July 21, 1931. R. R. NYDEGGER 1,815,269

APPARATUS FOR SUPPLYING MATERIAL

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FIG. 1.

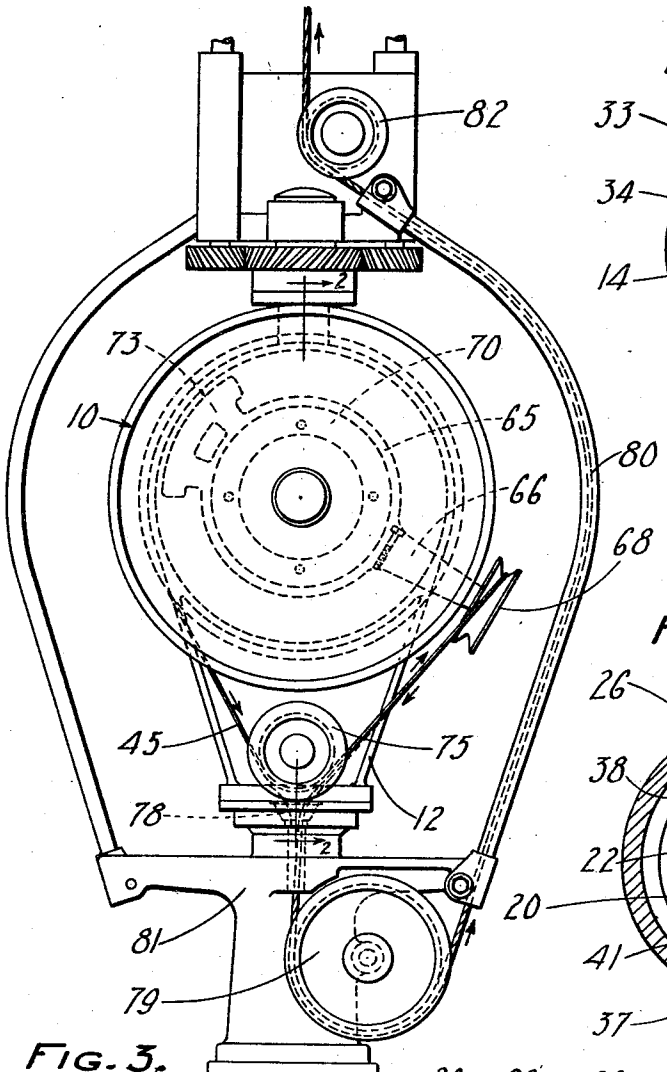


FIG. 5.

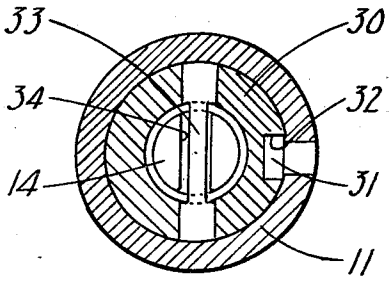


FIG. 4.

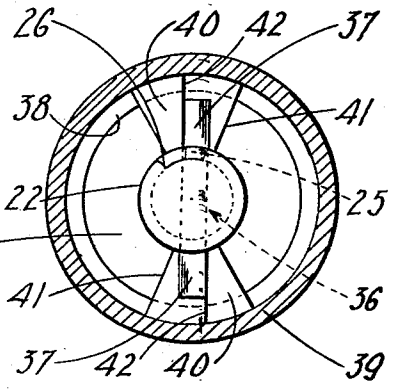
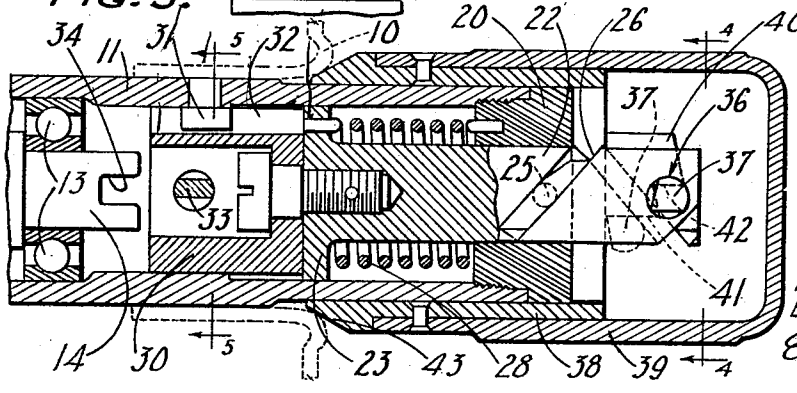


FIG. 3.



