

May 22, 1934.

X. BRÜGGER

1,959,567

YARN WINDING DEVICE

Filed Aug. 19, 1931

2 Sheets-Sheet 1

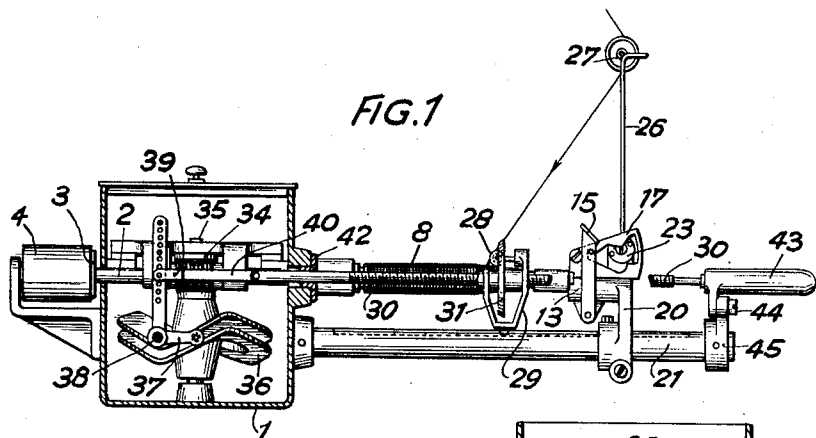


FIG. 1

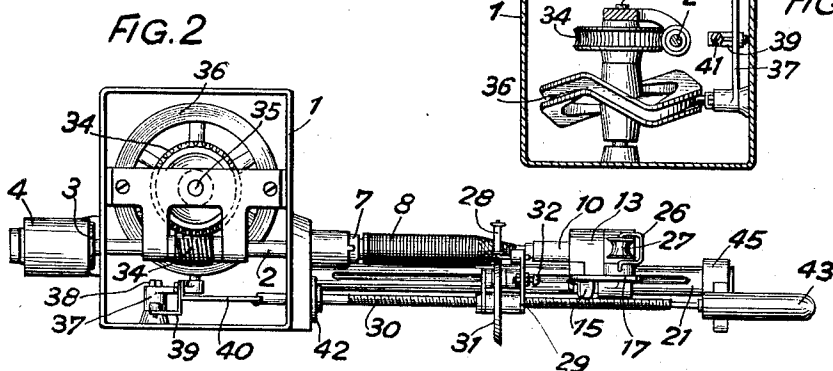


FIG. 2

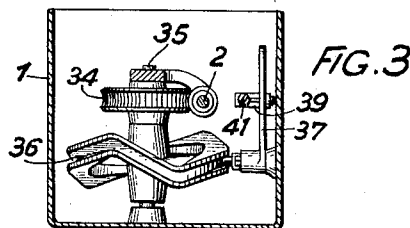


FIG. 3

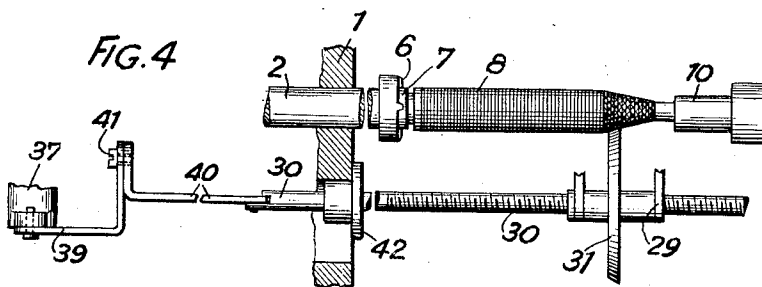


FIG. 4

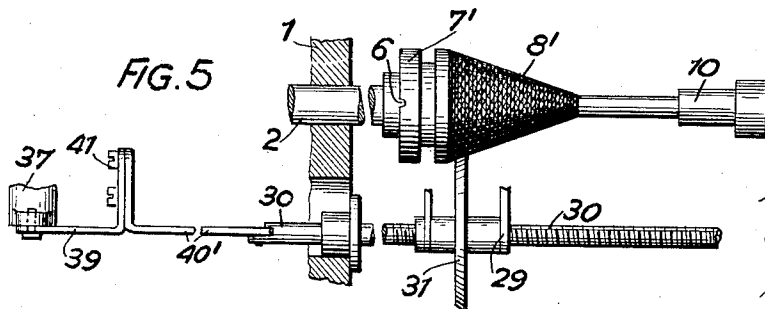


FIG. 5

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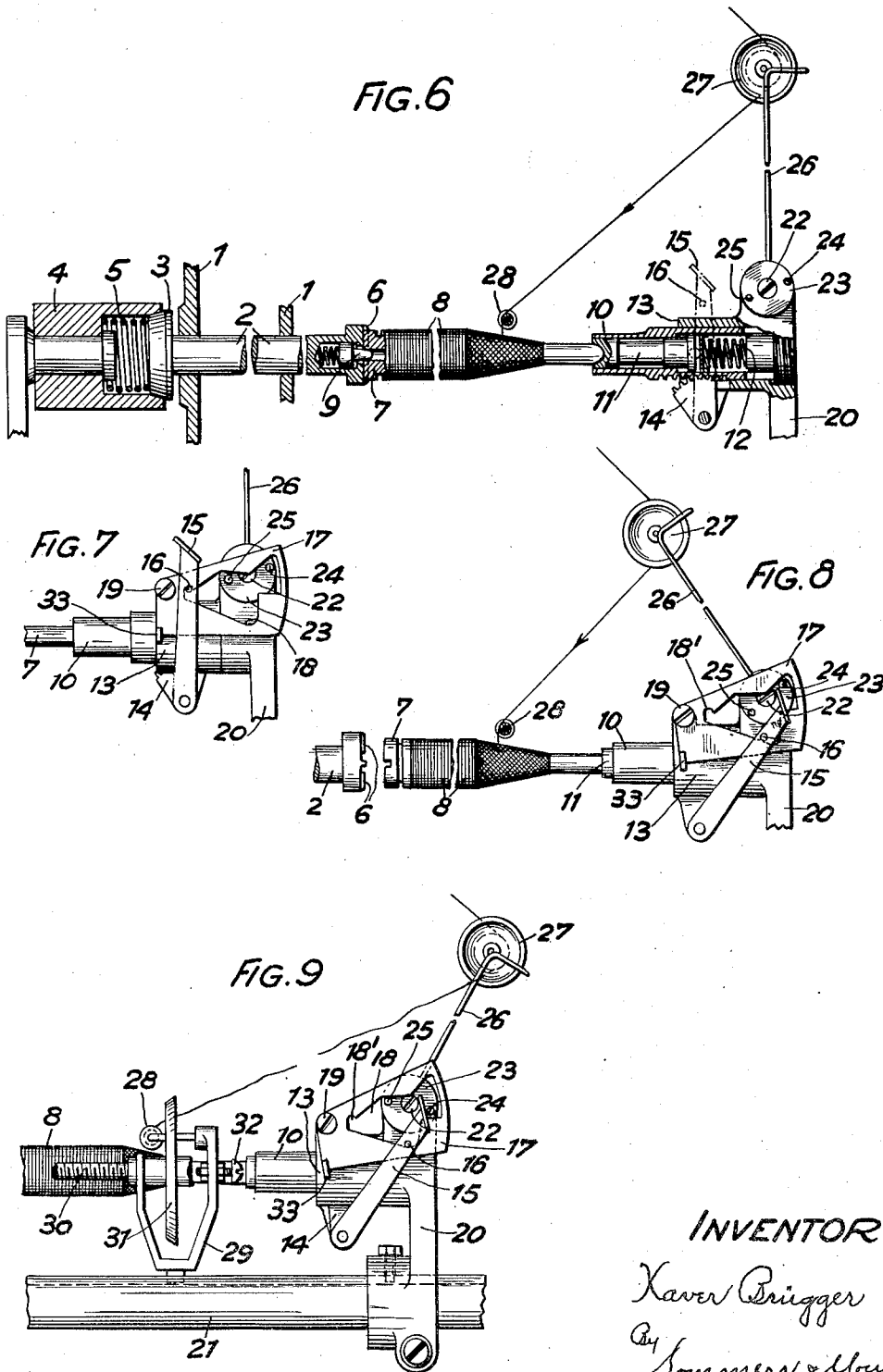
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YARN WINDING DEVICE

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UNITED STATES PATENT OFFICE

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YARN WINDING DEVICE

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In Germany September 4, 1930

5 Claims. (Cl. 242—27)

This invention consists in improvements in or relating to yarn-winding devices including a riser mechanism.

In connection with winding yarn on spools it is known to deposit the yarn in layers of helical windings on the spool. For this purpose the riser rod is imparted a reciprocating motion of a uniform throw or lift. According to the present invention the throw of the riser rod is varied with the result that the axial extent of the windings is correspondingly changed and the superposed layers consecutively offset relatively to each other. Means are also provided for adapting the winding device according to the invention to different sizes of the wound mass to be produced and to stop the device when the latter has reached the predetermined size as well as when the yarn breaks or gets tangled.

Means are furthermore provided whereby the spool is held between an axially movable spool spindle and an axially movable counter support, and means are provided on the spool spindle constituting a part of a surface contact friction drive coupling.

