July 2, 1935. H. H. MERWIN 2,006,404

MATERIAL HANDLING APPARATUS

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FIG. 1.

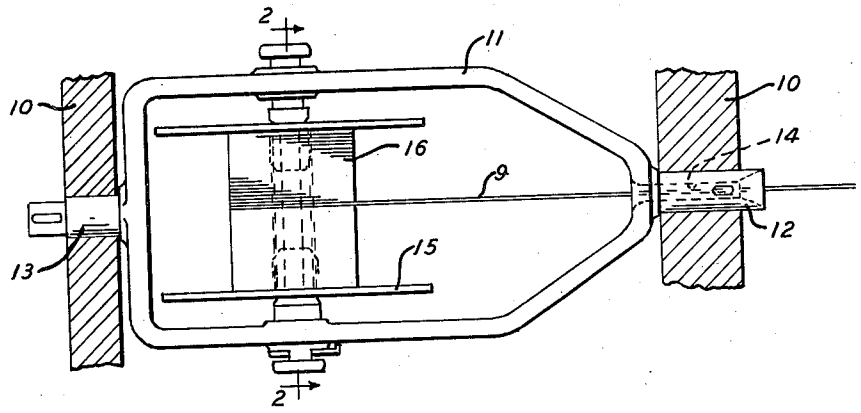
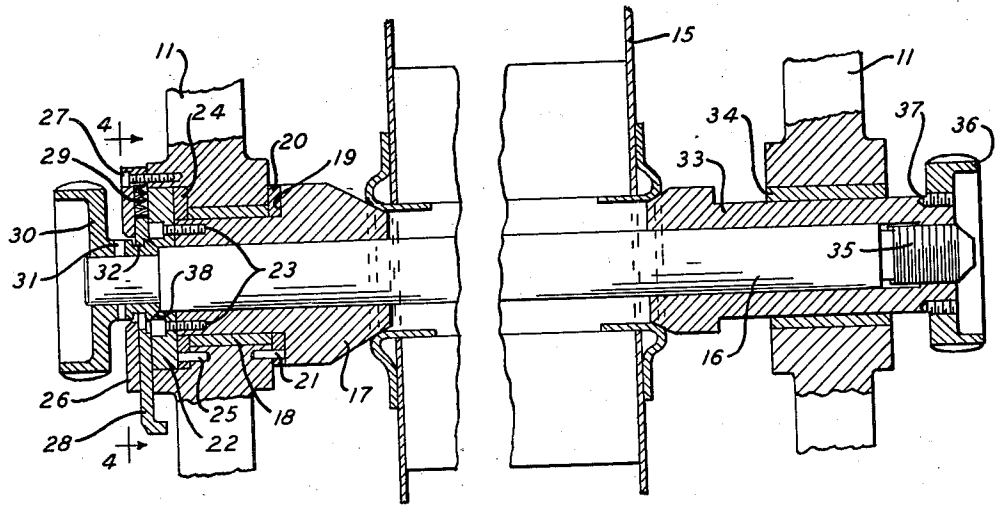


FIG. 2.



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FIG. 3.