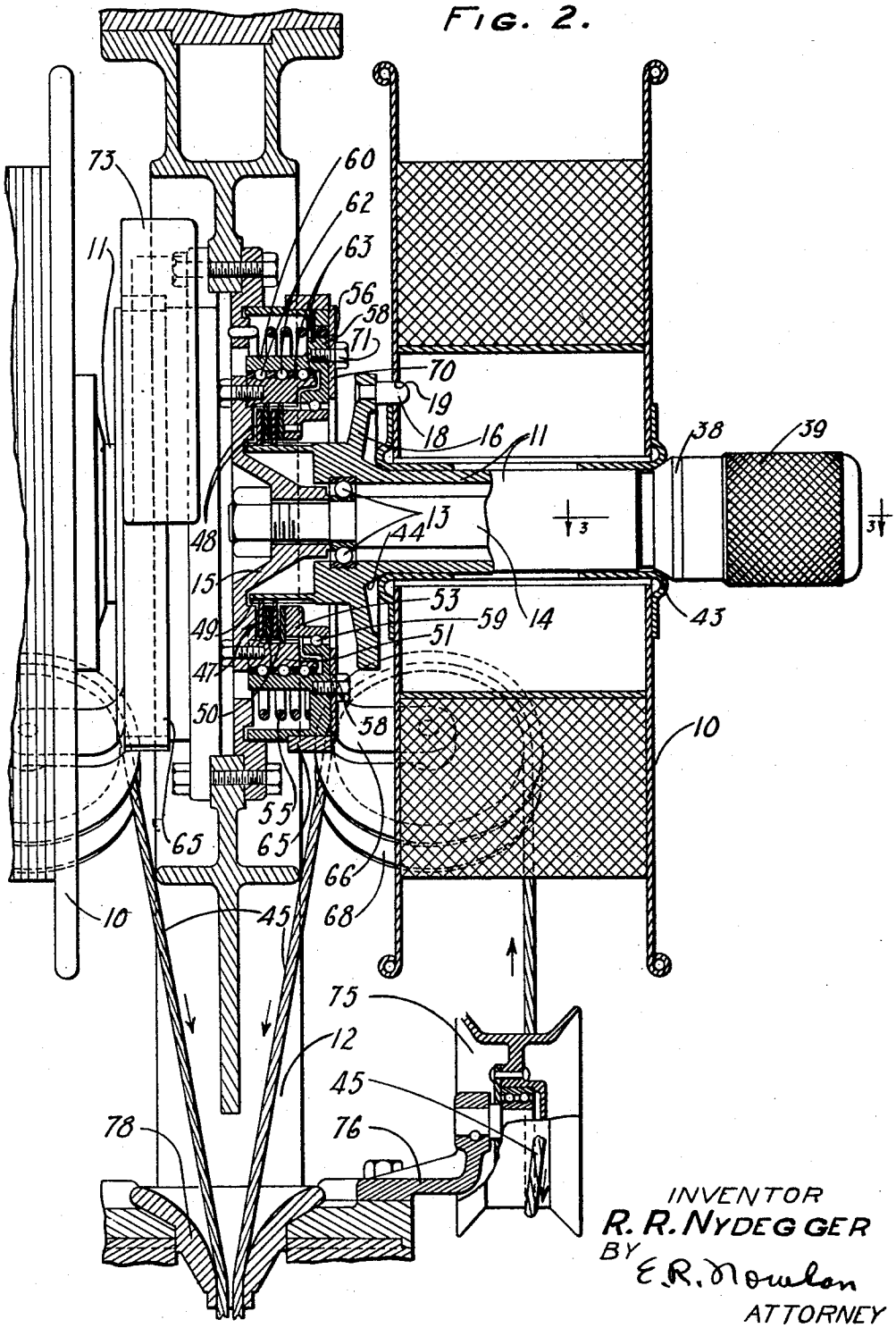
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APPARATUS FOR SUPPLYING MATERIAL

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FIG. 2.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR SUPPLYING MATERIAL

Application filed January 25, 1930. Serial No. 423,410.

This invention relates to an apparatus for supplying material and more particularly to an apparatus for supporting strand supply reels and for maintaining material being withdrawn therefrom under a predetermined tension.

An object of the invention is to provide a simple and efficient apparatus for supporting a supply of material and for delivering material therefrom at a constant tension.

