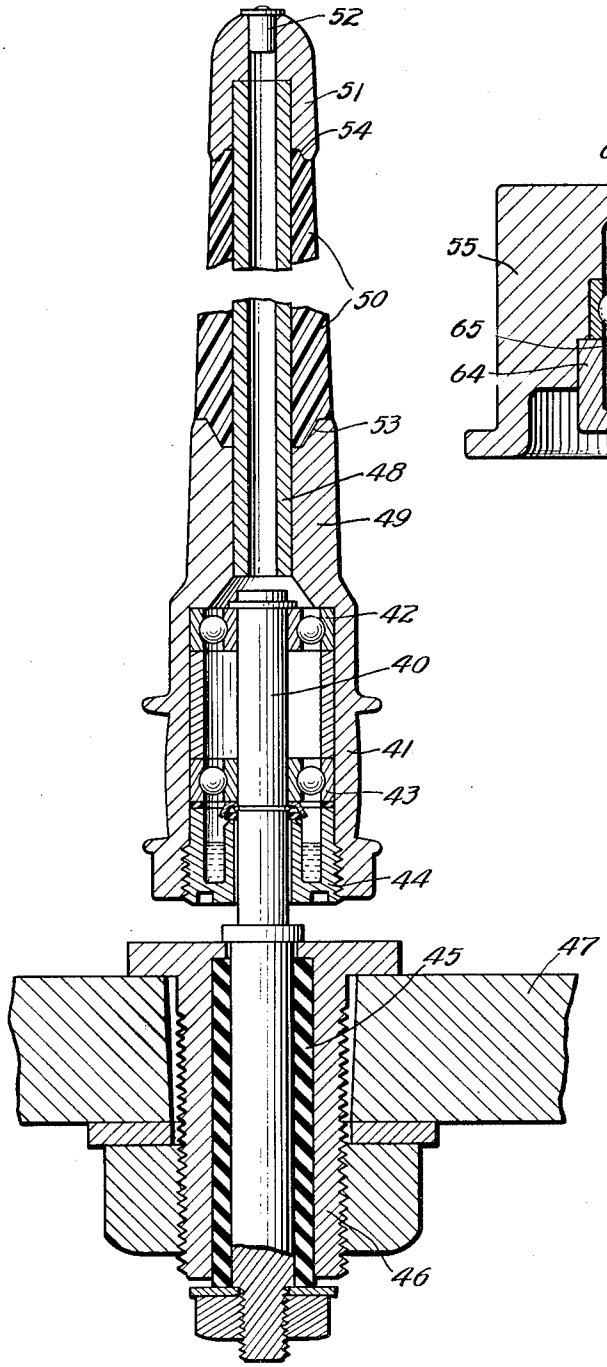
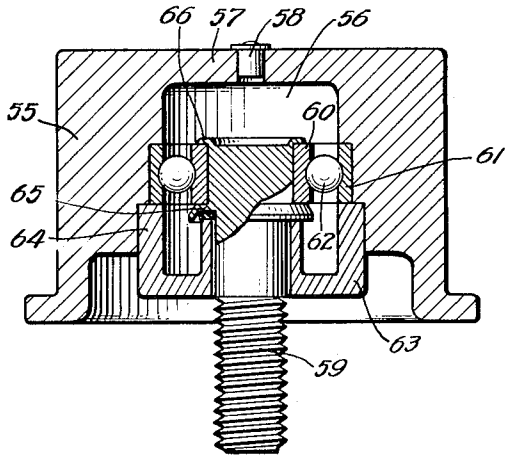


FIG. 5.



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TEXTILE SPINDLE

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Application February 23, 1949, Serial No. 77,723

6 Claims. (Cl. 57—133)

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My invention relates to lubricating means for spindles, pulleys and the like.

It is an object to provide an improved device of the character indicated.

It is another object to provide an improved lubricating means for a spindle, pulley, or the like, whereby less frequent servicing is needed, and whereby such servicing may be accomplished more rapidly and without the spilling of lubricant.