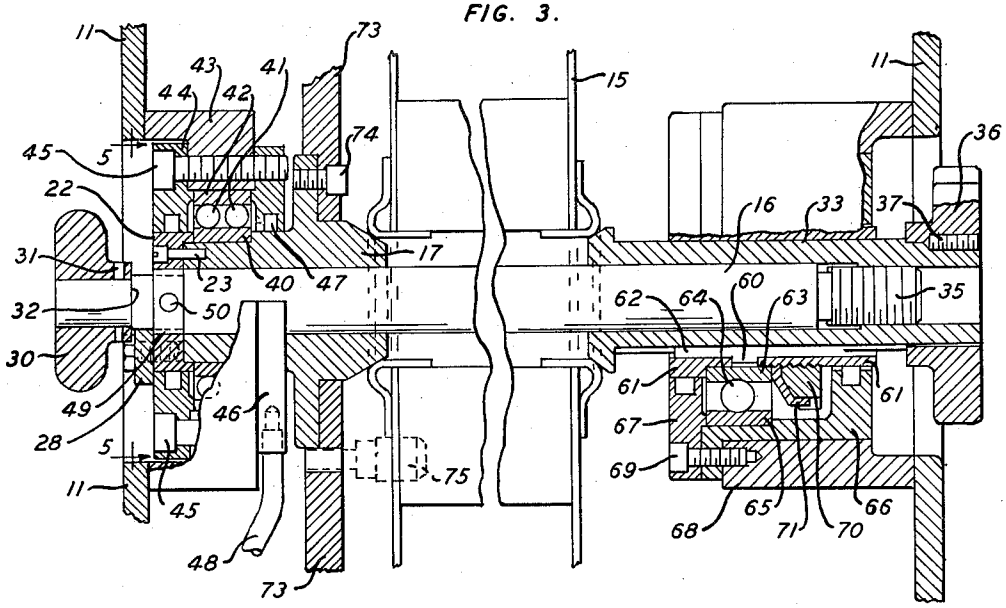


FIG. 4.

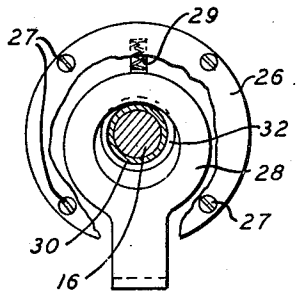
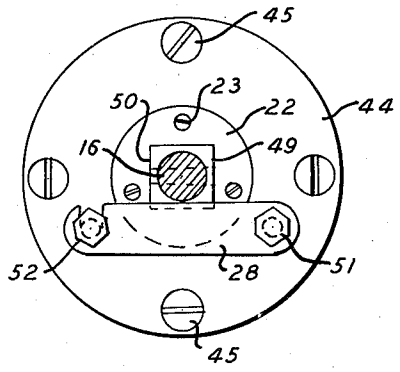


FIG. 5.



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MATERIAL HANDLING APPARATUS

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Application January 10, 1934, Serial No. 705,987

6 Claims. (Cl. 308—15)

This invention relates to material handling apparatus and more particularly to machines having interchangeable material supply or take-up means which are mounted on spindles or the like to be both rotatable on their own axes and revoluble about another axis not parallel thereto.

In machines of such kind the supply or take-up spools or the like are often subjected to cyclically varying and even cyclically reversed centrifugal stresses having a component in the direction of the axis of the spool. These are effective to rack the bearings on which the spool turns as strand is drawn therefrom, tend to vary the resistance of the spool to turning and thus impose a varying tension upon the strand being drawn therefrom, and also tend to loosen the means whereby the reels are attached to the spindles. Thus in some instances in the manufacture of the four conductor cable elements known as a "quad" in the telephone art, four supply spools are mounted with individual freedom to rotate on their own axes in a frame which is revoluble about a direction perpendicular to the common plane of the axes of the spools. Means are provided to maintain the axes of the four spools parallel to each other as they revolve. In consequence one diametral pair of spools will be subject to a maximum axial centrifugal stress and hence will tend to offer maximum frictional resistance to the withdrawal of their strands at the moment when the other pair is least affected.

It is an object of the present invention to provide a simple, strong and effective mounting for a rotatable element which shall permit of quick and easy interchange of elements mounted thereon and which shall be affected to a minimum extent by varying stresses along the axis of rotation.

With this and other objects in view an illustrative embodiment of the invention comprises a spindle withdrawably mounted in a bearing at either end, the bearings being carried by any desired framework. The spindle is free both to rotate and to slide axially in one of the bearings, but means are provided at the other bearing to prevent axial motion of the spindle therein while permitting freedom of rotation. These latter means are releasable to permit of withdrawal of the spindle for interchanging a spool mounted thereon.

Other objects and characteristic features of the invention will clearly appear from the following detailed description of illustrative embodiments thereof taken in connection with the accompanying drawings in which the same reference numerals are applied to identical parts in the several figures and in which

Fig. 1 is a diagrammatic view of a supply spool carrying yoke of a cable making machine embodying the invention;

Fig. 2 is a detached enlarged broken view in central longitudinal section of the spool, spindle and mountings of Fig. 1;

Fig. 3 is a similar view of a modified form;

Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 2, and

Fig. 5 is a similar view on the line 5—5 of Fig. 3.

In the embodiment disclosed in Figs. 1, 2 and 4, the machine has a frame 10 revoluble about an axis running from left to right in the plane of the drawing above or below the figure. A yoke or reel support 11 is journalled in the frame at 12 and 13 and may be rotated in the frame by means not shown. The yoke is provided at the bearing 12 with an axial bore 14 through which a strand 9 may be drawn from a supply reel or spool 15 demountably carried on a spindle 16 journalled in the yoke.

