Feb. 18, 1930. LE ROY M. FULTON 1,747,895

REELING MACHINE

Filed May 23, 1927 4 Sheets-Sheet 1

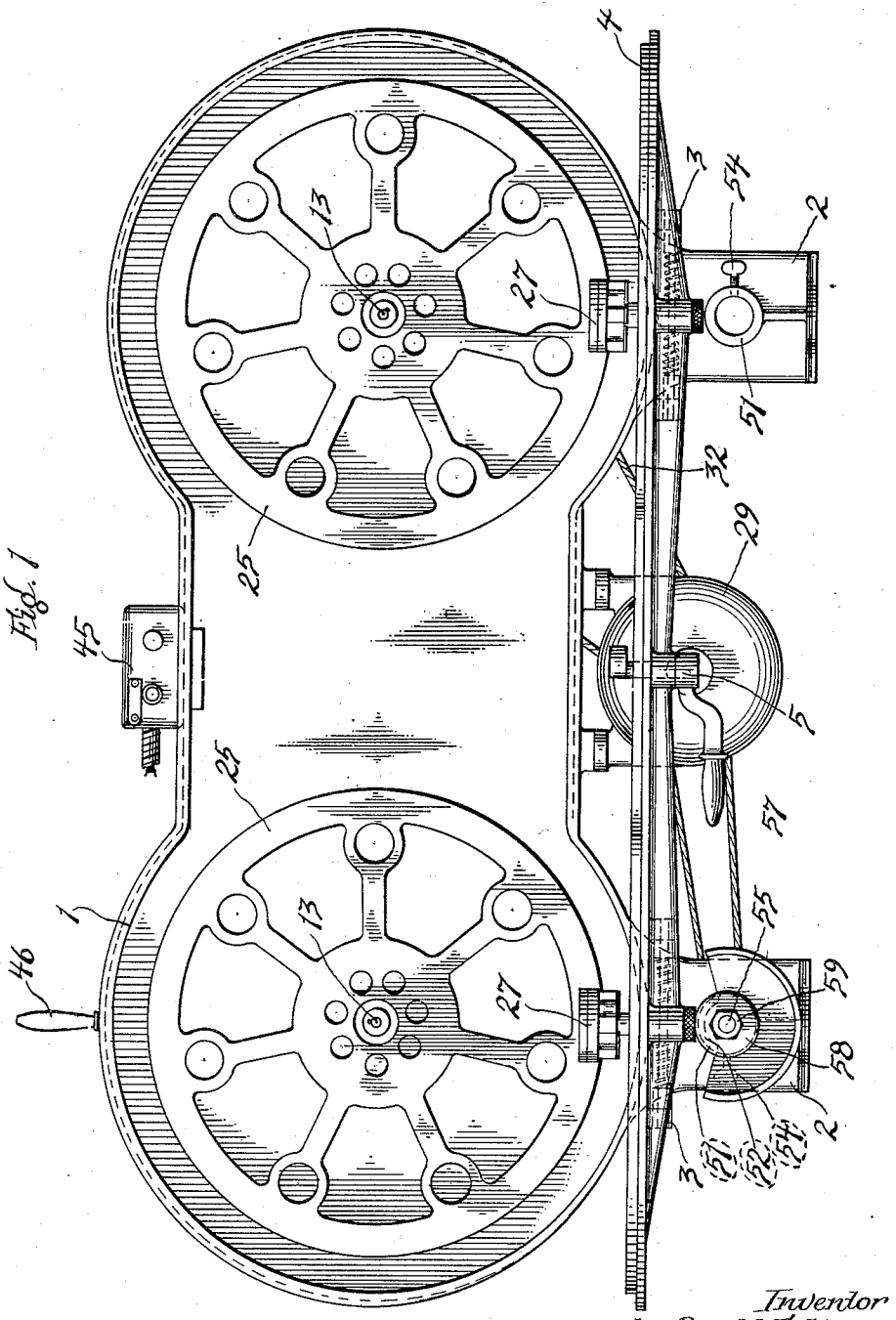


