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3,362,282

SPOOL CARRIER FOR BRAIDING MACHINES

Filed June 6, 1966

2 Sheets-Sheet 1

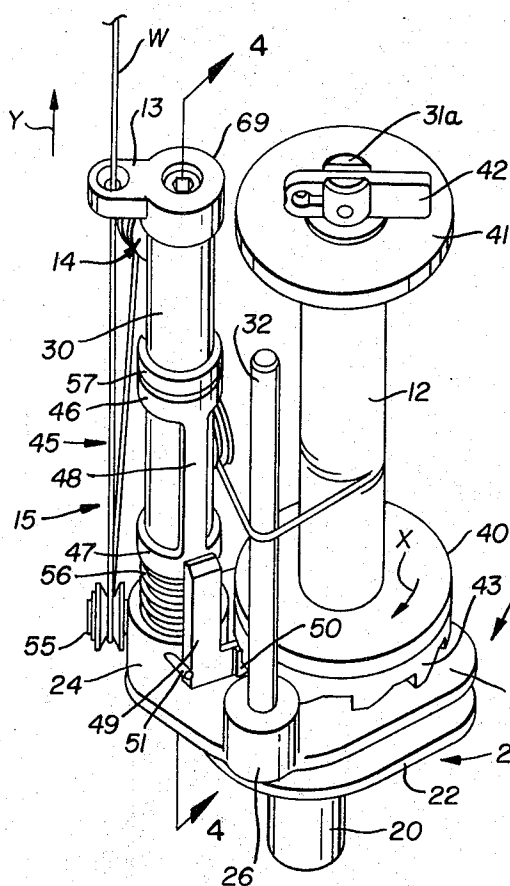


FIG. 1

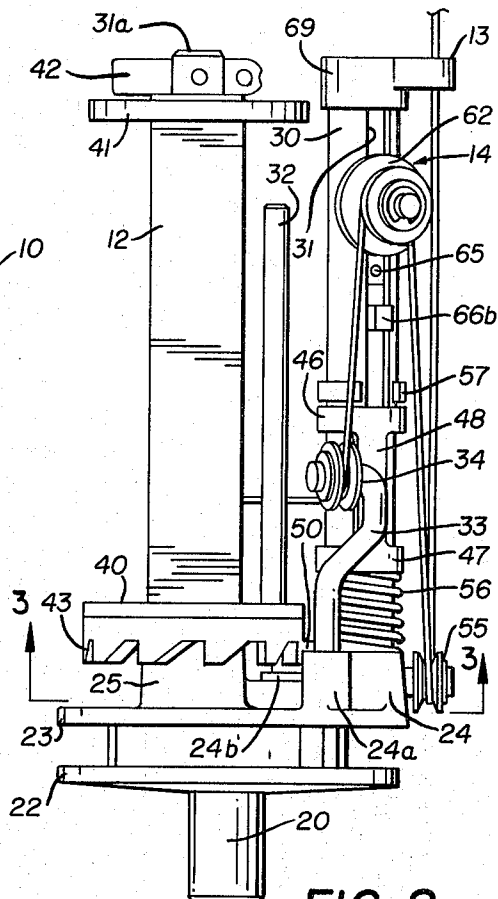


FIG. 2

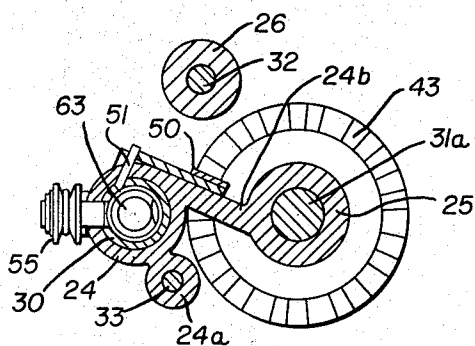


FIG. 3