In accordance with the general features of the invention, there is provided in one embodiment thereof an apparatus for supplying strand material, wherein a strand supply reel is locked in place upon a rotatable tubular arbor by means of a sleeve placed over the end of the arbor and having inwardly projecting jaws adapted, when the sleeve is rotated, to engage and rotate a spring controlled member slidably mounted within the arbor. When rotated, the member moves outwardly against the action of a spring to a position wherein the sleeve is securely locked thereto, through the engagement of a pin carried by the arbor with a helical groove formed in the member. The outward movement of the member also renders the arbor freely rotatable. Upon further rotation of the sleeve in the same direction, the grooved member is moved outwardly to permit the removal of the reel locking sleeve, after which the member is automatically moved inwardly by the spring to thereby lock the arbor against rotation. A multiple disc friction brake, controlled by a spring actuated member through a screw thread ball bearing camming action, maintains the strand under a predetermined constant tension as it is withdrawn from the supply reel.

The above and other features and advantages of the invention will be clearly understood from the following detailed description, reference being had to the accompanying drawings, wherein

Fig. 1 is a side elevational view of a portion of a strand twisting apparatus embodying features of the invention;

Fig. 2 is an enlarged fragmentary vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged detailed section taken on line 3—3 of Fig. 2 showing the improved arbor and reel locking device; and

Figs. 4 and 5 are detailed sections taken on lines 4—4 and 5—5, respectively, of Fig. 3.

Referring now to the drawings wherein like reference numerals designate corresponding parts in the several views, it will be observed that the invention is illustrated in connection with a strand twisting apparatus, wherein strand supply reels 10—10 (Fig. 2) are supported upon tubular arbors 11—11 carried upon opposite sides of a stationary pedestal or supporting stand 12. Each of the arbors 11 is rotatably supported by means of roller bearings 13—13 upon a stationary horizontal shaft 14 attached at its inner end to a bracket 15 (Fig. 2) secured to the pedestal 12.

An annular flange 16 formed on the inner end of the arbor 11 carries a driving pin 18 adapted to engage a corresponding aperture 19 in a head of the supply reel whereby the reel is rotatable with the arbor. The arbor 11 is internally threaded at its outer end to receive an externally threaded collar 20 (Fig. 3). A threaded member 22 is axially slidable in the collar 20 and has an annular flange 23 formed on its inner end which fits loosely within the arbor 11. A pin 25 secured to the collar 20 extends into a helical left hand thread or cam groove 26 formed in the periphery of the member 22. A torsional spring 28 encircles the member 22 and is secured at one end to the collar 20 and at its opposite end to the flange 23 of member 22.

Pivotally carried upon the flanged inner end of the threaded member 22 is a cylindrical locking member 30 which is slidable in the arbor 11 but restrained from rotation with respect thereto by a pin 31 secured to the arbor and engaging a longitudinal peripheral slot 32 in the member 30. A locking pin 33 carried by the member 30 is adapted to engage a cooperating slot 34 formed in the outer end of the stationary shaft 14 when the member 30 is moved to the left (Fig. 3), whereby the arbor 11 is positively locked against rotation.

A locking pin 36 extends transversely

through the member 22 near the outer end thereof and terminates in wedge shaped portions 37—37 which project from opposite sides of the member. A sleeve 38 having an externally knurled cap 39 attached thereto is designed to fit over a reduced outer end portion of the arbor 11 and is formed with diametrically opposed inwardly projecting jaw members 40—40 designed to cooperate with the wedge portions 37 of locking pin 36 to lock the sleeve 38 against the outer head of the reel under the tension of spring 28.

When it is desired to lock a reel in position upon the arbor, the locking sleeve 38 is placed over the end of the arbor and then turned in a clockwise direction (Fig. 4) and simultaneously pressed inwardly. As indicated in dotted outline in Fig. 3, the surfaces 41—41 of the jaw members 40 engage the wedge shaped end portions 37 of the locking pin 36 and thereby rotate the threaded member 22 in a clockwise direction against the action of the spring 28. The rotation of the member 22 is transmitted through pin 25 and helical cam groove 26 to cause a corresponding outward movement of the member and thereby the cylindrical locking member 30, whereby the locking pin 33 is disengaged from the slot 34 in the end of stationary shaft 14, thus rendering the arbor freely rotatable. The outward movement of the threaded member 22 also causes the locking pin 36 to move outwardly along the surfaces 41 of the jaw members 40, and upon clearing the end of the surfaces 41, the wedge portions 37 of the locking pin drop into V-shaped grooves 42—42 of the jaw members under the action of the spring 28, thereby securing the locking sleeve in position.