Fig. 1

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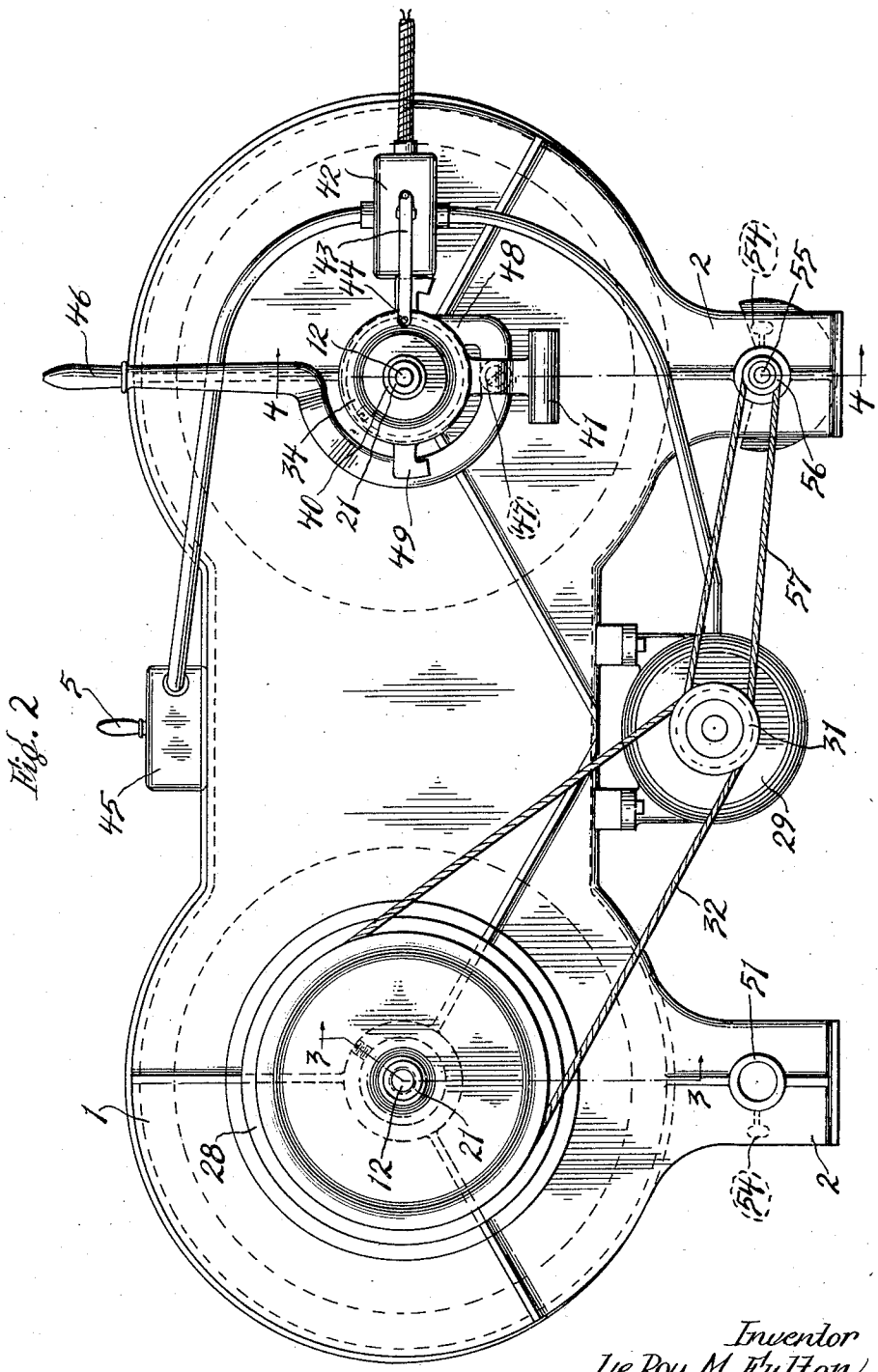