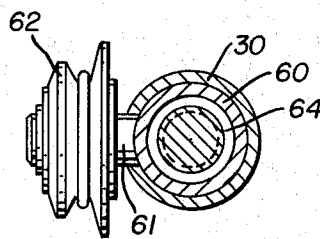


FIG. 6

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2 Sheets-Sheet 2

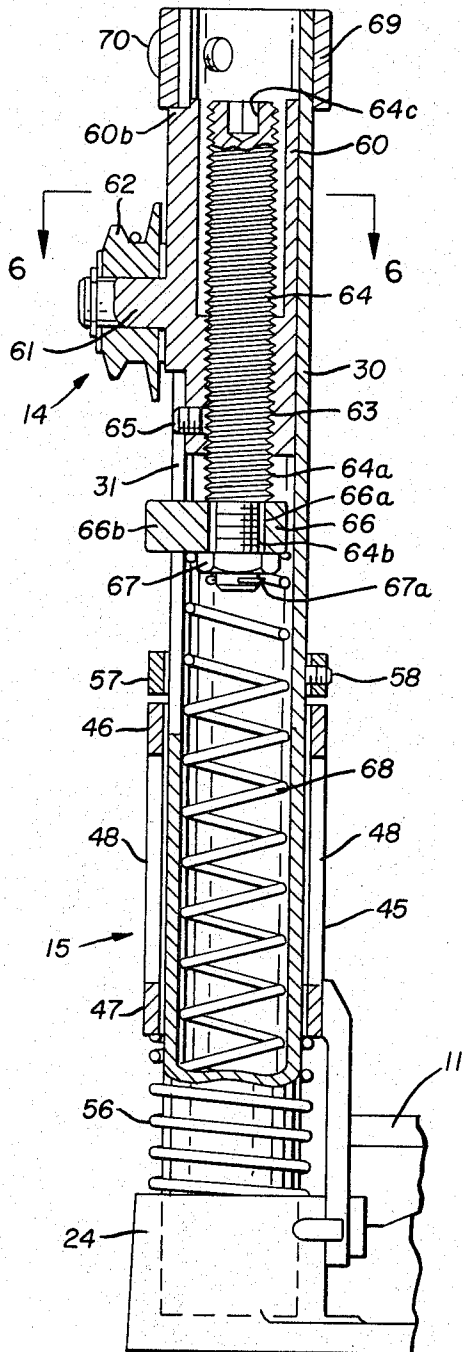


FIG. 4

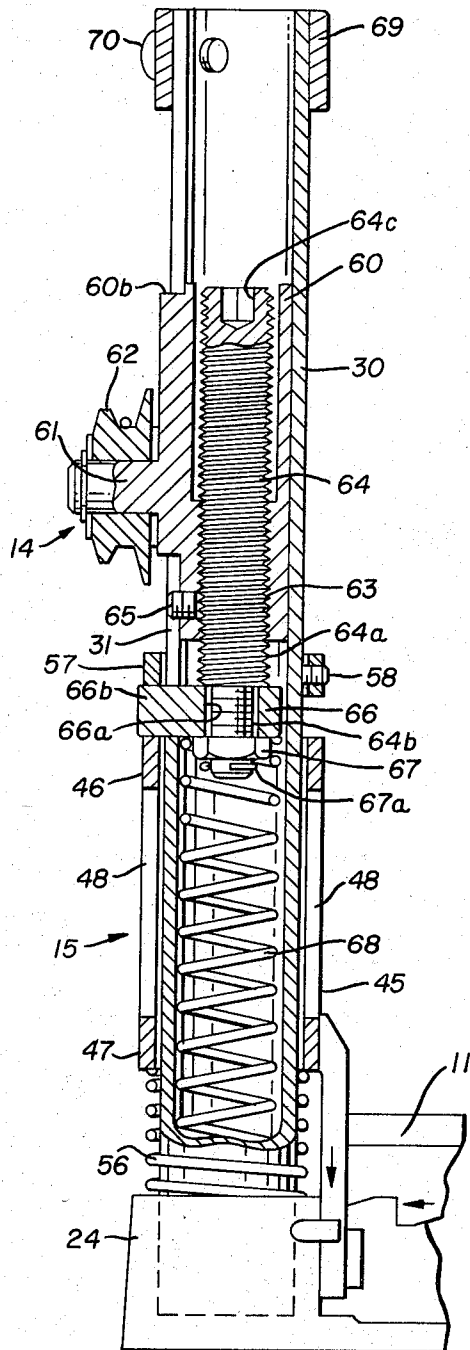


FIG. 5

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SPOOL CARRIER FOR BRAIDING MACHINES

