

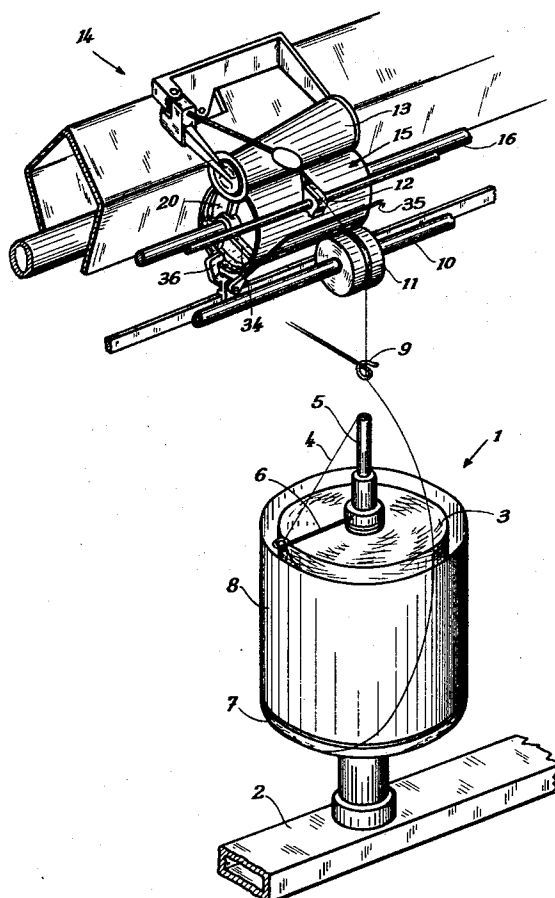
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[31] **P 17 10 118.7 and P 17 74 696.2**

[50] Field of Search..... 242/18, 18
(DD), 43.2, 36, 37, 39

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[54] **FRICITION ROLLER FOR DRIVING WINDING-UP**
BOBBINS AT THE CIRCUMFERENCE THEREOF
20 Claims, 11 Drawing Figs.
[52] U.S. Cl..... 242/18,
242/36, 242/37
[51] Int. Cl..... B65h 54/02;
B65h 63/02

ABSTRACT: A friction roller structure for driving winding-up bobbins at the circumference thereof which includes a roller body normally frictionally coupled by a helical spring to a drive shaft, and means by which the frictional coupling connection between said roller body and said drive shaft may be interrupted by changing the coil diameter of said helical spring.