Fig. 2

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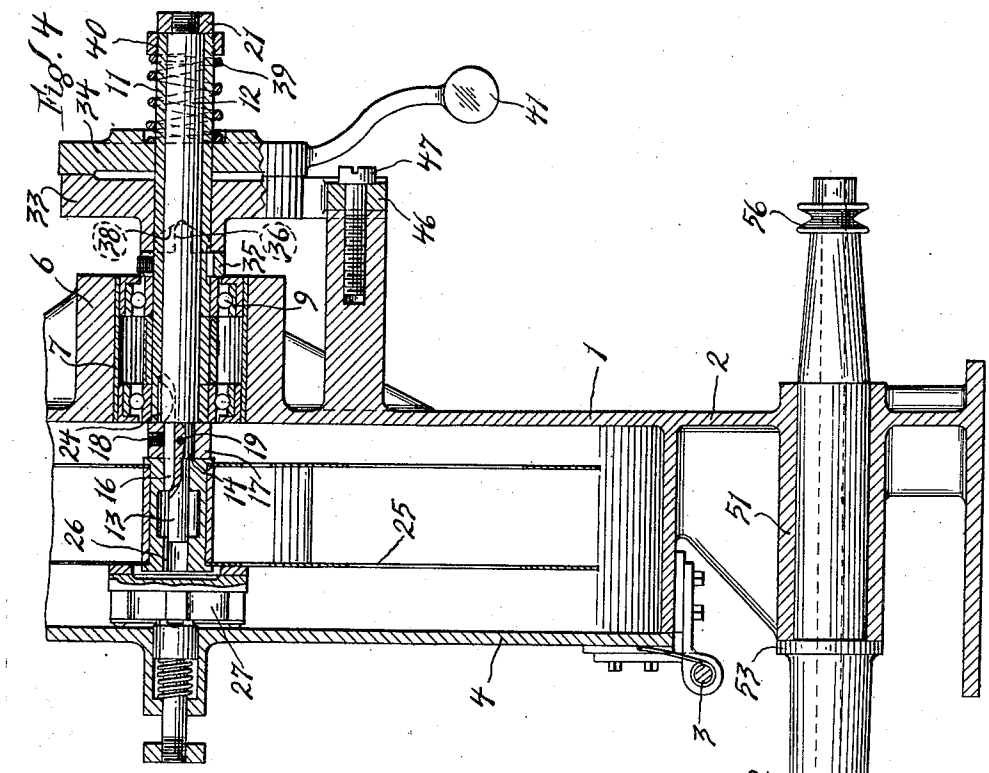