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ABSTRACT OF THE DISCLOSURE

A spool carrier for wire braiding machines wherein the spool is released for rotational purposes in order to supply more material by movement of a control guide and tripping mechanism which operate in response to tension on the wire being unwound. The tripping mechanism is characterized by movement in a straight line along the axis of a support tube and the control guide, which actuates the tripping mechanism, moves with respect to two fixed points. The amount of tension required to actuate the tripping mechanism and release the spool is adjustable.

This invention relates to the art of spool carrier devices that are used in connection with braiding machines and in particular has reference to an improved type of spool carrier that has an improved release mechanism that operates to release additional thread in response to the attainment of predetermined tension pressures on the wire or thread material being dispensed from the spool.

In applicant's earlier U.S. Patent 3,038,367, issued June 12, 1962, there was disclosed a spool carrier of the type herein being discussed, with this carrier having adjustment means provided that permitted variation in the amount of tension pressure that was required to cause emission of additional thread.

In the device disclosed in the aforementioned patent a movable control guide, having the wire material received about a pulley component carried thereon, moved or was pulled toward the dispensing end of the spool carrier by tension on the wire with a predetermined amount of such movement resulting in its engagement with certain cam, pivoted pawl and ratchet means that hold the spool member against rotation, and with such engagement releasing the spool member and thereby permitting the dispensing of additional wire material.

While the spool carrier of the aforementioned patent has met with considerable commercial success, it has nonetheless been found that the cost of achieving a similar result can be materially lessened by reversing the direction of movement of the movable control tensioning guide so that the same moves towards the base for tripping or release purposes in contrast to the earlier arrangement wherein such movement was toward the dispensing end and away from the base.

The reduction in cost just mentioned occurs as a result of the improvement of utilizing the movable control guide itself as an actuating element for an inexpensive tripping mechanism that is associated with the spool base and which requires no pivoting or other such movement to lock and unlock the device to selectively prevent or permit rotation of the spool.

It has also been found that improved uniformity of tension can be obtained by arranging the movable control guide in such a position that the movement of the same occurs with respect to two fixed pulley members in contrast to the earlier arrangement wherein the movable guide was associated with one pulley member and the dispensing eyelet of the braider carrier.

It is felt that the just described arrangement contributes to the attainment of higher accuracy with respect to release tensions since the increment of movement re-

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quired to release is, by virtue of the fact that two fixed points are used, approximately one-half the travel that would otherwise occur.

Another factor contributing to the accuracy of release tension is the fact that a straight line type of engagement and disengagement between pawl and spool is provided in lieu of the pivoted cam type arrangement of the earlier mentioned patent. In this regard it had been found that with the use of the pivoted pawl arrangement wear on the engaging end would eventually cause considerable inaccuracy and variation in release tension. Such inaccuracy can be eliminated by straight line engagement and disengagement wherein the whole pawl surface is engaged and disengaged as a unit rather than in the fashion where a progressive engagement is used as was the case in the earlier mentioned patent.

Production of an improved spool carrier having the above advantages accordingly becomes the principal object of this invention with other objects thereof becoming more apparent upon a reading of the following brief specification, considered and interpreted in the light of the accompanying drawings.

Of the drawings:

FIGURE 1 is a perspective view of the improved spool carrier.

FIGURE 2 is a side elevation looking at the rear portion of FIGURE 1.

FIGURE 3 is a sectional view taken on the lines 3-3 of FIGURE 2.

FIGURES 4 and 5 are vertical sections taken on the lines 4-4, 5-5 of FIGURE 1 and respectively showing the spool carrier in locked and dispensing conditions.

FIGURE 6 is a horizontal section taken on the lines 6-6 of FIGURE 4.