The machine as a whole is not illustrated here as the general nature of the machine is not relevant to the invention, but a machine to which among others the present invention is applicable is illustrated in U. S. Patent No. 1,104,078 for a Twisting machine, issued July 21, 1914 on an application of William F. Smith.

A sleeve 17 is mounted freely on the spindle 16 near its left hand end (Fig. 2) and is provided with a cone at the right to enter the central bore of the spool 15 to support the left end of the same. The left portion of the sleeve 17 is formed as a plain cylindrical male bearing member supported in a bearing sleeve 18 carried by the yoke 11. The sleeve 17 is further formed with a shoulder 19 engaging a thrust collar 20 carried by the yoke 11 and fastened thereto by pins 21 or in any appropriate manner. A thrust block 22 is attached to the left hand face of the sleeve 17 by screws 23 and engages a thrust collar 24 also carried by the yoke 11 and attached thereto by pins 25.

A centrally perforated cover plate 26 is mounted on the yoke by screws 27 and is provided with an appropriate recess to receive and house a slidable perforated plate-like latch member 28. This latch 28 has limited vertical freedom of motion and is constantly urged downwardly by a spring 29.

A hand wheel 30 is rigidly mounted on the left

hand end of the spindle by a taper pin 31. The right hand sleeve like extension of the wheel is formed with a circumferential groove 32 to receive the latch 28 which prevents any accidental displacement of the spindle.

The right end of the spool 15 is supported on the conical left hand end of a sleeve 33 on the right hand end of the spindle 16. The main body of the sleeve is cylindrical and is free to slide and to rotate in a bearing 34 mounted in the yoke 11.

The right hand extremity of the spindle is formed with a male thread 35 to coact with a corresponding female thread in the bore of the sleeve 33, and a hand wheel 36 is mounted on the end of the sleeve with a press fit and keyed thereto by screws 37.

Assuming now that there is no spool in position and that it is desired to mount one, holding the hand wheel 36 motionless and rotating the hand wheel 36 the sleeve 33 is disengaged from the threaded end 35 of the spindle. Upward pressure on the latch 28 then releases the latter from the groove 32 and the spindle may be withdrawn toward the left from the sleeve 33 and until its right hand end disappears into the sleeve 17. A spool 15 is then placed in position and the spindle pushed back to enter and be again supported by the sleeve 33. The latch 28 rides up on the sloping right hand extremity 38 of the sleeve of the hand wheel 30, and drops into the notch 32 locking the spindle again against accidental displacement. Sleeve 33 is pushed to the left and engaged with threads 35. Actuation of the hand wheel 36 will then engage the coned left end of the sleeve with the spool and will lock the spool firmly between the sleeves 17 and 33.

The spool is now free to rotate with the sleeves 17 and 33 in the bearings 18 and 34, but is held against any lateral motion by the thrust members 19 and 22 coacting with members 20 and 24. At the same time provision is made for minor variations in spool length and for temperature changes in the dimensions of the yoke, etc. by the freedom of the sleeve 33 to move longitudinally in the bearing 34. Should the sleeve 33 accidentally loosen on the threads 35, the spindle is still locked in place by the latch 28.

Provision may be made for spools of considerably differing lengths by providing an appropriate number of sleeves 33 of suitably varying lengths.

Figs. 3 and 5 disclose a modified form of the same embodiment of the invention in which the spindle 16 of a take-up reel is carried near its left hand end in a sleeve 17 formed toward the right with a cone to engage and support a reel or spool or the like 15. At the left the sleeve 17 carries a double ball race 40 press fitted thereon and further held by the block 22 attached to the sleeve 17 by screws 23. Anti-friction bearing balls 41 run in the ball race 40 and also in an outer concentric ball race 42. The race 42 is rigidly held between an appropriately recessed block 43 and a cover plate 44 held in place on the block by screws 45. The block 43 is integral with or attached to the yoke or support 11 by any appropriate means not shown such as screws or welding. On the inner face of the block 43 is a cover member 46 attached thereto by the screws 45 and having internal passageways 47 leading to the balls 41 by which lubricating matter may be fed to the ball bearing through an inlet pipe 48.

To force the spindle 16 to rotate with the sleeve 17, a square collar 49 is fastened on the spindle by a pin 50 and is seated in a corresponding square recess in the block 22. The spindle is held against accidental longitudinal displacement by a latch member 28 pivoted at one end at 51 on the cover plate 44 and notched at its other end to fit over a headed screw stud 52 also mounted on the cover plate.