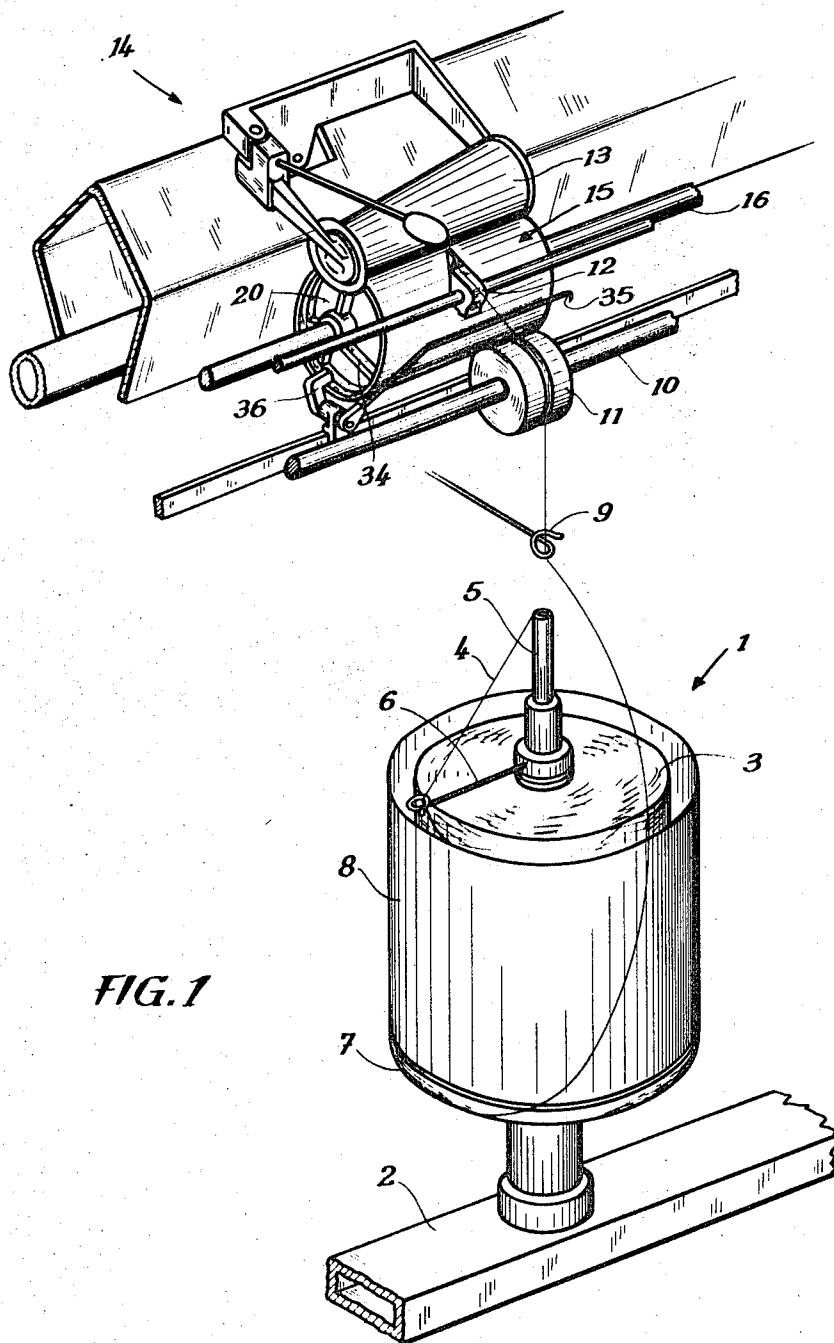
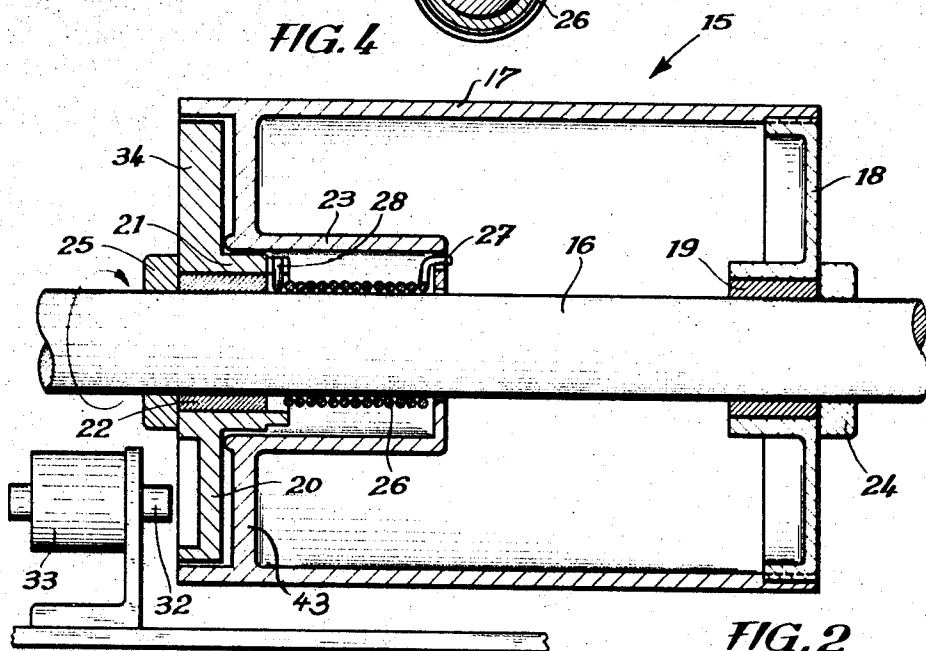
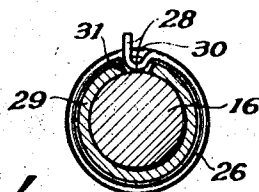
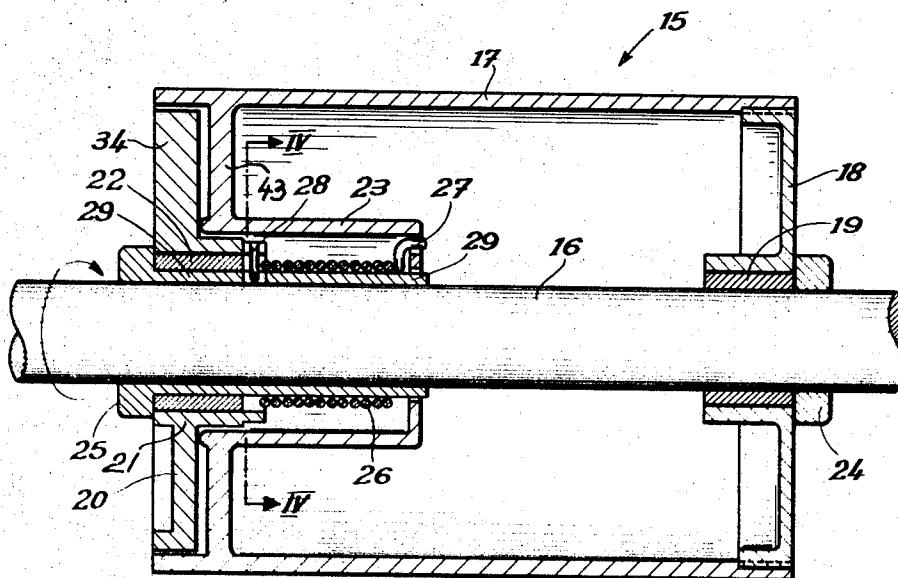
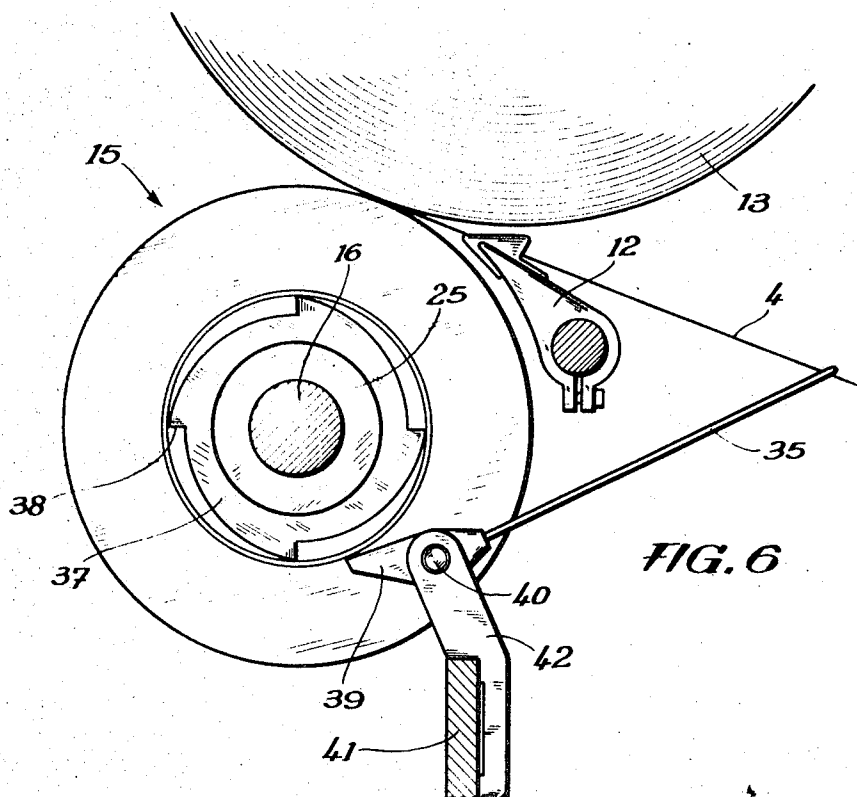
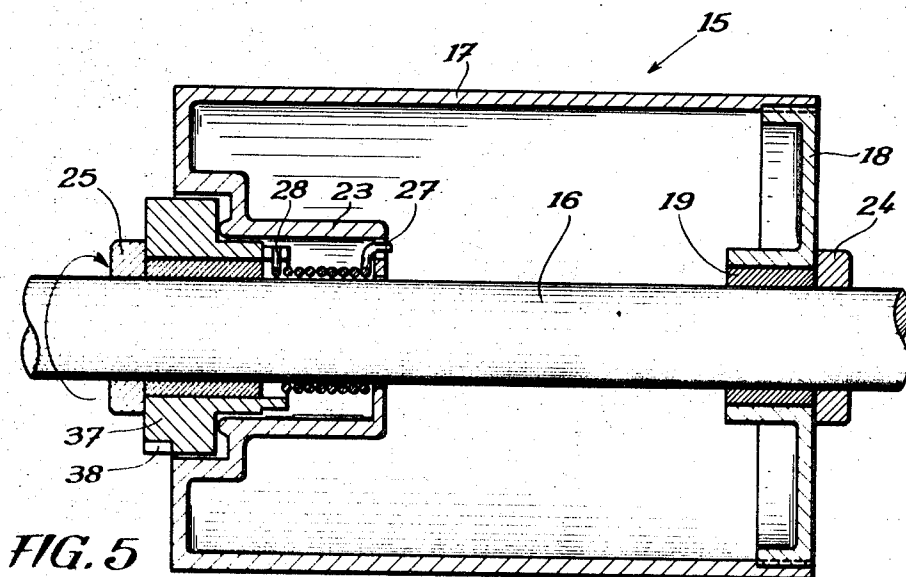