Referring now to the drawings and in particular to FIGURE 1, the improved spool carrier, generally designated by the numeral 10, includes a spool carrier unit 11 that rotatably supports a spool 12 with wire or thread material W being dispensed intermittently from the spool 12 through eyelet 13 as a result of movement of movable guide roller 14 into and out of contact with a tripping mechanism 15.

Considering first then the detailed structure of the spool carrying unit 11, the same includes the usual mounting shaft 20 that projects from a base casting 21 with casting 21 having a lower plate unit 22 and an upper plate unit 23 with lower plate unit 22 being designed to be received within the appropriate deck of a braiding machine while the upper plate 23 supports certain components of the unit 10 as will now be described.

In this regard and referring first to FIGURES 1, 2 and 3, the plate 23 further includes upwardly projecting boss members 24, 24a, 25, and 26, with boss 24 serving to support a main tube member 30 while boss 25 supports a tube or shaft 31a upon which the spool member 12 may be received as clearly shown in FIGURES 1 and 3 of the drawings. Boss 26 supports a take-off rod 32 while boss member 24a supports an upwardly extending rod 33 upon which the roller 34 may be received as clearly shown in FIGURE 2 of the drawings.

Referring next to FIGURES 1 and 2 it will be noted that the spool member 12 includes a lower end 40 and an upper end 41 with the upper end 41 being retained in place on shaft 31a by a pivot pin 42 while the lower end 40 includes depending teeth 43, 43 that are designed to be engaged and disengaged with respect to the tripping mechanism 15 as will now be described.

In this regard and referring to FIGURES 1, 4 and 5, the tripping mechanism 15 includes a circular sleeve-like member 45 that includes concentric upper and lower ring members 46 and 47 that are interconnected by vertical

components 48, 48 so as to form a rigid frame member of generally circular configuration surrounding the tube 30 in telescopic relationship therewith. Fixedly secured to and depending from the lower ring 47 is an L-shaped tripping element 49 that includes a projecting ratchet assembly 50 that is designed to engage and disengage with respect to the ratchet teeth 43 as is clearly apparent from FIGURE 1 of the drawings. This engagement and disengagement is accomplished by vertical movement of the ratchet assembly 50 as will be described more fully below.

A guide pin 51 projects radially from boss 24 for the purpose of preventing rotation of unit 45 and tripping mechanism 15 in one direction with respect to tube 30 with rotation in the opposite direction being prevented by web member 24b that interconnects the boss elements 24 and 25 as clearly shown in FIGURE 3 of the drawings. It is also to be noted here that the boss element 24 serves as a point of rotational mounting for the roller element 55 as clearly shown in FIGURES 1, 2 and 3 of the drawings.

To the end of normally urging the tripping mechanism 15 to the up or locked position of FIGURES 1 and 4 a spring member 56 is shown seated on boss 24 and surrounding the lower end of tube 30 so as to react against boss 24 and lower ring component 47 with upward movement of the unit 45 being prevented by C-shaped retaining collar 57 that is secured in place on the tube 30 by set screw 58 as clearly shown in FIGURE 4 of the drawings.

Turning now to FIGURE 4 for a description of the movable guide roller assembly that has been indicated generally by the numeral 14, it will first be noted that the tube 30 has an elongate axial slot 31 provided therein with this slot being required to permit movement of certain components of the guide roller assembly 14 as will now be described.

To this end and referring to FIGURES 2 and 4, the guide roller assembly 14 includes a sleeve-like member 60 adapted to be telescopically received within the tube 30 and having a boss-like projection 61 of narrow width that is adapted to pass through the slot 31 and thus support a roller element 62 as clearly shown in FIGURE 4.

For the purpose of providing adjustment of the assembly, a reduced diameter internal wall portion of sleeve 60 is provided with threads at 63 with these threads being designed to engage similar threads 64a that are provided on an adjusting rod 64 with relative rotation between the sleeve 60 and rod 64 being prevented by set screw 65 as shown in FIGURE 4.