The left hand end of the spindle is provided as before with a hand wheel 30 fastened thereon by a pin 31, and the latch member 28 rides in a circumferential groove 32 around the spindle 16 between the collar 49 and the stem of the hand wheel.

The spindle 16 as before is mounted in a sleeve 33 having at its right hand end a hand wheel 36 press fitted on the sleeve and keyed thereto with screws 37. The sleeve is positioned on and attached to the spindle as before by being formed with a female thread coacting with a male thread 35 on the slightly reduced end of the spindle. The sleeve is provided externally with a broad collar 61 keyed to the sleeve by a key 62. The key 63 is provided with a short radially extending lug 60 fitting into a corresponding shallow recess in the inner surface of the collar.

An inner raceway 63 is positioned on the collar and abuts at its left side against a stop shoulder formed on the collar and at its right side against a double locking member 70, 71 threaded on the collar as shown.

Bearing balls 64 are positioned between and run in the raceway 63 and in a corresponding outer raceway 65. The raceway 65 is supported by and clamped between a block 66 and a cover plate 67 fastened together and to a support 68 by screws 69. The support 68 is integral with the yoke 11 or is attached thereto by means not shown such as screws or welding.

The sleeve 33 is longitudinally slidable in the collar 61 but is held against rotation therein by the key 62.

In this illustration the reel 15 is thought of as a take-up reel and so means are provided to drive the reel comprising a member 73 mounted on and rigidly attached to the sleeve 17 as by screws 74. This member may be e. g. a gear or pulley or other element driven by means not shown and in turn may drive the spool 15 not only by the frictional engagement of the sleeve 17 therewith but also, if desired, by the direct engagement of a spring pressed plunger 75 mounted on the member 73 with a corresponding recess in the spool head or by some other appropriate device, the details of such means being not pertinent to the present invention.

While the invention is disclosed as embodied in a strand handling apparatus it is evidently equally applicable in any apparatus for handling spooled or reeled materials.

The embodiments of the invention herein disclosed are merely illustrative and may be modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. In a reelable material handling apparatus, a support, a bearing therein, a sleeve rotatable in the bearing and confined thereby against axial displacement and adapted to engage a reel to support the same, a second bearing in the support, a second sleeve rotatable and axially displaceable therein and adapted to engage a reel, a spindle positioned in both sleeves, and means to secure the spindle to the second sleeve.

2. In a reelable material handling apparatus, a

support, a bearing therein, a sleeve rotatable in the bearing and confined thereby against axial displacement and adapted to engage a reel to support the same, a second bearing in the support, a second sleeve rotatable and axially displaceable therein and adapted to engage a reel, a spindle positioned in both sleeves, and means to detachably secure the spindle to the second sleeve.

3. In a reelable material handling apparatus, a support, a bearing therein, a sleeve rotatable in the bearing and confined thereby against axial displacement and adapted to engage a reel to support the same, a second bearing in the support, a second sleeve rotatable and axially displaceable therein and adapted to engage a reel, a spindle positioned in both sleeves, and means to detachably secure the spindle to the second sleeve and thereby secure a reel placed thereon between the two sleeves.

4. In a reelable material handling apparatus, a support, a bearing therein, a sleeve rotatable in the bearing and confined thereby against axial displacement and adapted to engage a reel to support the same, a second bearing in the support, a second sleeve rotatable and axially displaceable therein and adapted to engage a reel, a spindle positioned in both sleeves, and means to prevent relative axial displacement of the spindle and the first sleeve.

5. In a reelable material handling apparatus, a support, a bearing therein, a sleeve rotatable in the bearing and confined thereby against axial displacement and adapted to engage a reel to support the same, a second bearing in the support, a second sleeve rotatable and axially displaceable therein and adapted to engage a reel, a spindle positioned in both sleeves, means to secure the spindle to the second sleeve, and means to prevent relative axial displacement of the spindle and the first sleeve.

6. In a reelable material handling apparatus, a reel support comprising a supporting member, a spindle, a rotatable bearing in the member adapted to receive the spindle with freedom to slide axially, a second rotatable bearing in the member to receive the spindle, and releasable means to prevent relative axial displacement of the spindle and the bearing, including a groove on the spindle and a perforated latch member carried by the supporting member through which the spindle passes and movable into and out of engagement in the groove.

HARRY H. MERWIN.