FIG. 1

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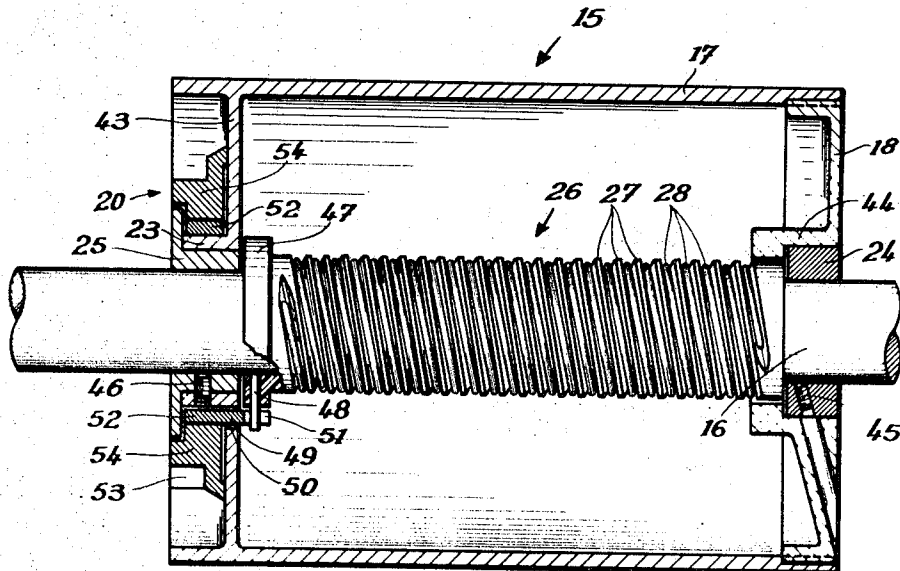


FIG. 7

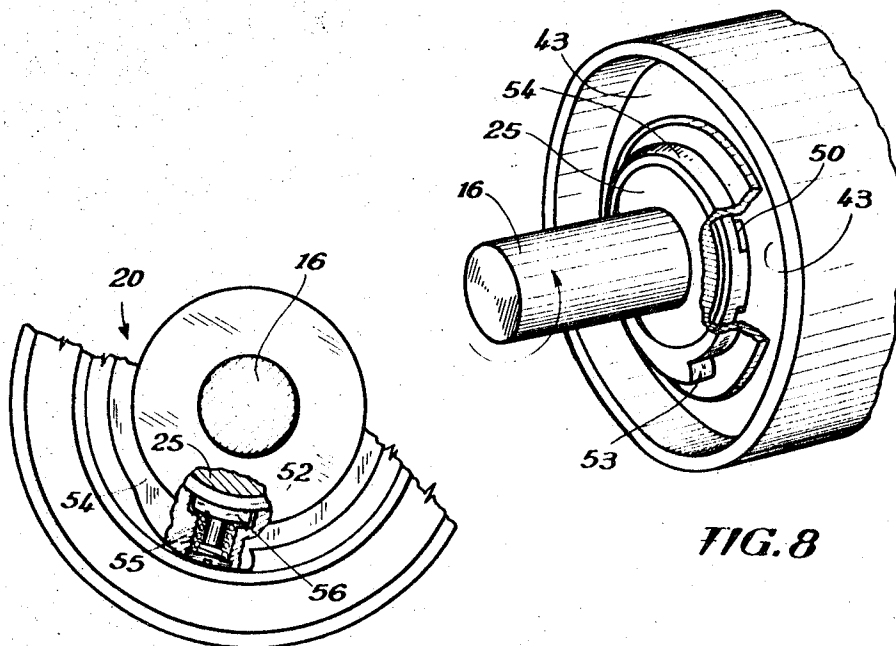


FIG. 8

FIG. 9

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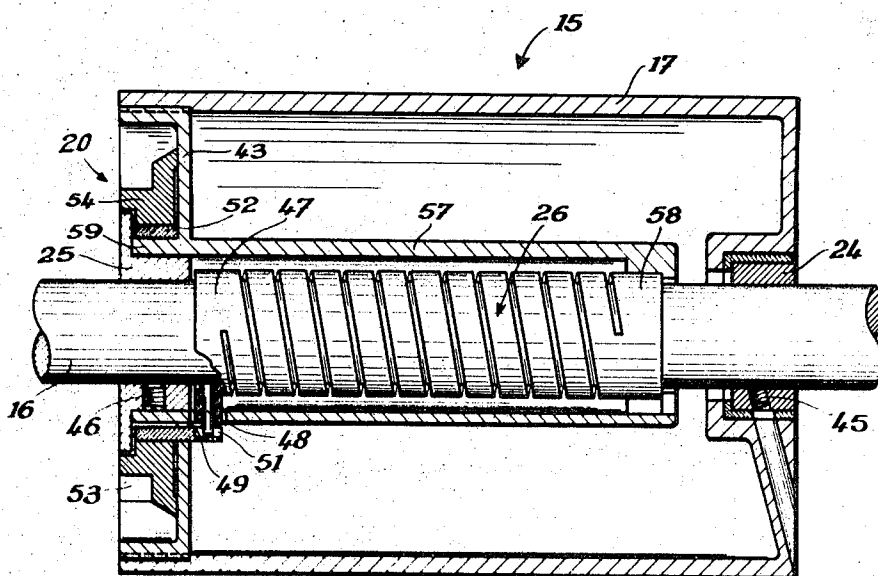