The lower end of rod 64 is reduced in diameter to define a further threaded shank portion 64b with this threaded portion being intended to receive a cam nut 66 with the cam nut 66 being apertured as at 66a for reception around shank portion 64b and with the cam nut 66 further including a cam element 66b that projects through slot 31 of tube 30 so as to be capable of striking the upper edge of ring member 46 during downward movement to the position shown in FIGURE 5 as will be described.

A nut 67 is threaded over shank portion 64b of rod 64 and prevents axial shifting of cam nut 66 although it is to be understood that this nut can be loosely kept in place by cotter pin 67a so as to permit the rod 64 to rotate with respect to cam nut 66 for the purpose of shifting the position of a camming element 66b along the axis of tube 30, with such turning being facilitated by an appropriate socket 64c provided in the upper end of rod 64 (see FIGURES 4 and 5).

Again referring to FIGURES 4 and 5 the movable guide roller assembly is shown urged to the upper portion of FIGURE 4 by a spring 68 that is telescoped within tube 30 with a stop ring 69 serving to limit the upper movement of the assembly upon engagement of the projecting

portion 60b with the lower end of the ring 69 as clearly shown in FIGURE 4.

Preferably, ring 69 is secured with respect to tube 30 by a threaded bolt 70 that is received in appropriate apertures provided in the members 69 and 30, and with the apertures that are provided being offset with respect to slot 31 as shown in FIGURES 4 and 5.

In use or operation of the improved spool carrier it will first be assumed that the component parts have been positioned as indicated in the drawings, with the movable guide roller assembly 14 being in the upper position shown in FIGURES 2 and 4 wherein the spring 68 has urged the same into contact with the upper ring or collar 69.

It will be further assumed that a predetermined amount of thread has been withdrawn from spool 12 after being first directed around take off rod 32, thence over roller 34, thence over roller 62, thence over roller 55 and finally outwardly through the eyelet 13 which is integral with and projects radially from the collar 69 as shown in FIGURES 1 and 2 of the drawings.

At this time the ratchet member 50 will be in locked engagement with the ratchet teeth 43, 43 so that rotation of spool 12 in the direction of arrow X in FIGURE 1 is prevented. As the wire W is pulled out in the direction of arrow Y tension on the wire (FIGURE 1) builds up.

Also, at this time it should be noted that the wire W is threaded under two fixed points (rollers 34 and 55) and over one movable point (roller 62). It is believed apparent that due to this arrangement pulling the wire in the direction of arrow Y will cause a downward movement of guide roller assembly 14, which carries movable roller 62, against the force of spring 68 toward the position of FIGURE 5.

It should be noted here that collar 57 is C-shaped so that cam element 66b of the guide roller assembly 14 will pass through it during this downward movement. When cam element 66b has moved downward a predetermined distance it strikes the upper surface of upper ring 46 as shown in FIGURE 4 and further downward movement will result in a like downward movement of the tripping mechanism 15 with spring 56 being overcome during such additional movement. As the downward movement continues the ratchet element 50 will automatically be disengaged with respect to the ratchet teeth 43, 43 and at this time the spool 12 will unwind in the direction of arrow X in FIGURE 1, with such movement resulting in a release of tension which accordingly permits the springs 56 and 68 to immediately return the control guide mechanism 15 to the position of FIGURES 2 and 4 causing re-engagement of ratchet means 50 with teeth 43, 43 whereupon the process just described will be repeated as additional pressure is applied to remove additional wire W from spool 12.

In the event it is desired to adjust the travel required before the cam member 66 engages the ring 46, it is merely necessary that set screw 65 be backed off at which time an appropriate turning tool, such as an Allen wrench may be inserted into socket 64c to thus effectuate rotation of rod 64. This rotation will serve to shift rod 64 and element 66 in unison with respect to sleeve 60 due to the fact that rod 64 will be advancing axially with respect to the sleeve 60 by virtue of its threaded connection with thread portion 63 thereof. It is to be noted that no such axial movement occurs between members 64 and 66 due to the fact that there is no threaded connection therebetween with the walls of slot 31 also restraining both the sleeve 60 and cam member 66 against rotation relatively of tube 30.

