Oct. 29, 1929. T. BIRKENMAIER 1,733,715

REEL

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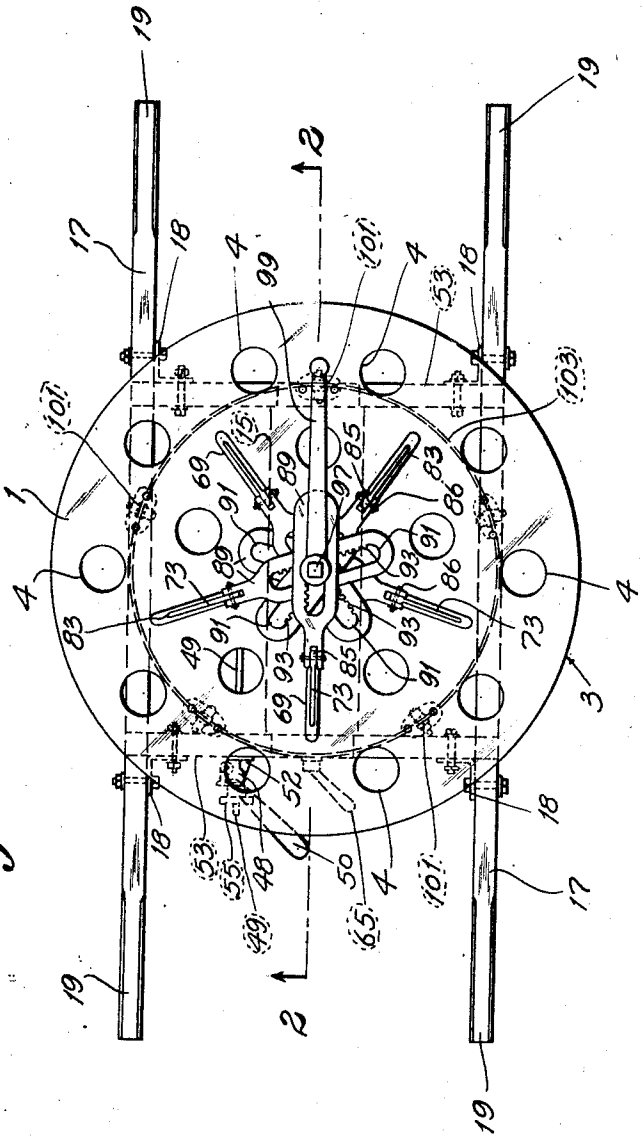


Fig. 1.

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Fig. 2.