FIG. 10

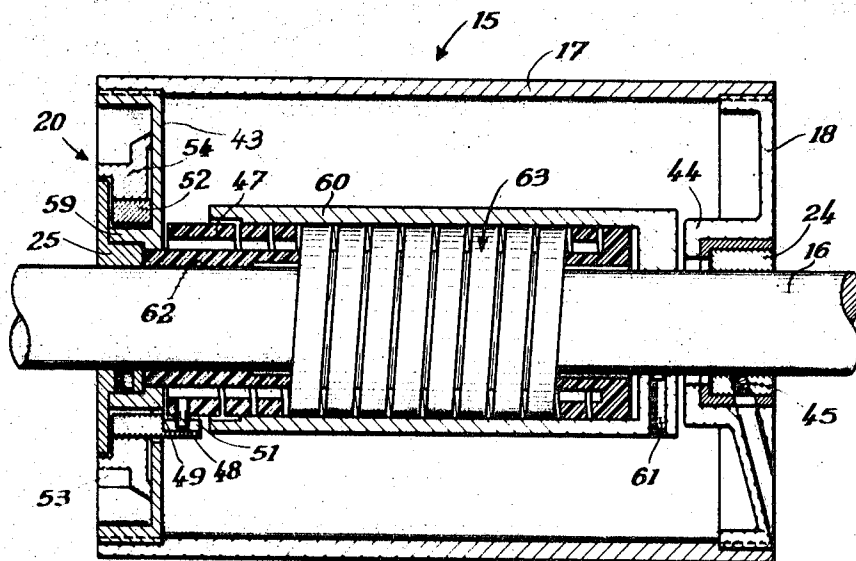


FIG. 11

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FRICION ROLLER FOR DRIVING WINDING-UP BOBBINS AT THE CIRCUMFERENCE THEREOF

The present invention relates to a friction roller for driving winding-up bobbins at the circumference thereof which friction roller is connected to the drive shaft by means of a clutch adapted to be disengaged during operation.

With textile machines which have a winding-up bobbin part, it must be possible to stop every individual winding-up bobbin independently of the other. This is of importance, for instance, when a winding-up bobbin has been completed and an empty sleeve is to be mounted or when a thread break occurs which requires a knotting together of the thread ends. Such operation makes it necessary to stop the entire working station and, in case of a two-for-one twisting machine, requires the stopping of the spindle as well as of the winding-up bobbin.

For the stopping of a winding-up bobbin which is mounted in a tiltably journaled bobbin frame, it is known to design the bobbin frame so that it can be tilted upwardly so that the winding-up bobbin by the tilting movement will be disengaged from the friction roller which continues to rotate.

Starting with a friction roller which is connected to its drive shaft by means of a clutch and which serves for driving winding-up bobbins at the circumference thereof, it is an object of the present invention to design the clutch so that it can be disengaged and reengaged during operation and will during rotation as well as during standstill assure a precise journaling of the friction roller on the drive shaft.

It is another object of this invention so to design a clutch of the type set forth in the preceding paragraph that the stopping as well as the restarting of the winding-up bobbin will be effected very smoothly.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is an isometric view of a two-for-one twisting spindle which is mounted on a spindle rail and is equipped with a winding-up bobbin held above the bobbin frame.

FIG. 2 shows a section through the embodiment of a friction roller according to the invention.

FIG. 3 represents a section through a second embodiment of a friction roller according to the invention.

FIG. 4 is a section taken along the line IV-IV of FIG. 3.

FIG. 5 illustrates a section through a third embodiment of a friction roller according to the invention.

FIG. 6 represents the end face of the friction roller shown in section in FIG. 5 with a winding-up bobbin engaged by the said friction roller.

FIG. 7 is a longitudinal section through a friction roller with a helical spring serving as clutch element for effecting connection with the drive shaft.

FIG. 8 is a perspective view of one end face of the friction roller according to FIG. 7 with an arresting protrusion.

FIG. 9 is a partial view of the end face of FIG. 8, partially sectioned.

FIG. 10 is a longitudinal section through still another embodiment of a friction roller body pertaining to a friction roller similar to that of FIG. 7.

FIG. 11 illustrates in longitudinal section a friction roller according to the invention with a helical spring serving as clutch element.

The friction roller according to the present invention is characterized primarily in that the friction roller body is freely rotatably journaled on the drive shaft and its coupling connection with the drive shaft is effected by a helical spring which within the friction roller body extends around the drive shaft while one end of said helical spring is frictionally connected to one bearing hub of the friction roller body whereas the other end of said spring is frictionally connected to an arresting disc which is freely rotatably journaled relative to the drive shaft and is adapted to be arrested from the outside. In this way it will be assured that when the arresting disc stops, which can be brought about in response to a thread regulator, the fric-

tional connection between the drive shaft and the friction roller is disengaged by means of the helical spring extending around the drive shaft, or when the arresting disc again starts to rotate, the helical spring again frictionally extends around the drive shaft.

According to one embodiment of the invention, the helical spring may be wound about a bearing bushing which is connected to the drive shaft, and that end of the helical spring which engages the arresting disc may have a radially inwardly directed crank adapted detachably to engage a recess in the bearing bushing. In this way a positive position arresting of the helical spring will be assured when a slip occurs which will be automatically stopped with the arresting operation. This is particularly advantageous with twisting machines in which the ratio of the withdrawing speed to the speed of rotation of the spindle must be held precisely constant in order to obtain a uniform twist of the thread. If, however, the arresting disc is stopped from the outside, with the widening of the helical spring, the crank slips out of the recess of the bearing bushing. As a result thereof, the encirclement of the drive shaft by the helical spring is ended and the disengagement is effected.

For stopping the arresting disc from the outside, various devices have been employed in conformity with the present invention. According to one solution, axially protruding abutments may be provided on the outer end face of the arresting disc while a stopping member is adapted during the rotation of the friction roller to move into the path of movement of said protruding abutments.

For purposes of simplifying the structural requirements of the clutch, it is suggested according to the present invention to journal the friction roller independently of the clutch members so that the weight of the winding-up bobbin which engages the friction roller will through the bearing portions of the friction roller body on the drive shaft be absorbed by the drive shaft without affecting the coupling members in their operation.

To this end, it is provided in conformity with the present invention that end of the helical spring which is adapted to be stopped from the outside extends with an axially directed arresting protrusion through an annular segmental-shaped recess in the end face of the friction roller body with lateral tilting play. This brings about that the journaling of the end face wall of the friction roller body will be completely independent of the coupling members by means of which the helical spring which is located inside the friction roller body will be affected from the outside for the coupling operation. This represents a considerable advantage for the effectiveness of the coupling operation when the friction roller is under load and for the central journaling thereof on the drive shaft.