It is another object to meet the above objects with a structure which will not require the dismounting or disassembly of the spindle, pulley, or the like, in any way.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred forms of the invention:

Fig. 1 is a vertical sectional view through a textile-spindle assembly incorporating features of the invention;

Fig. 2 is a fragmentary sectional view of a modification of a part of the arrangement of Fig. 1;

Fig. 3 is a further fragmentary sectional view of a modification of another part of the arrangement of Fig. 1;

Fig. 4 is a vertical sectional view through another textile-spindle assembly incorporating features of the invention; and

Fig. 5 is a vertical sectional view through an idler pulley incorporating features of the invention.

Briefly stated, my invention contemplates an improved means for lubricating the bearing means of a textile spindle, pulley, or the like, without requiring removal of any parts or the dismounting of the assembly. Such improved means is particularly applicable to means rotating on a generally upstanding axis and deriving support from beneath, and the lubricating access may be had through an opening on the upper part of the rotating means; in the present case of a textile spindle, use is made of a hollow spindle with means at the top end of the spindle for introduction of lubricant. If desired, filtering means may be included in the lubricant passage, and there also may be means for sealing the passage against entrance of dirt or foreign matter when not actually being lubricated. Further, if desired, means may be provided at the bottom end of the passage for more effectively distributing the lubricant over moving parts of the bearing means.

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The improved lubricating means may in certain cases suffice, but I show and prefer that it be employed with spindles, pulleys, or the like which carry a reservoir of lubricant for the normal lubrication of the bearing means, the improved lubricant passage serving, then, for the replenishment of the reservoir, as needed.

While my invention is, as indicated, also applicable to pulleys, I have shown in Fig. 1 of the drawings an application of the principles of my invention to a textile spindle revolubly mounted upon a stationary stud 5. The stud may have a lower tapered end 6 to be received in a base bolt 7, the bolt 7 being held by means of lock-nut means 8 to a spindle rail 9. If desired, resilient means such as opposed frusto-conical spring washers 10—11 may be interposed on the one hand between the bolt head and the rail, and on the other hand between the lock-nut means 8 and the rail.

The spindle may be supported by antifriction-bearing means, and in the form shown spaced bearings 12—13 are received within a bore 14 in the whorl or pulley portion 15 of the spindle. The inner rings of the bearings 12—13 may be held on the stud 5 by means of spaced snap rings 16—17, and the outer rings of the bearings 12—13 may be seated at one end against a shoulder 18 at the bottom of the bore 14 and held by a threaded member 19 at the other end. The threaded member 19 may include radially spaced walls defining an annular cup facing upwards toward the bearing means 12—13, and the member 19 may suitably retain all the lubricant needed by the bearing means 12—13 when the spindle is in rotation. Fig. 1 thus depicts the at-rest condition, in which all lubricant has drained into the cup of the threaded securing member 19. If desired, spanner recesses 20 may be provided at the bottom of the threaded member 19 for adjustment and removal of the same.

In accordance with the invention, I provide lubricating access to the bearings 12—13 from the top or upper part of the rotating means. If the rotatable means were a pulley with a closed upper side, then I would provide a lubricating opening in said side and communicating with the bore of the pulley; but, since the invention is shown in application to a spindle, I provide a novel blade construction for the spindle, whereby lubricant may be fed as needed to the bearings 12—13 without requiring dismounting or any disassembly of the described structure. In the form shown, my blade construction utilizes two parts, and the lubricant passage is within the

first of these parts 21, which may be a straight steel tube. The tube 21 may be formed with the whorl 15 or it may be press fitted (as shown), or otherwise secured to the whorl 15. In the form shown, the other part of the blade is a sheath member 22 encasing the tube 21 and including a part extending axially beyond the top end of the tube 21. This extending part is preferably of reduced section so as to permit a forming operation on the top end of the sheath 22, to make a rounded contour as shown at 23. The forming of the sheath 22 may be such as to provide an opening 24 for the induction of lubricant.