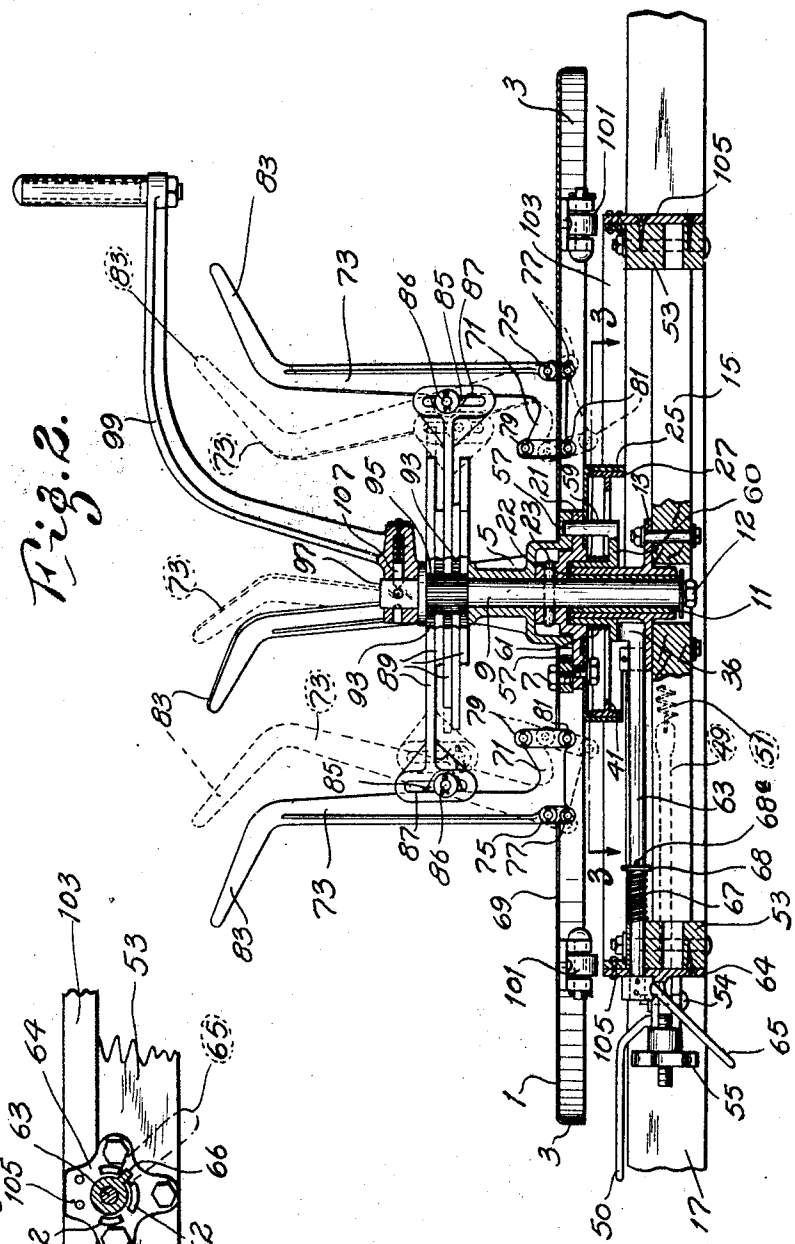


Fig. 5.

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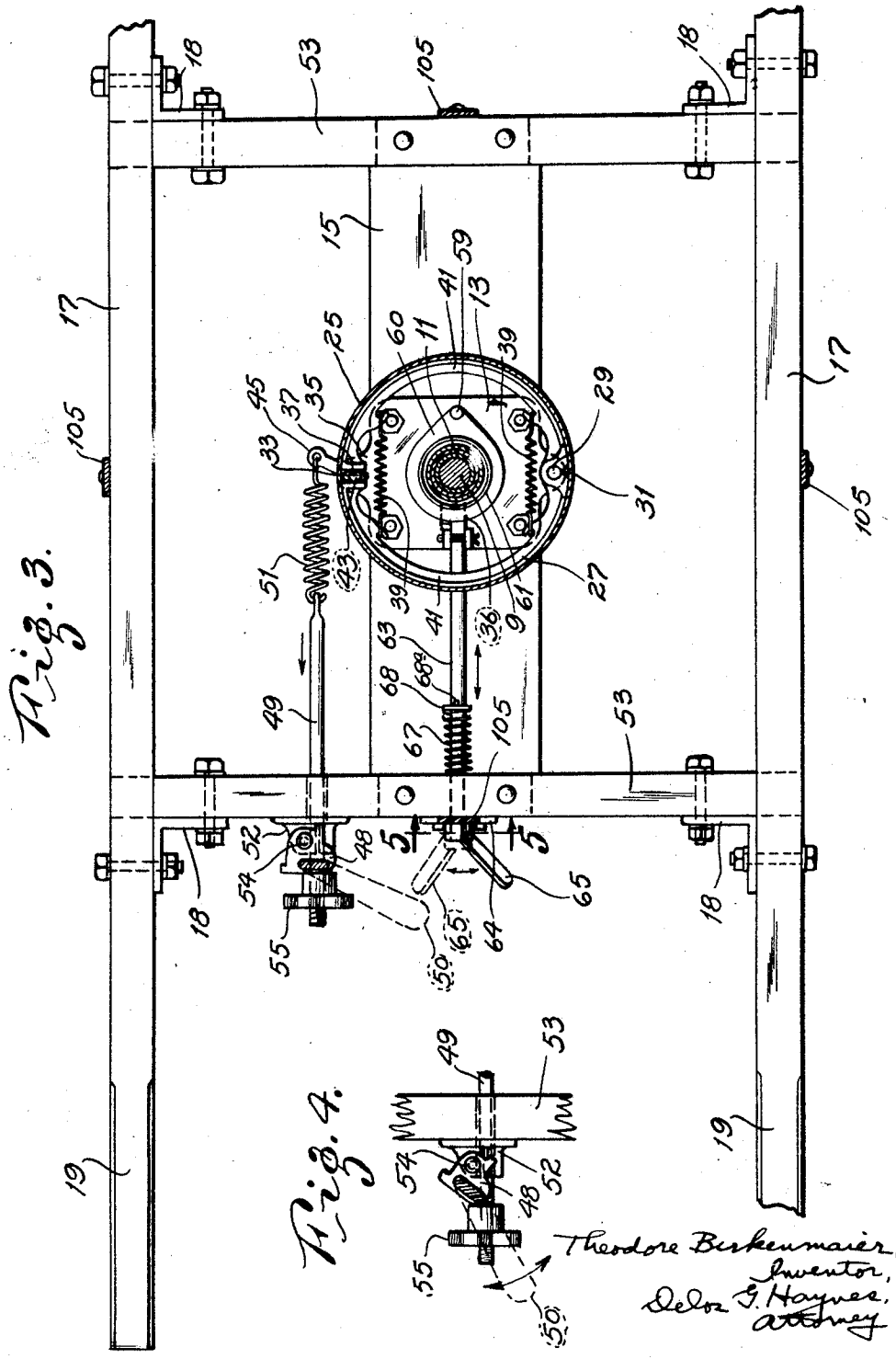


Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE

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REEL

Application filed August 9, 1926. Serial No. 128,084.

This invention relates to reels and with regard to certain more specific features to portable reels for wire, cable, and the like.

Among the several objects of the invention may be noted the provision of a portable reel adapted to be readily set up for winding purposes; the provision of a reel which, after winding has been accomplished, may readily and easily be collapsed to permit removal of reeled material therefrom; the provision of a reel upon which various sizes of rolls or coils may be wound; the provision of a reel which may be retained in a given position without rotative movement of the winding element; the provision of a reel which permits of a complete quick acting brake control of the adjustable winding element; the provision of a reel which can be conveniently controlled from one fixed position of the operator, and the provision of a reel of the class described which can be economically and ruggedly built. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction and arrangements of parts which will be exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated one of the various possible embodiments of the invention,

Fig. 1 is a plan view of the reel;

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

Fig. 3 is a section taken on line 3—3 of Fig. 2 showing the brake setting means and the brake-disc locking means.

Fig. 4 is a fragmentary detail showing the quick acting brake controlling device in brake set position;

Fig. 5 is a fragmentary detail showing means for holding the brake-disc lock in a fixed position.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Fig. 1 of the drawings, there is illustrated at numeral 1 a preferably sheet metal plate or disc having a turned down edge 3 for stiffening purposes and holes 4 for lightening purposes. The disc 1 is bolted to a normally rotatable hub 5 by means of bolts 7 (Fig. 2). The hub 5 is rotatably borne on a shaft 9. This shaft 9 is also rotatably held in a bearing 11 of a brace plate 13 and is prevented from leaving the bearing by an end washer and bolt combination 12. The plate 13 is made fast to a preferably wooden center bar 15 the ends of which are fixed to cross members or end bars 53 which in turn are themselves fastened to side bars or carrier members 17 parallel to the center bar 15 above mentioned. Angle braces 18 (Fig. 3) hold the end bars 53 rigidly to the side bars 17. The bars 17 have handles 19 formed thereon.

The shaft 9 is held integral with a bearing casting 21 by a pin 23. There may or may not be relative rotary motion between the bearing casting 21 and the hub 5, depending upon circumstances to be described. An easily replaceable friction washer 22 separates the lower bearing surface of the bearing casting 21 and the upper horizontal bearing surface of the bearing 11 formed with the brace plate 13, taking the major part of the wear upon these surfaces.