Once the appropriate adjustment has been achieved, it is merely necessary to reset the set screw 65 at which time normal operation may be resumed.

It will be seen from the foregoing how there has been provided a new and improved type of spool carrier char-

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acterized by a reduced number of component parts that operate in an improved manner.

It has been shown how this reduction in parts occurs as a result of replacing complicated tripping mechanisms with a simple straight line tripping mechanism that operates in response to opposed forces applied upon the adjustable component with the opposed forces being fixed at point of application so as to cause maximum accuracy.

It has also been shown how the improved carrier possesses a tripping mechanism that is readily accessible so as to permit adjustment of the tripping mechanism with a minimum amount of effort and lost time.

While a full and complete description of the invention has been set forth in accordance with the dictates of the patent statutes, it is to be understood that the invention is not intended to be limited to the specific form herein shown.

Accordingly, modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claims.

What is claimed is:

1. A braider carrier of the character described, comprising:
 - (A) a main base member;
 - (B) an elongate guide tube projecting from said base;
 - (C) a spool
 - (1) rotatably carried by said base member,
 - (2) having an axis of rotation that is parallel to the longitudinal axis of said guide tube and
 - (3) having ratchet teeth provided on the inboard end thereof;
 - (D) a dispensing eyelet carried by the projecting end of said guide tube in normally fixed relationship therewith;
 - (E) first and second guide rollers
 - (1) fixed with respect to said base and
 - (2) adapted to respectively receive thread from said spool and direct thread towards said eyelet;
 - (F) a control guide
 - (1) shiftably carried by said guide tube and
 - (2) normally being urged towards the projecting end thereof;
 - (G) tripping means
 - (1) carried by said guide tube for movement along the longitudinal axis thereof and
 - (2) having a pawl element fixed to and projecting from said tripping means;
 - (H) said pawl element normally engaging said ratchet teeth;
 - (I) said tripping means being adapted to move linearly toward said base in response to engagement with and continued movement of said control guide toward said base;
 - (a) whereby said movement of said tripping mechanism toward said base causes disengagement between said pawl element and said ratchet teeth thereby releasing said spool for rotation purposes.

2. The device of claim 1 further characterized by the fact that said control guide includes
 - (A) a roller and

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- (B) an adjustable contact element adapted to be adjustably spaced from said roller

- (1) whereby the amount of movement of said control guide prior to contact with said tripping means can be adjusted.

3. A control member for use with braider spool carriers of the type that include a rotatable spool with ratchet teeth thereon, comprising;

- (A) an elongate guide tube
 - (1) of hollow circular cross sectional configuration,
 - (2) having an elongate longitudinal slot extending inwardly from one end of said tube;
- (B) a control guide having
 - (1) a base portion adapted to be received within said tube and
 - (2) a key-like portion adapted to be received in said slot
 - (a) whereby said control guide may move longitudinally of said tube and
 - (3) a roller carried by said key-like portion externally of said control guide;
- (C) a camming element
 - (1) shiftably carried by the base portion of said control guide and having a cam projection slidably received within said slot;
- (D) a cover
 - (1) disposed over the upper end of said guide tube and
 - (2) including an exteriorally presented dispensing eyelet;
- (E) a retaining collar
 - (1) of generally C-shaped configuration in plan
 - (2) having its ends spaced with respect to said slot
 - (a) whereby said camming element may move longitudinally of said guide tube to a point that is lower than said collar;
- (F) a guide ring disposed in telescoping relationship around said guide tube at a point beneath said collar and normally being urged toward said collar;
- (G) a ratchet pawl
 - (1) depending from said guide ring and
 - (2) being adapted to engage with ratchet teeth of said spool;
- (H) means normally urging said control guide toward said top of said guide tube;
- (I) said camming element contacting said guide ring and moving said guide ring downwardly during continued downward movement of said control guide whereby said ratchet pawl becomes disengaged with respect to said ratchet teeth.

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JOHN PETRAKES, *Primary Examiner.*