Fig. 4

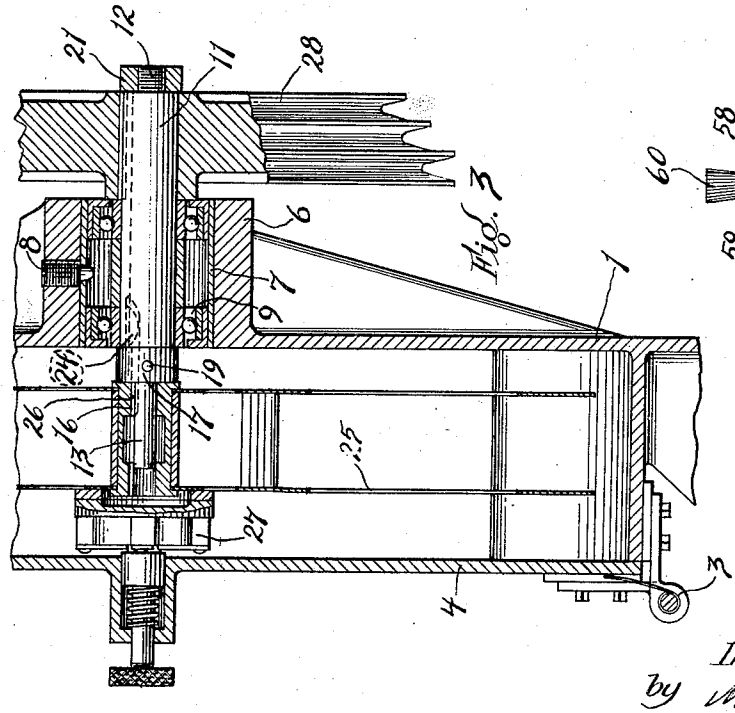


Fig. 3

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Fig. 5

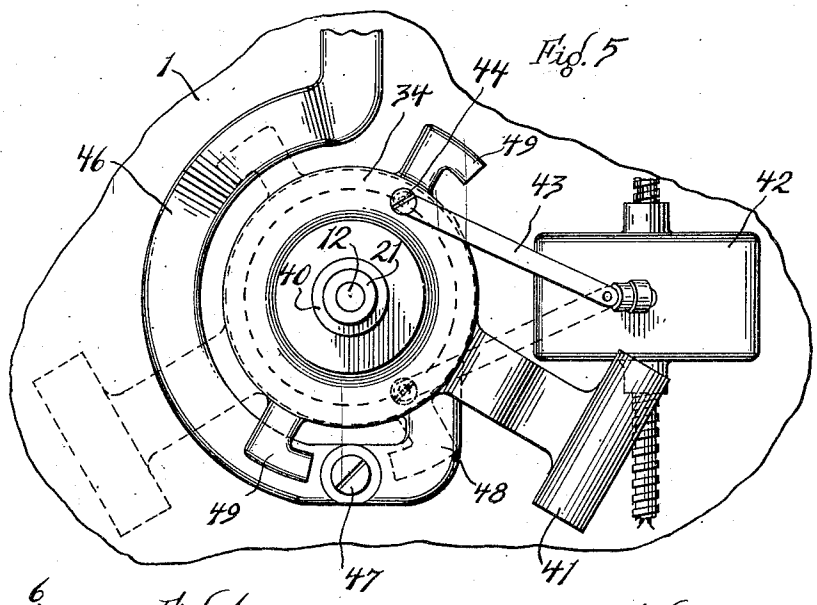


Fig. 6

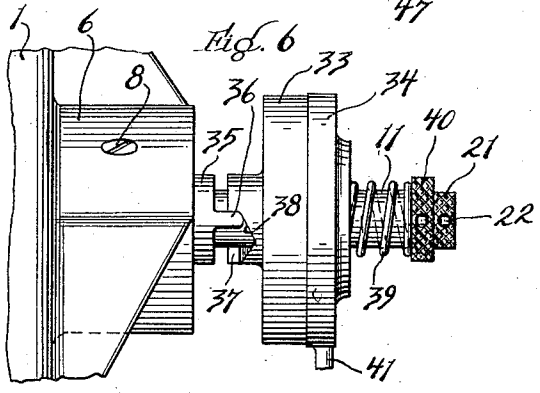


Fig. 7

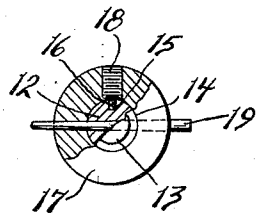
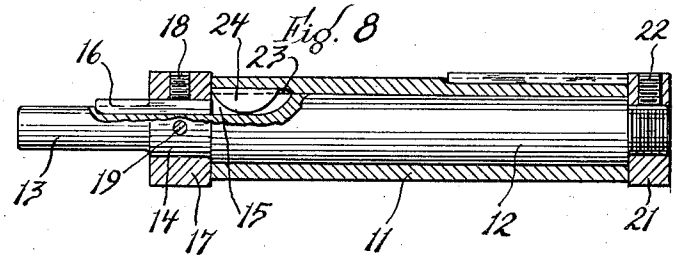


Fig. 8



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Patented Feb. 18, 1930 1,747,895

UNITED STATES PATENT OFFICE

LE ROY M. FULTON, OF DES PLAINES, ILLINOIS

REELING MACHINE

Application filed May 23, 1927. Serial No. 193,436.

My invention relates particularly to a reeling machine of the type commonly known as a rewinding machine and which is used for rewinding motion picture film after it has been run through a motion picture projecting machine preparatory to again running it through the projecting machine, although not limited to this use alone.

One of the objects of the invention resides in the provision of means for automatically terminating the drive of the reeling means when the material, such as the film, has been unreeled from the unreeling means with obvious convenience.

Another of the objects of the invention resides in the provision of a spindle structure which is particularly adapted for quick and convenient assembly and disassembly with a view toward quick and convenient replacement of parts.

Another object resides in the provision in a reeling machine of a work spindle to be driven from the same source of power as is the reeling mechanism of the machine with a view toward providing for the convenient accomplishment of repair and maintenance work in theatre projection rooms without unduly increasing the apparatus necessary therefor.

With these objects in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects, hereinafter appearing, are effected, all as fully described with reference to the accompanying drawings and more particularly pointed out in the appended claims.

In the said drawings—

Figure 1 is a front elevation of a rewinding machine embodying my invention and showing the cover of the casing, hereinafter described, opened;

Figure 2 is a rear elevation of the machine;

Figure 3 is an enlarged partial section on the line 3—3 of Figure 2;

Figure 4 is an enlarged partial section on the line 4—4 of Figure 2;

Figure 5 is an enlarged partial rear elevation of the machine showing certain parts in different positions than those in which they are shown in Figure 2;

Figure 6 is an enlarged side elevation of a portion of the machine;

Figure 7 is an end elevation of the spindle assembly of the machine with parts broken away;

Figure 8 is a side elevation of the spindle and revoluble sleeve assembly of the machine with parts broken away.

Like characters of reference indicate like parts in the several views.

Referring to the drawings 1 designates a casing forming an enlongated shallow enclosure open at one face thereof and provided with extended formations or feet 2 adjacent respective ends thereof whereby the casing is supported in a vertical position, these feet 2 being adapted to be secured downwardly upon a suitable support, not shown, to rigidly anchor the machine. Attached to the casing 1 by means of spring hinges 3 at the lower portion of the enclosure of the casing is a cover 4 which is thus movable to and from a position in which the cover completes the enclosure of the casing, a suitable manually controlled locking device 5 being provided for releasably securing the cover in closed position.