These main features of the winding device according to the invention are realized with the aid of a special design wherein a minimum of movable parts are combined in a self-contained unit, in such manner, that the attendance of the winding device is reduced to a minimum and at the same time high speeds paired with a great accuracy and safety with which the winding operation is performed are obtained.

In the accompanying drawings one constructional form of the invention is illustrated, by way of example only, in which

Fig. 1 shows an elevation of a winding machine;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a section of a gear casing;

Fig. 4 is a detail of Fig. 3 showing the riser rod and associated parts on a larger scale;

Fig. 5 illustrates a modification of Fig. 4;

Fig. 6 is a detail of Fig. 1 showing the winding spindle and associated parts on a larger scale;

Fig. 7 shows a detail of Fig. 1 on a larger scale;

Fig. 8 shows an elevation of a swivelling arm carrying the thread guide, and of related parts;

Fig. 9 is a view similar to Fig. 7 with the parts in different positions.

Referring to the drawings, in the gear box 1 the winding spindle 2 is mounted so as to be axially shiftable and provided at its one end with a conical driving disc 3 which cooperates with a complementary face of the driving member 4 for

actuating the spindle 2. The driving member 4 carries a compression spring 5 (Fig. 6) in a recess thereof which spring tends to move the conical disc 3 out of engagement with the driving member 4. The winding spindle 2 is provided at its other end with a catch 6 for gripping the spool carrier 7 so as to positively rotate the same or the spool 8 respectively in unison therewith, the spool carrier 7 being engaged by a spring-pressed centering pin 9 arranged at the end of the spindle 2.

The opposite end of the spool carrier is accommodated in the counter member 10 which for this purpose is provided with an inner pin 11 which is axially displaceable in a limited manner. This pin 11 is urged outwardly by a coil spring 12 acting on its rear end and provided at its front end with a recess for receiving the spool carrier 7. The counter member 10 is mounted in a casing 13 and formed with a toothed portion which meshes with a toothed sector 14 to which an operating lever 15 is secured. By means of the lever 15 the counter member 10 is adapted to be axially shifted as required depending upon whether it is desired to mount a spool body between the counter member and the spindle 2 or to remove a finished spool from its place of mounting.

The operating lever 15 is provided with a stop pin 16 which engages in an aperture 18 formed in a locking plate 17. With the parts of the machine in the operative position the stop pin 16 of the lever 15 engages in a notch 18' provided in the locking plate 17 thus locking the lever 15 in the operative position (Figs. 1, 6) of the same. The locking plate 17 is pivoted to the casing 13 by means of a pin 19, the casing being displaceably arranged by means of a supporting arm 20 on a carrier bar 21 fixed to the gear box 1.

On the casing 13 is mounted to freely turn on a bolt 22 thereof a disc 23 which is provided with two stop pins 24 and 25 that are also adapted to engage in the aperture 18 of the locking plate 17. The disc 23 carries an arm 26 on the outer end of which the guide roller 27 for the yarn is mounted. From this roller the yarn passes over a roller 28 which is supported on the guide stirrup 29 which is adapted to be displaced in a guide groove in the carrier bar 21 by means of an axially reciprocating traversing spindle or riser rod 30, as will be hereinafter explained, and which is provided with a feeler disc 31 for the spool 8, the hub of said disc engaging in the screw threads of the spindle 30.

Thus, if for any reason the tension on the

yarn is too great, for instance due to the yarn getting entangled on a supply reel, the arm 26 carrying the guide roller is rocked from the position shown in Figs. 1, 6 and 7, which it occupies when the tension on the yarn is normal, in the direction to assume the position shown in Fig. 8. During this rocking motion of the arm 26 the stop pin 24 on the disc 23 bears against an inclined face of the aperture 18 in the locking plate 17. Consequently the locking plate 17 is turned in the same direction so as to release the lever 15 and by influence of the compression spring 5 correlated to the driving disc 3 or to the winding spindle 2 respectively the counter member 10 is pushed back, thus disconnecting the drive of the spool 8 due to the disc 3 moving out of engagement with the driving member 4. Thereby the lever 15 is moved out of its operative position by the toothed sector.

When during the operation of the machine the yarn breaks, the arm 26 carrying the guide roller swings by influence of spring action in a manner known per se in the opposite direction to that mentioned above, in consequence of which it is shifted from the position indicated in the Figs. 1, 6 and 7 to that shown in Fig. 9. During this shifting motion of the arm 26 the stop pin 25 on the disc 23 cooperates with an oblique face of the aperture 18 in the locking plate 17, in such manner, that the operating lever 15 is again released, thus disconnecting the spool spindle 2 from the driving member 4 in the previously explained manner.