Bolted to the bottom of the casting 21 is a brake drum or bell 25 which rotates with said casting. The drum is inverted with respect to the brace piece 13. Held to said brace 13 (within the drum 25) is a brake shoe 27 (Figs. 2 and 3). The retaining bolt 29 for the shoe passes loosely through a notch 31 of the shoe, whereby the shoe is permitted to spring to various positions in the conventional manner under action of a cam 33 rotatably held by means of a bearing 35 of the brace piece 13.

The cam 33 is positioned within a slotted portion 37 of said shoe. Conventional springs 39 continually hold the two legs 41 of the shoe 27 against the cam 33 and out of contact with the drum 25 when the brake is in release position.

The cam 33 is rotatably held in said bearing 35 by means of the stem 43, to the outer or lower end of which stem is fastened an arm 45. An equalizing spring 51 connects the arm 45 with a brake rod 49 which rod slidably passes through one of the end bars 53 which join the runners 17. The brake rod 49 also slidably passes through a bracket 52 and the bifurcated cam end 48 of a brake lever 50. The end 48 is pivoted to the bracket 52. The end of the brake rod 49 is threaded to take a hand wheel 55, which when turned on said threaded portion increases or decreases the effective length of rod 49 thereby decreasing or increasing the tension of spring 51 to the desired amount for any position of the brake lever 50. Although the brake may be set or released by use of the hand wheel 55, a much quicker means is provided in the brake lever 50, which by turning in the proper direction about the pivot pin 54 of bracket 52 exerts a cam action on the inner surface of the hand wheel 55 thereby forcing it outwardly away from the bracket 52 and thus setting the brake (Fig. 4). Reverse movement causes the wheel 55 to move inwardly toward bracket 52 under the influence of the brake release springs 39, thereby releasing the brake (Fig. 3). The spring 51 permits of practically a constant pressure of the shoe 27 on the drum 25, although the drum may be somewhat eccentric or out of perfect alignment with said shoe. The advantage of this will appear hereinafter.

The hub 5 is adapted to be pinned to the casting 21 at certain times and adapted to rotate freely with respect thereto at other times. To accomplish this end, an extended portion of the hub casting 5 is provided with a plurality of holes 57 each adapted to receive a pin 59 which is slidably borne in the casting 21. The pin 59 is an integral part of the brake-and-disc lock casting 60, which is slidably and rotatably mounted on the said bearing extension 11 of the brace plate 13. A projecting cam 36 on a lock rod 63 normally engages the casting 60 to hold pin 59 in engagement with one of the holes 57. A spring 61 lowers the brake and disc lock casting 60 so that its pin 59 is withdrawn from any of the engaging holes 57 when the support of the projecting cam 36 is removed by turning a lock lever 65 made fast to the end of rod 63. Hence the lock rod 63 when turned through an angle of substantially ninety degrees permits the hub 5 to rotate independently of the brake mechanism. The cam 36 is securely held in its upward or normal position (Fig. 2) or in its other extreme or horizontal position by the functioning of a lug 66 (on the lock lever 65) in engaging the proper depression between the projections 62 on a lever locking plate 64. A spring 67 acting on the lock rod 63 through a washer 68 and pin 68^a, always retains the lock lever 65 in contact with the locking plate 64 and also limits the horizontal movement of the lock rod 63. Hence, the hub 5 and its attendant parts such as the disc 1, may at will be locked to or released from the braking system by movement of the lock lever 65 through an arc of substantially ninety degrees. This can be done by an operator standing in one position at the lever 65. It should be noted that the cam 36 is always in engagement with the lower surface of the member 60 and does not slip from under it when the lever 65 is manipulated longitudinally.