According to a further development of the present invention, that end of the helical spring which can be stopped from the outside may be designed in the form of hub which is arranged within the friction roller body and extends around the drive shaft. The hub is by means of that arresting protrusion of the hub which extends through the end wall in the annular segmental recess, frictionally connected to the arresting disc. The arresting disc is journaled on the drive shaft outside the friction roller body and in front of the end wall. The said arresting disc is provided with at least one arresting abutment. This embodiment furnishes the possibility to provide a plurality of arresting abutments for stopping the helical spring which with a single arresting protrusion extends through the end wall of the friction roller body. The said arresting abutments may be distributed over the arresting disc.

The further design of the arresting disc is intended to assure that the coupling operation can be carried out still a smoother. To this end, in conformity with the invention, the arresting disc may comprise a bearing hub to which the arresting protrusion is molded which extends through the end wall, and may furthermore comprise an arresting ring which is provided with the arresting abutment and is freely rotatably journaled on the bearing hub. The arresting ring is by means of a radially inwardly directed friction shoe which is under the influence of

a spring force frictionally connected to the bearing hub. In view of this frictional connection within the arresting hub, namely between the arresting ring controllable from the outside and its bearing hub which is frictionally connected to the helical spring, an additional friction clutch is interposed between the arresting abutment and the friction roller body. In view of the arrangement of said friction clutch, it will be possible, when disengaging the friction roller from the drive shaft, in other words, when stopping the arresting ring and when disengaging the helical spring from the drive shaft, that the friction roller body rotates somewhat further and thus will come to a standstill in a soft manner and not in a shocklike or jerky manner.

The further advantage consists in that first only a small partial mass of the friction roller body, namely the arresting ring, is to be stopped which mass only with decreasing sliding of the arresting ring and the bearing hub increases to the total mass of the friction roller even though already with the first stopping of the arresting ring a disengagement of the helical spring from the drive shaft has taken place in view of the widening of the helical spring.

In connection with the mounting of the friction roller it may be of particular advantage that the clutch members can all be inserted as a unit from one side of the friction roller body into the same. To this end it may be advantageous that a bushing which with radial play extends around the helical spring and which extends inwardly through the entire friction roller body engages the inside of the end face wall which pertains to the friction roller body and cooperates with the arresting disc. The free end of said bushing is detachably connected to that end of the helical spring which engages one bearing hub of the friction roller body. In this way the friction roller is composed of a cylindrical body which by means of its end walls is journaled on the drive shaft and of the clutch members which from one side are introduced into the bushing extending through the friction roller body, said clutch members being formed primarily by the helical spring and the arresting disc. Thus, the installation as well as any possible repair of the clutch members are considerably simplified.

For safely centrally journaling the arresting disc and the friction roller body on the drive shaft, it is also possible in conformity with the invention to design the outside of the end wall so as to form a bearing hub for the arresting disc. In this way a central journaling of the friction roller body on the drive shaft, if desired through an engaging disc serving as bearing hub, will be assured for connecting the clutch members to the friction roller body.

In conformity with the above mentioned designs of the subject matter according to the invention, the helical spring directly surrounds the drive shaft with the result that a frictional connection is effected between shaft and the helical spring. According to a modification of this arrangement, it may be provided in conformity with the invention that the helical spring extends around the drive shaft with radial play and that in the clutch position the helical spring engages radially outwardly the inner mantle surface of a cylindrical bushing which surrounds the drive shaft with radial play and is fixedly connected to the drive shaft. Consequently, the drive shaft is supplemented by a bushing body which extends around the drive shaft in spaced relationship thereto but is fixedly connected to the drive shaft. The inner inner mantle surface of said bushing body represents the engaging surface for the helical spring for the clutch operation. For purposes of disengaging the clutch, the diameter of the helical spring is reduced so that its frictional contact with the inner mantle surface of the bushing is interrupted without, however, engaging the outer mantle surface of the drive shaft. The construction and mode of operation are thus fundamentally the same as with the other above mentioned embodiments.

According to a further development of the invention, the end wall of the friction roller body which cooperates with the arresting disc may be by means of its bearing hub frictionally extend around a bearing bushing which is freely rotatably

mounted on the drive shaft. This bearing bushing or bearing sleeve extends behind the bearing station with radial play relative to the drive shaft through the friction roller body and has that end of the bearing sleeve which is opposite said bearing station in engagement with the helical spring which from there extends with radial play relative to the bearing bushing to the end wall and in the engaged clutch position is in outward direction in engagement with the cylindrical bushing which is firmly connected to the drive shaft. In this way it will again be assured that the clutch members of the friction roller can be introduced into the friction roller body from one side whereby the installation is considerably facilitated.

If the friction roller is of a design according to which the helical spring extends with radial play around the drive shaft and is connected to the bearing sleeve which in its turn engages the end wall instead of the helical spring, also the bearing sleeve may consist of synthetic material and may form one single piece with the helical spring. Any synthetic material customarily used for helical springs may be used in this instance.

Furthermore, according to the invention, the spring wire of the helical spring may have a rectangular cross section so that the coupling friction surface of the helical spring with the driven counter surface will be increased. It will be appreciated that a helical spring with circular cross section has per each winding only a line contact with the drive shaft which, while assuring a good frictional connection in view of the many windings, can, however, be greatly improved by a rectangular cross section of the helical spring.

If the helical spring consists of synthetic material and has a rectangular cross section, the spring tension may be increased by providing the outer circumferential surface of the helical spring with a groove which is engaged by a helical spring of the same number of windings of spring steel and under tension.

Referring now to the drawings in detail, FIG. 1 shows a two-for-one twisting spindle 1 which is journaled in a spindle rail 2. The threads 4 on the delivery bobbin 3 carried by said spindle are withdrawn by a drag wing 6 which rotates about the hollow spindle shank 5. The threads 4 to be twisted pass through the hollow spindle shank 5 and radially leave the thread storage disc 7 of the spindle rotor; the threads then form a thread balloon around the protective pot 8, the zenith point of the thread balloon being located in the thread-guiding eye 9. As will be seen from the drawing, the twisted threads subsequently pass over the running-ahead roller 11 which is mounted on the driven shaft 10 and by means of a traversing thread guide 12 is wound upon the winding-up bobbin 13 over the length thereof. The bobbin 13 is by means of a bobbin frame 14 held between two arms thereof and is freely rotatably resting against the friction roller 15 which is journaled on the driven shaft 16.