After the spool has reached the desired size a stop member 32 (Fig. 9), arranged on the guide stirrup 29 to be adjustable in the direction of travel of the same, hits a side lug 33 of the locking plate 17. In this manner the locking plate is also rocked, so as to cause the operating lever 15 to be released, whereupon the spindle 2 is, as previously explained, again disconnected from the driving member 4.

In order to return the parts of the machine into operative position i. e. to bring the machine in working condition, the control lever 15 is swung back by hand into the operative position and in the same manner also the arm 26 carrying the guide roller is moved back into normal position, whereafter the locking plate 17, by action of its own weight, is positively turned back into working position in which it locks the lever 15 in the operative position of the same.

From the winding spindle 2, by way of the worm drive 34, a shaft 35 is driven to which the cam disc 36 is fixed. In the guide groove of this disc a double armed control member 37 engages which is mounted on a pin 38 secured to the gear box 1. To the control member 37, by means of angular pieces 39, 40 which are interconnected by a bolt 41, the screw spindle 30 is connected which actuates the yarn guide by engagement of its threaded portion, so that in operation the feeler disc 31 or the guide stirrup 29 respectively together with the guide roller 28 are moved step by step. The angle pieces 39, 40 form together a connecting member which is adjustably connected to the other arm of the control member 37 by means of a series of holes provided in this arm. The screw spindle 30 is mounted in a bearing 42 supported by the gear box and at its other end the spindle is accommodated in a bearing 43 which is connected to a bracket 45, fixed to the carrier bar 21, by means of a screw 44 engaging in a slot in said bracket to be adjustable transversely of the carrier bar. Also the bear-

ing 42 is adjustable in the transverse direction of the gear box 1, by means not shown on the drawings, and the stop member 32 is adjustably arranged transversely of the guide stirrup 29, the angular piece 40 in turn being displaceable relatively to the angular piece 39 by a screw and slot connection 41. This construction enables setting the riser rod 30 at a distance from the spindle 2 which corresponds with the size of the spool to be produced. Fig. 5 shows a second position of adjustment of the riser rod and a spool of a corresponding size with the riser disc in co-operation therewith. In this figure the angular piece 40' represents a modification of the angular piece 40, the one leg of the piece 40' being elongated to receive a screw and slot connection including two screws 41.

The guide groove of the cam disc 36 for reciprocating the riser rod 30 is provided with ascending portions of different inclination. In this manner the reciprocating traversing spindle 30 is imparted different throws i. e. throws of different extent, so that the yarn is placed on the spool in windings of corresponding axial extent.

I claim,

1. In a yarn winding device, a rotating spool, a means for guiding a thread on said spool, said thread-guiding means mounted on a shaft parallel to said spool axis, means for imparting reciprocations to said shaft, a friction drive member fixed to said thread-guiding means, said member being provided with means for stepwise shifting the same along said shaft by contact with said rotating spool, means for removably fastening the spool between an axially movable spool spindle and a spring pressed axially movable counter support, for rotation with the spool spindle, means on the spool spindle constituting a part of a surface contact friction drive coupling.

2. In a yarn winding device, a rotating spool, a means for guiding a thread on said spool, said thread-guiding means mounted on a shaft parallel to said spool axis, means for imparting reciprocations to said shaft, a friction drive member fixed to said thread-guiding means, said member being provided with means for stepwise shifting the same along said shaft by contact with said rotating spool, means for removably fastening the spool between an axially movable spool spindle and a spring pressed axially movable counter support, for rotation with the spool spindle, means for adjustably connecting the reciprocating shaft to a motion transmitting lever which in turn is actuated by a cam disc, whereby the reciprocating shaft may be adjusted relative to the spool spindle in accordance with the desired length of the reciprocations.

3. In a yarn winding device in combination, a spool winding spindle, driving means in driving engagement with said spindle, a counter support, means for connecting a spool between said spindle and said counter support, means for axially shifting said spindle, spool and support relative to said driving means, an oscillatable member for locking said spindle, spool and support against axial shifting and means controlled by the thread tension for releasing said oscillatable member upon thread breakage or increased tension of the thread, whereby the spindle is released from driving engagement with said driving means.

4. In a yarn winding device as defined by claim 3 in which an additional means is provided for cooperation with said oscillatable member for re-

leasing the same upon filling of the spool with thread.

5. In a yarn winding device as defined by claim 1 in which an oscillatable locking member is operatively connected to the axially movable counter support for locking the same against axial movement, means controlled by the tension of

the thread for releasing the said locking member upon substantial change in the thread tension, and means connected to the reciprocating shaft for releasing the oscillatable locking member upon filling of the spool.

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