If desired, filtering means may be placed in the lubricating passage of the spindle, between the opening 24 and the bearing means, and in the form shown such filtering means is accommodated just above the top end of the inner tube 21 of the blade. Such filtering means may include a piece of felt 25, and, if desired, a wire gauze 26 beneath the felt 25 may assist in the straining function and also provide support for the felt over the opening in the tube 21. The space 27 above the top of the felt 25 and within the rounded nose 23 is preferably relatively limited, so as to prevent an over-lubrication of the spindle. With the proportioning shown in Fig. 1, this space 27 is such as to permit perhaps a single squirt from an oil can before flooding out the opening 24. The flooded excess may be wiped off, and the lubricant in the space 27 may gradually soak into the felt 25 and feed down the inner wall of the tubular member 21 for distribution to the bearings 12—13.

In Fig. 2, I show a modification of the lubricant-feeding means of Fig. 1. In Fig. 2, I employ a resiliently operated sealing means in the form of a ball 28, spring urged, as by the spring 29, to close off the top opening 24 of the blade sheath. Such seal means may be carried as a unit within a suitably bored block 30 to seat upon a shoulder 31 in the blade sheath 22, and the shoulder 31 may be provided at a point axially beyond the top end of the blade tube 21. Filtering means, such as the felt 32 and the gauze 33, may therefore be interposed between the seal means 28 and the top end of the blade tube 21 as in the case of Fig. 1. It will be appreciated that the arrangement of Fig. 2 may provide an effective sealing means against the entrance of foreign matter and that this arrangement may, therefore, provide for extended life and better service from the filtering means, all without any need for ever dismantling the spindle.

In Fig. 3, I show a modification of another part of the arrangement of Fig. 1, and in particular I provide in Fig. 3 for a distribution of blade-fed lubricant directly to rotatable parts of the bearing means. In Fig. 3, such distribution may be aided by a flanged cup member 35 which may be threaded to the bottom end of the tubular blade member 21. The inner diameter of the cup member 35 is preferably at least as great as the inner diameter of tubular member 21, whereby the member 35 may present no impediment to the flow of lubricant in the passage of the blade tube 21. The base of the cup member 35 may include a flange 36 extending radially outwardly, preferably at least as far as the outer diameter of the inner ring of the bearing means 12; and radial passage means, such as grooves 37, in the flange means 36 may assure the flow of lubricant at least to the outer diameter of the inner bearing ring. It will be appreciated that with such a construction any lubricant that is fed down the passage through the blade will either drain only onto moving parts of the bearing means or will be centrifugally thrown for direct access to such parts.

In Fig. 4, I show another spindle arrangement incorporating features of the invention. The spindle of Fig. 4 may be revolubly supported on a relatively fixed stud 40 in a manner similar to that described for the spindle of Fig. 1. Thus the stud 40 may extend within a bore in the whorl 41, and spaced antifriction bearings 42—43 may locate the whorl on the stud. An annular lubricant reservoir 44 may be held at the bottom of the whorl. If desired, the stud itself may be resiliently mounted within a sleeve 45 of resilient material, which in turn may be carried by a mounting sleeve 46. The mounting sleeve 46 may be flanged at one end and threaded at the other in order to permit securing to the rail 47. Resilient mounting means of the type shown are disclosed and discussed with greater detail in my copending application, Serial No. 77,724, filed February 23, 1949.

The spindle of Fig. 4 may incorporate novel blade-construction features, and I show a straight tubular member 48 which may serve as the core of the blade and at the same time provide a suitable lubricating passage for lubricant introduced at the top end thereof. For simplicity and for rigid support of the tubular member 48, I prefer that the whorl 41 be provided with a relatively extensive upwardly projecting shank 49 and that the tubular member 48 be press-fitted in a bore in the shank portion 49. A blade sheath 50 may fit over the tubular member 48 and directly abut the whorl shank 49. To complete the assembly a cap member 51 is also preferably press-fitted to the tubular member 48 and, if desired, a lubricant fitting 52 may be carried by the cap 51 and preassembled therewith. The blade sheath 50 may be of molded plastic construction and in order to insure absolute concentricity of mounting the blade sheath 50 between the cap 51 and the whorl 41 I prefer that the interfitting ends of the members 41—50 and 51 be tapered, as at 53—54. It will be appreciated that with this tapered-fit construction, the final press-fitting assembly step may not only axially rigidly support all blade elements but also concentrically align these elements.