It will be understood that the locking sleeve exerts a constant pressure upon the outer head of the reel due to the action of the torsional spring 28. The reel is accurately centered upon the arbor by means of a tapered end portion 43 of the locking sleeve 38 and a cooperating tapered portion 44 of the arbor.

In order to remove the reel from the arbor, the locking sleeve is turned in the same direction as mentioned above and simultaneously pressed inwardly, causing the threaded member 22 to move outwardly until the locking pin 36 clears the outer end of the jaw members 40, whereupon the screw member is rotated in a counter-clockwise direction under the action of the spring 28, thereby disengaging the locking pin from the jaw members. The counter-clockwise rotation of the member 22 is transmitted through pin 25 and helical groove 26 to cause an inward movement of the member, whereby the pin 33 is engaged in the slot 34 of the stationary shaft 14, thus positively locking the arbor against rotation.

From the above described construction and arrangement of the parts it will be obvious that unless the locking sleeve 38 is securely locked in position, the arbor is automatically locked against rotation, thereby preventing the withdrawal of the strand therefrom. This feature of the invention insures the proper locking of the reels upon the arbors before starting the operation of the apparatus.

Mechanism is provided for maintaining a strand 45 drawn from the supply reel 10 under a predetermined constant tension at all times. This mechanism comprises a multiple disc friction brake 47 (Fig. 2) which consists of a plurality of spaced friction discs 48, 48 slidably keyed to an inwardly projecting cylindrical portion 49 of the arbor 11 and arranged to engage a plurality of correspondingly spaced friction discs 50, 50 slidably keyed to a stationary collar 51 attached to the bracket 15. The friction discs 48 and 50 are normally compressed between the bracket 15 and a cooperating collar 53 under the action of a torsional coil spring 55 having one end attached to the bracket 15 and its other end adjustably fastened in one of a plurality of apertures 56 in an annular member 58. The member 58 is free to turn with respect to the collar 53 through a thrust bearing 59 and is formed with a cylindrical portion 60 having internal left hand threads or spiral grooves which cooperate with corresponding spiral grooves, formed on the periphery of the collar 51, to accommodate ball bearings 62, 62 carried by a retaining sleeve 63 interposed between the collar 51 and the cylindrical portion 60 of the annular member 58. The construction just described is such that upon the rotation of the annular member 58 in a clockwise direction (Fig. 1) against the action of the spring 55, the braking pressure of the friction discs 48 and 50 is reduced, while the rotation of the member in a counter-clockwise direction increases the braking pressure of the friction discs.

A sleeve 65 carried by the annular member 58 has an arm 66 projecting therefrom which carries an idler sheave 68 at its outer end. The sleeve 65 is fixed to the member 58 so as to be rotatable therewith by means of a retaining plate 70 attached to the member by screws 71. By loosening the screws 71, the sleeve 65 may be turned with respect to the member 58 so as to change the normal operating position of the idler pulley 68 as desired, after which the screws are tightened to secure the sheave supporting sleeve in the adjusted position. The weight of the arm 66 and sheave 68 is counter-balanced by a diametrically opposed projection or counterweight 73 formed on the sleeve 65 (Fig. 1).

In the operation of the above described tension controlling mechanism, the strand 45 drawn from the supply reel 10 passes over a guide pulley 75 mounted on a fixed bracket 76 attached to the supporting framework of

the apparatus. From the pulley 75 the strand passes over the guide sheave 68, through a bell mouthed bushing 78, over a guide sheave 79, through a tubular arm 80 of a flier 81, and then over a guide sheave 82 to a take-up reel (not shown). At a point between the bushing 78 and the guide sheave 79 the strand is twisted in a well known manner with one or more companion strands through the rotation of the flier 81. The strand, in passing over the guide sheave 68 under tension, tends to rotate the sleeve 65 and thereby the annular member 58 against the action of the torsional spring 55. The rotation of the member 58 is transmitted through the camming action of the ball bearings 62 in the left hand spiral grooves of the member and collar 51 to cause a corresponding axial movement of the member and thereby the collar 53 to thereby vary the braking pressure of the friction discs 48 and 50, in accordance with variations of the tension on the strand. Thus, when the tension on the strand increases, as for example when starting or accelerating the rotation of the supply reel, the member 58 is rotated in a clockwise direction (Fig. 1) which, through the screw ball bearing camming action above described, causes the member 58 and thereby the collar 53 to move toward the right (Fig. 2) thus decreasing the braking pressure of the friction discs with a resulting reduction in the tension on the strand. When the tension on the strand decreases, as for example when decelerating or stopping the rotation of the supply reel the member 58 is rotated in a counter-clockwise direction by the spring 55. This rotation of the member causes the collar 53 to move to the left (Fig. 2) thus increasing the braking pressure of the friction discs with a resulting increase in the tension of the strand. In this manner the strand is maintained under a constant tension at all times. The coil spring 55 may be adjusted to provide a predetermined tension on the strand under normal operating conditions.