In order to facilitate the formation of a coil on the disc 1, the following collapsible spool is provided:

In each of preferably five slots 69 is slidably held a webbed portion 71 of a spool finger 73. Each webbed portion is provided at its outer end with pairs of wheels 75 and 77 adapted to ride respectively above and below the edges of its respective slot 69 (Fig. 2). The wheels of said pairs 75 and 77 are separated vertically a distance slightly greater than the thickness of plate 1. At its inner end each web 71 is provided with pairs of wheels 79 and 81 above and below said edges of the slot respectively. These pairs of wheels 79 and 81 are separated a distance much greater than the thickness of said plate 1 for purposes to be made clear. It should be noted that four wheels are placed on each side of the web 71 so that the web is symmetrically held. Furthermore, when the lower pairs of wheels 77 and 81 are both substantially in a horizontal position with respect to one another, then the body of the finger 73 is vertical. In this position the upper, inner pair of wheels 79 do not engage said plate 1.

The body portion of each finger 73 has formed outwardly from the top thereof an upwardly sloping arm 83 adapted to prevent a coil of wire on the fingers 73 from slipping endwise from said fingers during a winding process.

After a coil of material has been wound, it may be removed from the fingers 73 by throwing them inwardly to their dotted-line positions indicated in Fig. 2. The rearward upper pair of rollers 79 is such a distance away from the plate 1, that before striking said plate 1, the outer ends of the arms 83 may be brought into alignment or within the limits of the position of the lower ends of the fingers 73 during the winding operation. Hence a coil of wound wire or the like will readily clear the arms 83 upon removal from the plate 1.

It may be noted that the slots 69 are long enough to permit of radial adjustment of the

fingers 73 so that various diametered coils may be wound on the device.

In order to adjustably position the fingers 73 angularly and radially, each of said fingers which is T-shaped in section, has an ear 85 provided on the stem of said T-shape. A pin 86 is formed through said ear and sidewardly engages slotted portions 87 of an adjusting bar 89. There are preferably five adjusting bars, one for each finger 73. Each bar comprises a flat member in which is formed an opening 91. On one side of the openings 91 are formed teeth 93 adapted to engage teeth 95 formed at the upper end of the shaft 9. Upon such engagement between said teeth 93 and 95, the other side of the opening 91 is adapted to be tangentially arranged with respect to the ends of the teeth 95.

It may be seen that the teeth 95 in substance comprise a pinion. The bars 89 are each arranged in a separate plane and are vertically juxtapositioned at the gear teeth or pinion 95. Said teeth 95 are of a length adapted to engage at once all sets of the rack teeth 93 of the five members 89. All the members 89 are made alike and the slotted portions 87 are of such length that any of the pins 86 may be accommodated in motion, regardless of which of the five elevations any pin's respective member 89 is placed. Hence all the fingers 73 and adjusting members 89 may be made exactly alike and from a single pattern. Above the gear teeth 95, the shaft 9 is integrally provided with squared or other polygonal means 97, for non-rotatably but removably receiving a crank arm 99 for purposes of turning the shaft 9. The assembled spool now comprises the plate or disc 1, its hub 5, and the adjustable fingers 73.

In order to brace the disc 1 against weaving as a reeling operation is performed, rollers 101 are provided on the under side of disc 1 immediately above a circular track 103 which is supported on the frame members 53 and 17. The track is fastened to said frame members by the track fastening lugs 105.

Operation of the reels is as follows, assuming it to be without wire or the like thereon, and in collapsed position (see dotted lines Fig. 2):

First, the lock lever 65 is turned to permit relative motion between the member 21 and the hub 5, that is, the cam 36 is caused to lay flat thereby permitting the pin 59 to lower. The brake is released and a handle or crank 99 applied to the shaft 9. By turning the shaft from the crank 99 and lightly holding the disc 1 with the hand, foot or otherwise, the adjusting bars may be set for any desired diameter of coil within the limits of the dimensions of the slots 69. If this adjustment is being made outwardly, then the fingers 73 will automatically assume a vertical position. If the adjustment is being made inwardly, then after adjustment for diameter has been made at the crank 99, the fingers 73 may be manually positioned in a vertical manner by applying outward pressure at the upper ends thereof. The fingers 73 are then in their solid line positions shown throughout the drawings. During the above operation the shaft 9 rotates with respect to the hub 5 and disc 1.

