May 22, 1934. E. ZINDEL 1,959,606

MOUNTING DEVICE FOR SPOOLS IN WINDING MACHINES

Filed Nov. 21, 1932

Fig. 1

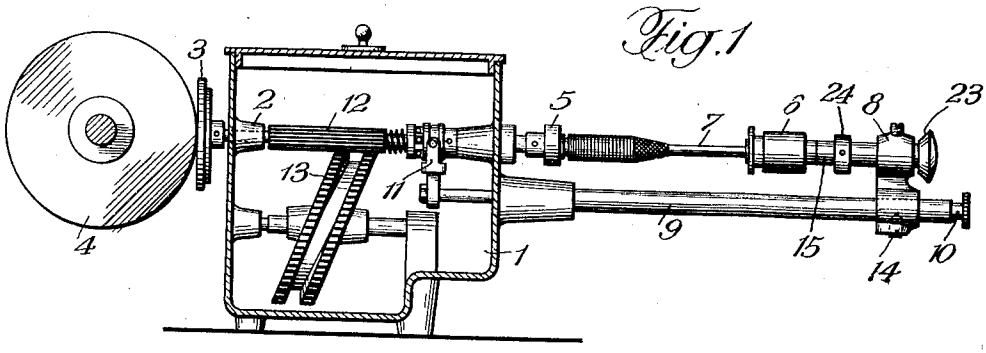
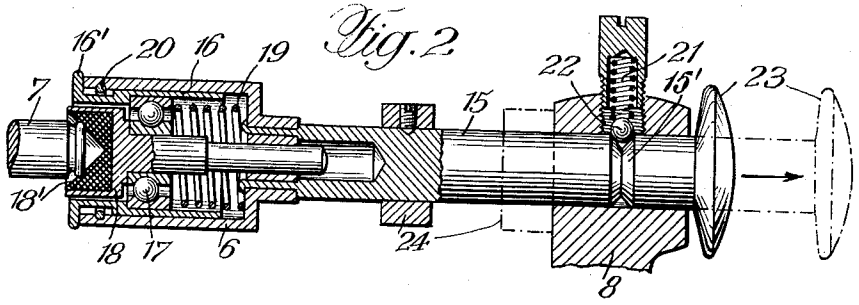


Fig. 2



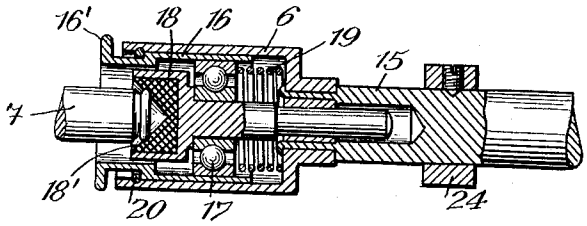


Fig. 3

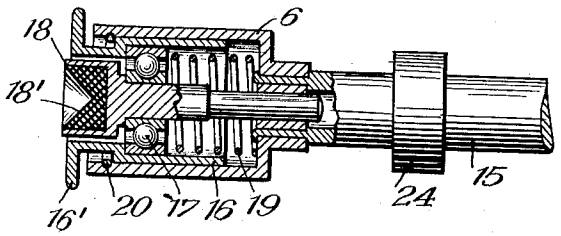


Fig. 4

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Patented May 22, 1934

1,959,606

UNITED STATES PATENT OFFICE

1,959,606

MOUNTING DEVICE FOR SPOOLS IN WINDING MACHINES

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Application November 21, 1932, Serial No. 643,707
In Switzerland December 7, 1931

8 Claims. (Cl. 242—18)

This invention relates to mounting devices for spools to be wound with strand materials, such as thread, yarn and the like, in winding machines comprising a winding shaft, which is disconnectable from the drive and a holder adapted for receiving one end of the spool and provided with a displaceable thrust influenced bearing for the spool the thrust being so regulatable by means of a movable auxiliary member that the spool with the spool spindle disconnected from its drive is released to be freely rotatable for unwinding the material, whereupon for joining the thread ends the spool is adapted to be stopped in the mounting device, i. e. secured against rotation, by removing the said thrust from the bearing of the spool with the winding shaft stopped.

This construction for the mounting device permits of conveniently piecing up the thread ends, when thread breakage occurs during the winding operation.

With this arrangement normally means are combined for directly urging the spool bearing backwardly so as to provide a range of movement for the same which permits the insertion and the removal of the spool.