In Fig. 5 I show an application of the principles of my invention to an idler-pulley construction. The pulley of Fig. 5 comprises a body 55 with a bore 56 terminating short of a closed end 57. A lubricating device 58 similar to the device 52 of Fig. 4 may be carried by the closed side 57. The pulley 55 may be supported for free rotation on a stud 59 by means of an antifriction bearing comprising an inner ring 60, an outer ring 61, and antifriction elements 62. The open side of the pulley may be closed by an annular lubricant-retaining cup or reservoir 63, which in the form shown is press-fitted into the base of the pulley 55. For an effective centrifugal distribution of lubricant to the bearing, I prefer that the inner surface of the outer wall 64 of the annular cup 63 shall have the same diameter as the inner surface of the outer bearing ring 61; if desired, this diameter may coincide with the diameter of the bore 56. For simplicity of construction, the stud 59 may be integrally formed with a flanged portion 65 extending over the inner wall of the reservoir cup 63, and the outer surface of the flange 65 may be flared outwardly (as

shown) in order to deflect lubricant dripping from the inner bearing ring 60. To retain the assembly the stud may be initially formed with a relatively weak annular projecting lip which may be swaged or formed over the inner ring 60 to provide a retaining shoulder 66.

It will be appreciated that I have described simple spindle and pulley constructions lending themselves to simplified maintenance, wherein the periods between dismantling operations may be very substantially extended beyond those necessary with present-type spindles. With my arrangements I provide against the introduction of foreign matter to the rotating parts, and I provide for the best possible distribution of such lubricant as is introduced.

While I have described my invention in detail for the preferred forms shown, it will be understood that modifications may be made within the scope of the invention as defined in the appended claims.

I claim:

1. In a device of the character indicated, a relatively fixed, upright stud for rotatably supporting a rotatable whorl or like member, said member having a bearing recess for receiving the upper end of said stud, antifriction bearing means interposed between the upper end of said stud and said bearing recess, an annular lubricant retaining cup carried by said rotatable member and closing the lower end of said recess, said cup having an upstanding inner wall defining a central passage through which said stud projects, said rotatable member having a lubricant passage therein opening through the top thereof and communicating with the bearing recess, whereby lubricant may be introduced through the top of said rotatable member and will be retained in said annular lubricant retaining cup.

2. In the combination defined in claim 1, a blade having a longitudinal lubricant passage and extending up from said whorl or like member.

3. In the combination defined in claim 1, a blade having a longitudinal lubricant passage and extending up from said whorl or like member, and a sheath fitting said blade and having an opening in the top for receiving lubricant.

4. In the combination defined in claim 1, a blade having a longitudinal lubricant passage and extending up from said whorl or like member, a sheath fitting said blade and having an opening in the top for receiving lubricant, and lubricant filtering means between the lubricant passage in said blade and the top of said sheath.

5. In the combination defined in claim 1, a blade having a longitudinal lubricant passage and extending up from said whorl or like member, a sheath fitting said blade and having an opening in the top for receiving lubricant, said sheath including a cap enclosing the top of said blade and having a lubricant introducing opening in the top thereof.

6. In the combination defined in claim 1, a blade having a longitudinal lubricant passage and extending up from said whorl or like member, a sheath fitting said blade and having an opening in the top for receiving lubricant, said sheath including a cap enclosing the top of said blade and having a lubricant introducing opening in the top thereof, and a valve for controlling said lubricant introducing opening.

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