Next, to reel a cable or the like the lock lever 65 is turned so as to cause engagement of the pin 59 in a hole 57, whereby the hub 5 and member 21 are locked together. There is then no relative motion between the hub 5 and the member 21. The brake is kept in a released position however, so that the shaft 9 may rotate in the bearing 11 of the brace 13.

Now, if a cable or the like is applied to the outside of the fingers 73 at the base thereof, preferably at the disc 1, then movement of the crank 99 will result in winding of the cable on the outside of the fingers 73 as on a spool. No relative motion is had between the disc 1 and the shaft 9, so that the teeth 95 and the adjusting bars 89 are not operable to adjust. Winding takes place preferably from a point near the disc 1 up to the arms 83 and thereafter back and forth as on any winding spool. The first coils wound near the bases of the fingers 73 hold said fingers substantially at the right angle or at any other pre-designed position with respect to disc 1. The exact positioning depends upon the relative positioning of the lower sets of wheels 77 and 81, which are in the present embodiment aligned horizontally with respect to the vertical body portions of fingers 73.

If, while winding a coil as described, it is desirable to temporarily stop, then the brake may be set tight, whence tension in the cable will not cause undesirable unwinding.

If under certain circumstances, after partial or complete winding, it is desirable to again pay out wire from the reel, then the brake may be held to any intermediate position between "off" and "on" by means of the break lever 50. A pull on the wire will then cause unwinding at a rate depending on the amount the brake is set. An even rate of pay is provided inasmuch as the equalizing spring 51 insures a substantially constant pre-determined brake set. Any of various tensions may be maintained in the unreeling wire by properly adjusting the brake. If substantially no tension is desired, said brake may be released entirely and the wire unwound. During the unwinding operation the crank 99 may or may not be removed, as desired, although it is preferable to do so.

Finally, after a coil of cable has been completed (large or small), the brake is again released, the lock lever turned to again permit relative motion between the hub 5 and the member 21 and the crank 99 turned while the disc 1 is lightly held as before. The turn-

ing of the crank 99 is now done in such a direction as to draw the adjusting bars 89 inwardly. The fingers 73 will have a tendency to be drawn inwardly and collapse to their dotted-line position shown in Fig. 2. The collapse will be certain when the webs 71 touch the inner ends of their slots 69, as the only remaining possible movement of the fingers is about the pins of the wheel sets 75 and 77 as pivots. It is evident that the slotted portions 87 permit complete movement of the pins 86.

After the collapse of the fingers, the coil of wire may readily be removed vertically as it will readily clear the arms 83.

It is to be understood that the reel may be fully operated in the horizontal positions thereof indicated in the drawings, or that the side frames 17 may be positioned substantially vertically (say leaning against some object) whereby cranking is easily accomplished. In fact the reel may be employed and operated in any position into which it may be put.

End movement of the handle or crank 99 is resiliently resisted by a spring pressed round-nosed detent 107 adapted to engage a depression in the polygonal upper end of the shaft 9. Hence the handle may be readily applied or removed but will not drop off of its own accord.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A reel comprising a framework, a shaft rotatably borne therein, means for braking the shaft, a rotatable spool mechanism mounted on the shaft and rotatable with respect thereto, and means for collapsing said spool mechanism when relative rotation between it and said shaft is had, and means for locking the spool mechanism with the shaft, comprising a locking member adapted to be moved from a remote control to locking and unlocking positions, said control being operable from a predetermined stationary point with respect to said framework.

2. A reel comprising a framework, a shaft rotatably borne therein, means for braking the shaft controlled from a point stationary with respect to said frame, a rotatable spool mechanism mounted on the shaft and rotatable with respect thereto, means for collapsing said spool mechanism and repositioning it for winding when relative rotation between it and said shaft is had, and means for locking the spool mechanism with the shaft whereby it is prevented from collapsing or repositioning itself, said locking means comprising a locking member adapted to be moved from a remote control to locking and unlocking positions, said control being operable from a predetermined stationary point with respect to said framework.

In testimony whereof, I have signed my name to this specification this 6th day of August, 1926.

THEODORE BIRKENMAIER.