The drawing serves for explaining one constructional exemplification of the invention, in which

Fig. 1 shows a sectional elevation of a winding machine according to the invention;

Fig. 2 shows a longitudinal section of a holder according to the invention on a larger scale;

Figs. 3 and 4 are similar longitudinal sections as Fig. 2, but with the holder in different positions of its parts.

Referring to Fig. 1 of the drawing, 1 denotes a gear box in which the drive shaft 2 of the machine is longitudinally displaceable in limited manner and which in this case is identical with the spool spindle. The drive shaft 2 is provided at one of its ends with a friction wheel 3 for cooperation with a driving friction wheel 4 and at its other end with a head piece 5 to which a holder 6 is opposed. The head piece 5 and the holder 6 serve for the reception of the spool 7 to be wound with material. The holder 6 is arranged on a hollow carrier bar 9, by means of a support 8, the carrier bar being secured to the gear box 1 and serves as a guide sleeve for a displaceable rod 10. The rod 10 is coupled at its end extending into the gear box with the drive shaft 2 by means of a connecting member 11 which permits of respectively connecting or disconnecting the drive shaft from the drive wheel 4. When the spool spindle 2 is connected, the rod 10 is secured in its respective position by a locking device (not shown). The spool spindle 2 gears by means of gear teeth 12 with a lifter disc 13 which imparts movement to the thread carrier of the device (not shown) reciprocating alongside of the spool.

The support 8 for the holder is adjusted into position on the carrier bar 9 by a set screw 14 so as to be readjustable along the bar accordingly to the length of the spool to be wound with material. In support 8, coaxially with the spool spindle 2, a spindle 15 is mounted. The spindle 15 carries at one of its ends the spool holder 6 which is in the form of a sleeve and in which a displaceable bushing 16, a ball bearing 17, a displaceable bearing 18 for the spool 7, and a coil spring 19 are arranged. The ball bearing 17 is intercalated between the bushing 16 and the spool bearing 18 which by these means is adapted to rotate in unrestricted manner. A spring 19 urges the ball bearing 17 against a shoulder formed on the bearing 18, thus pressing the parts 17, 16 and 18 in the direction towards the spool 7 which consequently is firmly held in the bearing 18 and through the influence of this spring also pressed in the head piece 5 of the spool spindle 2, whereby the other end of the spool firmly engages the spool spindle 2.

A split ring 20 arranged in a groove inside the sleeve 6 is adapted for limiting the endwise movement of the bushing 16 and thus also that of the bearing 17, in the sleeve 6. On turning the spool spindle 2, the spool 7 is turned in unison therewith thus winding the thread arriving from a reel or a supply bobbin on the spool 7.

When for any reason thread breakage occurs, subsequently to the disconnection of the spool spindle 2 from the driving wheel 4 for piecing up the separated thread ends, the bushing 16 is pressed inwardly in the sleeve 6 against the action of the spring 19 by means of its flange 16' for hand control which is disposed exteriorly of the sleeve 6, until the flange 16' rests against the respective front end of sleeve 6, as shown in Fig. 2. The ball bearing 17 takes part in this movement through its connection with the bushing 16, thereby correspondingly reducing the pressure exertion of the spring 19, which is thus compressed, on the bearing 18. In consequence thereof, the spool 7 is released so as to be adapted to freely turn in its bearing 18 and in the head piece 5. Thereupon, by turning the spool 7, the broken thread is unwound from the spool for such a length, as to enable conveniently tying it together by hand with the other broken end of

the thread. For effecting the knot, the bushing 16 is released which has the effect that the bearing 18 is again pressed against the spool 7 by spring 19 the same as previously, thus holding the spool so fast in the head piece 5 and the holder 6 that turning it by pulling the thread is rendered impossible. After the uniting of the thread ends the spool spindle 2 is again connected with the drive, whereupon the winding operation is continued.

For doffing and donning the spools the spool bearing 18 is moved backwardly to the requisite extent against the action of the spring 19 by means of the spool proper, as shown in Fig. 3. This is readily performable since the bearing 18 is adapted to effect a substantially greater movement than the bushing 16. Fig. 4 shows the holder with its parts in a position, when no spool is inserted in the device.

The axially displaceable bearing 18 is provided with a thickened portion in which a removable insert 18' is accommodated which has a conical seat for receiving and centering the spool. The head piece 5 of the spool spindle 2 for engaging the other end of the spool is provided with a similar removable insert. This construction permits of always employing inserts at both mounting positions for the spool the seats of which are adapted to the diameter of the spools to be used.