The friction roller 15 is illustrated in different designs in FIGS. 2, 3 and 5 respectively. The friction roller 15 comprises a cylindrical friction roller body 17 which is centrally journaled on the drive shaft 16. To this end, at one end face there is provided a circular disc 18 which is screwed into the friction roller body 17 while the bearing hub of disc 18 is freely rotatable on the drive shaft 16 by means of a bearing bushing 19. The other end face 43 of the friction roller body 17 is by means of a bearing hub 23 journaled on the drive shaft 16. This end face 43 of the friction roller body 17 is covered from the outside by an arresting disc 20 which is freely rotatable by means of its bearing hub 21 and bearing bushing 22 on the drive shaft 16. The bearing hub 23 of the friction roller body 17 rests upon the bearing hub 21 of the arresting disc 20 in such a way that the friction roller 15 can rotate concentrically with or together with the drive shaft 16. The axial location of friction roller 15 is determined by the two discs 24 and 25 which are fixedly connected to drive shaft 16, e.g. by set screws (not shown).

The clutch for engaging the friction roller 15 and drive shaft 16, which clutch is disengageable during the operation, com-

prises, according to FIGS. 1—6, a helical spring 26 which under tension extends around the drive shaft 16. One end of the helical spring 26 engages the bearing hub 23 of the friction roller body 17, whereas the other end 28 of said spring 26 engages the bearing hub 21 of the arresting disc 20. By means of this helical spring 26 which in tensioned condition firmly engages the drive shaft 16, the friction roller 15 is frictionally connected to the drive shaft 16. When the helical spring 26 is in its relaxed condition, the friction roller body 17 will freely rotate on the drive shaft 16 together with the bearing bushings 19 and 22. If, consequently, the engagement between the friction roller body 17 and the drive shaft 16, namely the tension of the helical spring 26 at which the latter surrounds the drive shaft 16, is interrupted, the friction roller 15 will be without drive and, therefore, will stop with the winding-up bobbin 13 thereon, whereas the drive shaft 16 continues to rotate.

The disengagement of or subsequent connection of the driving part with the part to be driven of the friction roller 15 is effected by means of the clutch in a simple manner by stopping or releasing the arresting disc 20. More specifically, if the arresting disc 20 is stopped which rotates together with the friction roller body 17, the helical spring 26 which under tension extends around the drive shaft 16, is from its end 28 on which it is connected to the arresting disc 20 widened with regard to the end 27 which further rotates together with the friction roller body 17. In this way the frictional connection between the drive shaft 16 and the friction roller 15 is interrupted. If, however, the arresting disc 20 is no longer stopped from the outside, it can again rotate together with the drive shaft 16 so that the helical spring 26 will in view of its own tension automatically be tensioned so that again a frictional connection will be established between the drive shaft 16 and the friction roller body 17.

FIG. 3 shows a further embodiment of the invention and, more specifically, of a clutch detachable during operation. According to FIG. 3, the helical spring 26 is wound around the bearing bushing 29 which is connected to the drive shaft 16, e.g. by a set screw (not shown). The outer collar of the bearing bushing 29 simultaneously forms the abutment disc 25 for the arresting disc 23 which is freely rotatable on the bearing bushing 29. That end 28 of the helical spring 26 which engages the arresting disc 20 is, in conformity with FIG. 4, provided with a radially inwardly directed crank 30 adapted to detachably engage a recess 31 in the bearing bushing 29. This design has the advantage that it will be assured that the helical spring 26 in case of a slip will come into frictional and positive engagement with the drive shaft 16. It will be appreciated that, according to this embodiment, in addition to the tensioning of the helical spring 26, with the engagement of the recess 31 of bearing 29 by the crank 30, a positive connection is established between the drive shaft 16 and the friction roller 15. If the clutch is to be disengaged, the arresting disc 20 is stopped from the outside. As a result thereof, first the helical windings of spring 26 are widened against their spring tension while, if desired, the crank 30, if it is engaged, is moved out of the recess 31 of the bearing bushing 29 whereby the clutch is disengaged. For purposes of establishing a frictional connection, the arresting disc 20 is again released. When releasing the arresting disc 20, the helical spring 26 narrows in diameter whereby the connection between bearing bushing 29 and drive shaft 16 is established and thus the friction roller 15 will again drive the winding-up bobbin 13.

The engagement as well as the disengagement of the friction roller 15 and thereby the stopping of the arresting disc 20 may be effected in response to the reaction of a thread guide. If, for instance, a thread break occurs on a two-for-one twisting spindle, in which instance a thread guide will respond, an electromagnet 33 stationarily arranged on the machine will through a nonillustrated contact emitter with displacement armature 32 be caused to respond. The displacement armature 32 axially displaced in this way will move into the path of movement of the ribs 34 which extend from the center radially outwardly, whereby the arresting disc 20 by abutment of a rib

34 will be moved to the free end of the displacement armature 32 and stopped. With this stop of the arresting disc 20, the disengagement of the clutch starts, namely the widening of the helical spring 26 against its spring tension. Only when the frictional engagement of the drive shaft 16 by the helical spring 26 has been completely eliminated, will the disengagement operation be completed. The same remarks apply when coupling the friction roller 15 inasmuch as in reverse sequence, the helical spring 26 tensions and the drive shaft 16 is frictionally connected to the friction roller body 17.

The mechanical transmission of the pivotal movement of a thread guide in case of a thread break, and thus the movement of a stopper into the path of movement of the abutments of the arresting disc 20 is shown in FIG. 1. If the thread guide 35 which engages the thread is pivoted in case of a thread break, in clockwise direction, the arm 36 which is mounted on the pivot shank of the thread guide 35 will carry out a tilting movement and will tilt into the path of movement of the ribs 34 so that the arresting disc 20 is stopped.

A further possibility of stopping the arresting disc is illustrated in FIGS. 5 and 6. The outer marginal area of the arresting disc 37 is according to FIGS. 5 and 6 provided with recesses or steps the surface of which is spirally curved inwardly. It is against these arresting steps 38 of the arresting disc 37 that the arm 39 of the thread guard 35 is pivotable about the pivot 40. The pivot 40 is arranged at the free end of the holding arm 42 which latter is connected to the rail 41 extending along the machine.