From the above description it will be apparent that the invention provides a simple and efficient apparatus for supporting strand supply reels and for maintaining material being withdrawn therefrom under a predetermined constant tension at all times. It will be understood, of course, that the invention is capable of other applications within the scope of the appended claims.

What is claimed is:

1. In an apparatus for supplying material, a rotatable arbor for supporting a supply of the material, a member for locking the arbor against rotation, and common means for securing the supply of material upon the arbor and for releasing the locking member to permit the rotation of the arbor.

2. In an apparatus for supplying material, a support for holding a supply of material, a member attachable to the support for securing the material thereto, an element carried by the support and movable with respect thereto, said element having a portion for locking engagement with the member, and means responsive to a relative movement between the member and the support for moving the element with respect to the member to attach the member to the support.

3. In an apparatus for supporting material, a support, a member attachable to the support for securing the material thereto, and means responsive to a movement of the member in one direction with respect to the support for locking the member to the support, the said means being responsive to a further movement of the member in the same direction for detaching the member from the support.

4. In an apparatus for supplying material, an arbor for supporting a supply of material, and means for securing the supply upon the arbor comprising a member mounted within the arbor, a sleeve mounted upon the arbor and having a portion engaging the member, and means responsive to a relative rotary movement between the sleeve and the arbor for causing a relative axial movement between the arbor and the member to thereby lock the sleeve upon the arbor.

5. In an appartaus for supplying material, a rotatable arbor for supporting a supply of material, and means for securing the supply upon the arbor comprising a threaded member mounted within the arbor, a sleeve rotatable about the arbor and having a portion engaging the member, a pin carried by the arbor and cooperating with the threaded member in response to a relative rotary movement between the sleeve and the arbor for causing a relative axial movement between the arbor and the member to thereby lock the sleeve upon the arbor.

6. In an apparatus for securing a strand supply reel to a supporting arbor, a member slidably mounted within the arbor and having a spiral groove formed in the periphery thereof, a sleeve rotatable about the arbor and having an inwardly projecting portion engaging the member, and a pin carried by the arbor and engaging the spiral groove in the member for causing an axial movement of the member with respect to the arbor in response to a relative rotary movement of the sleeve and thereby the member with respect to the arbor.

7. In an apparatus for supporting a strand supply reel, an arbor, a spring pressed spirally grooved member slidable within the arbor and rotatable with respect thereto, a locking pin carried by the member, a retaining sleeve slidable and rotatable upon the end of the arbor and having an inwardly projecting notched portion for accommodating the locking pin, and means carried by the arbor and

cooperating with the grooved member upon a rotary movement of the sleeve to cause an interlocking engagement of the sleeve with the locking pin whereby the sleeve is pressed against the reel by the spring pressed member.

8. In an apparatus for supporting a strand supply reel, a reel supporting arbor, and means for locking the reel in position upon the arbor, comprising a spring pressed member slidable and rotatable within the arbor, a sleeve rotatable about the arbor and having a portion for engaging the reel and a portion for interlocking engagement with the member, and means responsive upon a relative rotary movement between the arbor and the sleeve to cause a relative axial movement between the member and the arbor and thereby an interlocking engagement of the sleeve with the member.

9. In an apparatus for supporting a strand supply reel, a stationary supporting shaft, a tubular arbor rotatable upon the shaft, a member slidable within the arbor and carrying means for engaging the shaft to lock the arbor against rotation, a spring for normally holding the arbor locked to the shaft, a sleeve for cooperating with the member to lock a reel in position upon the arbor and having an inwardly projecting portion for interlocking engagement with the member, and means responsive to a relative rotary movement between the sleeve and the arbor for causing a relative axial movement between the member and the shaft to thereby release the arbor for free rotation and simultaneously lock the sleeve to the member.

In witness whereof, I hereunto subscribe my name this 17th day of January A. D., 1930.

ROLAND R. NYDEGGER.