For the case that the spool spindle 2 is provided with a needle projecting into the spool to be mounted and serving in a known manner, with its length and arrangement correspondingly designed, for passing the thread on removing the spool through the axial bore thereof after drawing it endwise off the spool, special means are arranged for providing the thus longer path of movement required for donning and doffing the spools. For this purpose the spindle 15 actually carrying the spool holder 6 may be displaceably arranged in the support 8. The spindle 15 is secured in its position of adjustment in the support 8 by a stop ball 22 engaging in a circumferential groove 15' of the spindle 15 and loaded by a spring 21 (Fig. 2). With the spindle 15 locked in this manner the holder 6 is in its normal position in which the spool is held in mounted position by the bearing 18.

When it is desired to remove the spool after the winding operation is finished, the spindle 15 is so far retracted against the action of the spring loaded stop ball 22 by pulling the easily accessible hand button 23 on the spindle in the direction, indicated by the arrow in Fig. 2, until an adjusting ring 24, arranged on the spindle 15, abuts against the support 8. Thereby the holder 6, while releasing the spool, is moved such a distance away from the head piece 5 of the spool spindle 2 that the spool is adapted to be readily slid over the previously mentioned needle, eventually by bending the same, for removing the spool from the machine. After the fresh spool to be wound with material has been slid over the needle and inserted in the head piece 5, the spindle 15 is pushed back into its initial position of adjustment in which it is again automatically secured by the stop ball 22. The spool is then in mounted position as previously explained. When it is wanted to primarily release the spool on thread breakage occurring, this is effected as previously described by pushing the displaceable bushing 16 backwardly.

Axial displacement of the spindle 15 for the length of its predetermined path of movement may be carried out in any suitable manner, for example by means of a spring pressed lever not shown. Instead of displacing the spindle, the holder may be arranged to be displaced as a whole, that is inclusive of all its parts, on the carrier bar for the same.

The inserts provided at both mounting positions for the spool, one of which at least is exchangeably arranged, may consist of a yielding material having a high coefficient of friction, such as rubber.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed. What I claim is:

1. In a spool mounting for thread winding machines, in combination, a spool spindle adapted to operatively engage the spool for actuating the same, a disconnectable drive for said spool spindle, a counter holder for the spool, an exterior sleeve of said holder, an inner shoulder of said sleeve at the end thereof remote from said spool spindle, a bushing displaceably arranged in said sleeve and projecting therefrom towards said spool spindle, a mounting for the spool displaceably arranged in said bushing, a spring intercalated between said mounting and said inner shoulder of said sleeve and tending to urge said mounting in the direction towards said spool spindle, means for regulating the thrust exerted on said displaceable mounting by said spring and adapted to release the spool to be freely rotatable between said spool spindle and said mounting, and control means adapted for disconnecting said drive on thread breakage for unwinding the thread from the released spool for piecing up the thread ends with the spool locked with the stopped spool spindle and the counter holder by action of said thrust influencing said mounting.

2. In a spool mounting for thread winding machines, in combination, a spool spindle adapted to operatively engage the spool for actuating the same, a disconnectable drive for said spool spindle, a counter holder for the spool, an exterior sleeve of said holder, an inner shoulder of said sleeve at the end thereof remote from said spool spindle, a bushing displaceably arranged in said sleeve and projecting therefrom towards said spool spindle, an antifriction bearing displaceably arranged in said bushing, a mounting member for the spool rotatably carried in said antifriction bearing to be free to turn therein, a spring intercalated between said antifriction bearing and said inner shoulder of said sleeve and tending to urge said bearing in the direction towards said spool spindle, means for regulating the thrust exerted on said displaceable antifriction bearing by said spring, and adapted to release the spool to be freely rotatable between said spool spindle and said mounting member, and control means adapted for disconnecting said drive.

3. In a spool mounting for thread winding machines, in combination, a spool spindle adapted to operatively engage the spool for actuating the same, a disconnectable drive for said spool spindle, a counter holder for the spool, a carrier spindle for said holder, a supporting member for said carrier spindle, an automatic clamping device intercalated between said carrier spindle and said supporting member therefor for securing said carrier spindle on said supporting member in a

position wherein the spool is mounted between said spool spindle and said holder, a thrust influenced mounting for the spool displaceably arranged in said counter holder, means for regulating said thrust exertion on said displaceable mounting and adapted to release the spool to be freely rotatable between said spool spindle and said mounting, and control means adapted for disconnecting said drive on thread breakage for unwinding the thread from the released spool for piecing up the thread ends with the spool locked with the stopped spool spindle and the counter holder by action of said thrust influencing said mounting.