According to FIGS. 7 to 11, the friction roller body 17 is at its end faces journaled on one hand by means of the screwed-in circular disc 18 and on the other hand by the end wall 43 so as to be freely rotatable on the drive shaft 16. While the bearing hub 44 of the circular disc 18 is journaled on drive shaft 16 by means of the disc 24 adapted to be connected to the drive shaft 16 by means of a set screw 45, the end wall 43 is journaled by means of the disc 25 which likewise by means of a set screw 46 is fixedly connected to the drive shaft 16 to prevent an axial displacement of the friction roller 15.

The friction roller body 17 is connected to the drive shaft 16 by means of a helical spring 26 which under tension extends around the drive shaft 16 (see FIGS. 7 and 10). The helical spring 26 may consist of synthetic material and has a rectangular cross section for purposes of increasing the friction surface engaging the counter surface of the clutch. As will be evident from FIGS. 10 and 11, the helical spring may have a solid rectangular cross section or, as indicated in FIG. 7, may have the outer circumferential surface of the helical spring 26 provided with a groove 27 which is engaged under tension by the helical spring 28 which has the same number of windings as the spring 26 but consists of spring steel. By designing the clutch spring 26 in this way, it is possible, when employing a spring of synthetic material, to increase the friction resistance between the friction surface of the spring and the clutch surface.

According to FIG. 7, one end of the helical spring 26, which end in all embodiments forms a ring, frictionally engages the bearing hub 44 of the circular disc 18. The other end of the helical spring 26 forms an annular hub 47 which is arranged directly behind the end wall 43 of the friction roller 17 within the latter and extends with slight play around the drive shaft 16.

The radially directed pin 48 is fastened in the hub 47 which forms the end of the helical spring 26, said end being as adapted to be stopped from the outside. In order to be able during a disengaging operation of the clutch from the outside to stop the helical spring 26 against the rotation of the friction roller 15 together with the drive shaft 16, in other words during the rotation to disengage the coupling between the friction roller body 17 and the drive shaft 16, the arresting protrusion 49 extends through the segmental recess 50 (FIG. 8) in the end wall 43 and frictionally engages the free end of pin 48 with lateral tilting play. To this end, there is provided a groove 51 located in that end of the arresting protrusion 49 which is

located within the friction roller body 17. This groove 51 is engaged by the free end of pin 48 whereby the helical spring 26 is firmly connected to the arresting protrusion in both directions of rotation.

The arresting protrusion 49 is formed onto the bearing hub 52 which, in conformity with FIG. 7, extends around the engaging disc 25, said hub 52 forming a portion of the arresting disc generally designated 20. The arresting disc 20 furthermore comprises an arresting ring 54 which is provided with the arresting abutment 53 and is freely rotatably journaled on the bearing hub 52. The arresting ring 54 is frictionally connected to the bearing hub 52 of the arresting disc 20 by means of friction shoes 56 which are shown in FIG. 9 and are radially inwardly directed, said friction shoes being spring biased by pressure springs 55. The friction shoe 56 merely establishes a frictional connection between the arresting ring 54 and the bearing hub 52 and thus with that end of the helical spring 26 which is adapted to be stopped from the outside.

There will now be described the movements of operation which occur during a disengagement of the clutch.

When the drive shaft 16 rotates and the arresting disc 20 by the arresting abutment 53 is not stopped from the outside, the friction roller body 17 is frictionally connected through helical spring 26 with the drive shaft 16, said helical spring 26 extending over the entire length of the friction roller body 17 and under tension extends around the drive shaft 16. When the arresting disc 20 is stopped from the outside, the friction shoe 56 will under the pressure of the spring 55 slide about the bearing hub 52 of the arresting disc 20 and will brake the bearing hub 52. Already the first retardation of the bearing hub 52 which occurs when stopping the arresting disc 20 will have such an effect upon the helical spring 26 that the latter will be widened against its tension whereby the rotary connection between the drive shaft 16 and the helical spring 26 or the friction roller body 17 is eliminated. This effect is brought about through the intervention of the arresting protrusion 49 which with lateral tilting play extends through the segmental recess 50 of the end wall 43 and is connected to the hub 47 of the helical spring 26 through a pin 48. In view of this design of the arresting disc 20, the clutch which is disengageable during the operation will permit the friction roller 15 to come to a standstill in a smooth and shock-free manner.

If the stop (not shown) for the clutch has engaged the arresting abutment 53 for the disengaging operation is now removed from the path of movement of the arresting abutment 53, the helical spring 26 will due to its own tension again firmly extend around the drive shaft 16. In this way automatically a frictional connection is established between the drive shaft 16 and the friction roller body 17.

According to the embodiment of FIG. 10, the clutch member of the friction roller 15 is so designed that it can be moved as a unit from one end face of the friction roller body 17 into the latter. As before, the friction roller body 17 will through the two end walls radially rest upon the drive shaft 16 while, in contradistinction to the embodiment of FIG. 17, the end wall 43 is now also designed as bearing for that end of the helical spring 26 which firmly engages the friction roller body 17. To this end, the bushing 57 is provided on the inside of the end wall 43 and with radial play extends around the helical spring 26, said bushing extending axially inwardly through the entire friction roller body 17. The free end of bushing 57 is fixedly connected to the ring 58 which is mounted on the drive shaft 16 and which forms that end of the helical spring 26 which is to be connected to the friction roller body 17.

According to the embodiment of FIG. 10, the end wall 43 forms a bearing for the arresting disc 20 inasmuch as the bearing hub 59 is formed onto the end wall 43. The arresting disc 20 is precisely centrally journaled on the bearing hub 59.

According to the embodiment of FIG. 11, the helical spring 63, in contradistinction to the embodiments of FIGS. 7 and 10, extends with radial play around the drive shaft 16 and in its coupling position radially outwardly engages the inner mantle surface of the cylinder bushing 60 which with radial play

partly extends around the drive shaft 16 and is fixedly connected thereto. The connection between the drive shaft 16 and the cylinder bushing 60 is effected by a set screw 61 which is screwed into the bottom of the cylinder bushing 60 and has its tip engaging the drive shaft 16.

If, in conformity with this embodiment, that end of the helical spring 63 which is connected to the arresting disc 20 is prevented from rotation by stopping the arresting ring 54, the helical spring 63 will not be widened as is the case with the embodiments of FIGS. 7 and 10. Instead, the helical spring will be reduced in diameter against the tension of the spring whereby the frictional connection between the outer surface of the helical spring 63 and the inner mantle surface of the cylinder bushing 60 will be lost. While the friction roller 15 is coming to a standstill, the drive shaft 16 may together with the cylinder bushing 60 continue to rotate within the friction roller body 17.