4. In a spool mounting for thread winding machines, in combination, a spool spindle adapted to operatively engage the spool for actuating the same, a disconnectable drive for said spool spindle, a counter holder for the spool, a carrier spindle for said holder, a supporting member for said carrier spindle, an automatic clamping device intercalated between said carrier spindle and said supporting member therefor for securing said carrier spindle on said supporting member in a position wherein the spool is mounted between said spool spindle and said holder, a supporting rail for said supporting member extending longitudinally of the device for displacing said holder as a whole with respect to said spool spindle, a thrust influenced mounting for the spool displaceably arranged in said counter holder, means for regulating said thrust exertion on said displaceable mounting and adapted to release, the spool to be freely rotatable between said spool spindle and said mounting, and control means adapted for disconnecting said drive on thread breakage for unwinding the thread from the released spool for piecing up the thread ends with the spool locked with the stopped spool spindle and the counter holder by action of said thrust influencing said mounting.

5. In a spool mounting for thread winding machines, in combination, a spool spindle, a gripping head on said spool spindle for the spool, an insert in said gripping head for one end of the spool to bear against and consisting of a yielding material having a high coefficient of friction, a disconnectable drive for said spool spindle, a counter holder for the spool, an exterior sleeve of said holder, an inner shoulder of said sleeve at the end thereof remote from said spool spindle, a bushing displaceably arranged in said sleeve and projecting therefrom towards said spool spindle, an antifriction bearing displaceably arranged in said bushing, a mounting member for the spool rotatably carried in said antifriction bearing to be free to turn therein, an insert in said mounting member for the other end of the spool to bear against and consisting of a yielding material having a high coefficient of friction, a spring intercalated between said antifriction bearing and said inner shoulder of said sleeve and tending to urge said bearing in the direction towards said spool spindle, means for regulating the thrust exerted on said displaceable antifriction bearing by said spring and adapted to release the spool to be freely rotatable between said spool spindle and said mounting member, and control means adapted for disconnecting said drive.

6. In a spool mounting for thread winding machines, in combination, a spool spindle adapted to operatively engage the spool for actuating the same, a disconnectable drive for said spool spindle, a counter holder for the spool, a carrier spindle for said holder, a supporting member for said carrier spindle, an automatic clamping device intercalated between said carrier spindle and said supporting member therefor for securing said carrier spindle on said supporting member in a position wherein the spool is mounted between said spool spindle and said holder, a supporting rail for said supporting member extending longitudinally of the device for displacing said holder as a whole with respect to said spool spindle, an exterior sleeve of said holder, an inner shoulder of said sleeve at the end thereof remote from said spool spindle, a bushing displaceably arranged in said sleeve and projecting therefrom towards said spool spindle, an antifriction bearing displaceably arranged in said bushing, a mounting member for the spool rotatably carried in said antifriction bearing to be free to turn therein, a spring intercalated between said antifriction bearing and said inner shoulder of said sleeve and tending to urge said bearing in the direction towards said spool spindle, means for regulating the thrust exerted on said displaceable antifriction bearing by said spring for the purpose of regulating the thrust exerted on said displaceable antifriction bearing by said spring and adapted to release the spool to be freely rotatable between said spool spindle and said mounting member, and control means adapted for disconnecting said drive.

7. In a spool mounting for thread winding machines, a spool driving shaft having a head, a counter support, means for operatively connecting a spool between said head and said support including a spring-pressed mounting for said spool displaceably arranged in said counter support, means for limiting the stroke of said displaceable mounting, means for displacing said mounting to a limited extent to release said spool to freely rotate between the shaft head and the said mounting, said mounting being further displaceable to make possible the insertion and removal of said spools.

8. In a spool mounting for thread winding machines, a spool spindle, a counter support in axial alignment with said spool spindle, means for operatively connecting a spool between said spindle and said support and including a spring-pressed bushing in said support, a mounting for said spool shaft in said bushing, means for limiting the stroke of said bushing, said displaceable bushing adapted to release said spool for free rotation between the spool spindle and said mounting, and means for holding the counter support in winding position, said means being yieldable to permit the counter support to be moved to a position releasing the spool.

ERNST ZINDEL.