Similar to the embodiment of FIG. 10, the clutch member of the friction roller 15 is, in conformity with FIG. 11, so designed that it can be introduced into the friction roller 17 from one end face. To this end, the bearing hub 59 of the end wall 43 pertaining to the friction roller 17 extends around the bearing sleeve 62 which is freely rotatably journaled on drive shaft 16. Sleeve 62 extends behind said bearing station with radial play relative to the drive shaft 16 through the friction roller body 17 and merges with the helical spring 63 at that end which is remote from the bearing station. Also according to this embodiment, the helical spring 63 consists of synthetic material and is made of one piece together with the bearing sleeve 62.

All of the embodiments according to FIGS. 7, 10 and 11 have in common that the friction roller body 17 is journaled on the drive shaft 16 independently of the journaling of the arresting disc 20 or other clutch members. In this way, the engaging pressure of the winding-up bobbin resting on the friction roller 15 is initiated without affecting the coupling members. More specifically, the said engaging pressure is conveyed through the two end walls 18 and 43 into the drive shaft 16. Furthermore, the friction surface between the helical spring 26 and the counter coupling surface is with the illustrated embodiments improved by the design of the spring wire with a rectangular cross section relative to a spring with a round spring wire cross section. By increasing the friction surface between the clutch counter surface and the helical spring 26, it will be assured that the friction roller body 17 will be rotated by the drive shaft 16. Furthermore, the disengaging operation of the clutch will in view of the frictional connection between the arresting ring 54 and its bearing hub 52 be effected in a jerk-free and smooth manner. This will in an advantageous manner prevent that when the winding-up bobbin is stopped, a considerable relative movement will occur between the latter and the friction roller 15 which relative movement could be harmful for the uppermost thread layer of the winding-up bobbin.

It is, of course, to be understood that the present invention is, by no means means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

We claim:

1. In combination with a drive member formed by a drive shaft, a friction roller structure for selectively establishing and interrupting driving connection between said drive member and a winding-up bobbin of a textile machine, said roller structure including: a rotatable roller member forming a friction roller body supported by and rotatable about the longitudinal axis of said drive shaft, rotatable control means coaxial with and rotatable relative to said drive shaft, coupling means interposed between said friction roller body and said drive shaft and comprising helical spring means having at least a portion thereof arranged within said friction roller body and surrounding an adjacent portion of said drive member formed by said drive shaft, said spring means normally frictionally establishing driving connection between said members, said spring

means having one portion rotatably connected to one of said members and having another portion operatively connected to said rotatable control means, said control means being rotatable by said drive member through the intervention of said spring means and also being adapted to be held stationary to interrupt driving connection between said members.

2. A roller structure according to claim 1, which includes bushing means provided with a radially extending passage and being rotatably connected to said driving shaft, said bushing having said helical spring means wound therearound and normally in frictional engagement therewith, that portion of said spring means which is connected to said rotatable control means having a radially inwardly directed extension detachably engaging said passage.

3. A roller structure according to claim 1, in which said control means includes a disc having one end face facing outwardly and provided with axially protruding abutment means, and which includes stop means operable to engage said abutment means to keep said disc from rotating to thereby cause said helical spring means to interrupt driving connection between said members.

4. A roller structure according to claim 1, in which said control means includes ratchet wheel means, said roller structure also including thread regulator means and pawl means operatively connected to said thread regulator means and operable in response to a movement of said regulator means as a result of a thread break to engage said ratchet wheel means to stop the latter.

5. A roller structure according to claim 3, in which said abutment means includes rib means extending radially outwardly on said one end face.

6. A roller structure according to claim 3, in which said stop means is formed by electrically controlled means.

7. A roller structure according to claim 3, which includes thread regulator means and lever means operatively connected to said thread regulator means and forming said stop means, said lever means being operable in response to a thread break to engage said abutment means for stopping said disc.

8. A roller structure according to claim 6, in which said stop means includes an electromagnet and an armature controlled thereby.

9. A roller structure according to claim 1, in which said other portion of said helical spring means is provided with radial pin means, and in which said control means includes a bearing hub with axially extending protrusion means provided with recess means receiving said pin means and also includes an arresting ring surrounding said bearing hub and being frictionally connected to said bearing hub.

10. A roller structure according to claim 9, in which said rotatable body has an annular end wall with segmental passage means therethrough through which extend which extend said protrusion means, and in which said other portion of said heli-

cal spring means forms a hub having said radial pin means connected thereto, said arresting ring being located on the outside of said annular end wall.

11. A roller structure according to claim 9, in which said arresting ring includes spring-urged friction shoe means frictionally engaging said bearing hub.

12. A roller structure according to claim 1, in which said roller body is provided with end walls forming hubs and including bearing members connected to said drive shaft and supporting said hubs, said control means being arranged at and outside one of said end walls, and a bushing having one end portion connected to the hub of said last mentioned end wall and extending inwardly thereof with radial play around and along said helical spring means, the other end portion of said bushing being detachably connected to an adjacent portion of said helical spring means.

13. A roller structure according to claim 12, in which said control means is journaled on the hub of the adjacent end wall.

14. A roller structure according to claim 1, which includes: sleeve means arranged within said roller body and having an inner substantially cylindrical surface substantially coaxial with said drive shaft and surrounding the same in spaced relationship thereto, means connecting said sleeve means for rotation with said drive shaft, and a bushing substantially coaxial with said drive shaft and in radially spaced relationship to said inner cylindrical surface of said sleeve means so as to define therewith an annular space, said bushing being rotatably connected to said roller body and having a portion rotatably supporting said drive shaft, said helical spring means being located in said annular space and normally frictionally engaging said inner cylindrical surface, one end portion of said spring means being connected to said bushing.

15. A roller structure according to claim 14, in which said bushing is frictionally connected to said roller body.

16. A roller structure according to claim 12, in which said one end wall is detachably connected to said roller body to permit insertion of said into and said helical spring means as a unit into said roller body from one side thereof.

17. A roller structure according to claim 1, in which said helical spring means consists of synthetic spring material.

18. A roller structure according to claim 14, in which said bushing and said helical spring means form one single integral piece with each other.

19. A roller structure according to claim 1, in which the coils of said helical spring means have a rectangular cross section.

20. A roller structure according to claim 17, in which the outer circumferential surface of the coils of said helical spring means is provided with a helical groove extending along the coils of said helical spring means, and in which there is provided a steel spring having the same number of coils as said helical spring means and being located in said helical groove.

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