The end portions of the enclosure of the casing 1 are circular in form and the wall of the casing opposite the open side thereof is provided with outwardly extending hubs 6 disposed concentrically with these end portions and bored concentrically therewith. See Figures 3 and 4. Removably engaged in the bores of these hubs are sleeves 7 which are releasably secured in these bores by means of set screws 8 screwthreaded into these hubs and engaging said sleeves. Mounted in the sleeves 7 are anti-friction bearings 9, and extending through and mounted in said bearings for rotation are sleeves 11 which extend outwardly beyond the hubs 6, the sleeves 7, and the bearings 9 at the outer ends of the hubs.

Spindles 12 are removably engaged in the bores of the sleeves 11, and these spindles are provided with reduced end reel mount portions 13 and larger reduced portions 14

immediately inward of these reel mount portions. The spindles 12 are also provided with keyways 15 extending from points inwardly of the reduced portions 14, and consequently inwardly of the reel mount portions 13, across the portions 14 and into the reel mount portions 13. See Figures 3, 4, 7, and 8. Reel driving keys 16 are removably engaged in these keyways 15 and extend from points inwardly of said reel mount portions 13 into said reel mount portions. Collars 17 are removably engaged on the reduced portions 14 of the spindles and set screws 18 are screwthreaded into these collars and abut the keys 16 to secure the keys in said keyways. Tapered pins 19 are removably engaged in corresponding transverse bores in the collars 17 and the spindles 12 to positively fix the collars longitudinally of the spindles.

The spindles 12 are engaged in the bores of the sleeves 11 with the collars 17, which are larger in diameter than the diameter of the main portions of the spindles, abutting the inner ends of the sleeves 11 and with the reel mount portions 13 disposed in the enclosure of the casing 1, and collars 21 are screwthreaded upon the spindles 12 and are adapted to clamp the sleeves 11 between them and the collars 17 to longitudinally fix these sleeves with the spindles, set screws 22 being screwthreaded into the collars 21 to releasably fix these collars on the spindles. The sleeves 11 are provided with internal keyways 23 and keys 24 engageable in these keyways and the inner portions of the keyways 15 of the spindles 12, which portions are not occupied by the reel drive keys 16, to rotatably fix these sleeves and the spindles.

Reels 25 of suitable construction are removably mounted on the end reel mount portions 13 of the spindles and are provided with keyways 26 in the spindle bores thereof for engagement with the reel drive keys 16 to rotatably fix the reels and spindles. See Figures 1, 3, and 4. The reels 25 when mounted on the spindles 12 lie within the enclosure of the casing 1, and the cover 4 is provided with resilient pressure devices 27 which centrally engage the reels when the cover is in closed position to maintain the reels in proper relation on the spindles for reeling material, such as motion picture film from one reel onto the other reel in a usual manner.

It will be observed that the sleeves 7 are conveniently removable from the casing, that the spindles 12 are conveniently removable from the sleeves 11, and that the reel driving keys 16 are conveniently removable from the spindles, so that replacement of parts or units of the spindle assemblies is correspondingly convenient.

One of these spindles assemblies is utilized for the mounting of a reel from which the material is to be unreeled and the other is utilized for the mounting of a reel upon which the material is to be reeled, and the sleeve 11 of the reeling spindle assembly has a bored driving pulley 28 slidably keyed on the portion thereof extending outwardly beyond the outer end of the hub 6 related therewith, and the collar 21 on the corresponding spindle 12 is engageable with the corresponding end of this pulley to maintain it on this sleeve 11. See Figure 3. An electric motor 29 is secured on the bottom of the casing 1 between the feet 2 thereof, and a pulley 31 is secured on the shaft of this motor for driving the pulley 28 through the medium of a belt 32. See Figure 2.

The operation of the motor is controlled as follows. Journaled on the portion of the sleeve 11 of the unreeling spindle assembly which extends outwardly beyond the outer end of the corresponding hub 6 is a pair of cooperating friction clutch elements 33 and 34. See Figures 2, 4, 5, and 6. Secured on the sleeve 11 of the unreeling spindle assembly between the bearing 9 and the inner clutch element 33 is a collar 35 which is provided with diametrically opposite lugs 36 extending in the direction of the clutch element 33. The hub of the clutch element 33 is provided with diametrically opposite openings 37 into which the lugs 36 project and these openings are formed to provide helical cam surfaces 38 engageable with the lugs 36 to actuate the clutch element 33 against the clutch element 34 with angular movement of the corresponding sleeve 11 with respect to the clutch element 33. Thus is provided a lost motion driving connection between the unreeling spindle and the clutch element 33 including cam means operating as aforesaid. See Figure 6. A coiled compression spring 39 encircles the sleeve 11 of the unreeling spindle assembly between a collar 40 secured on the outer end of this sleeve and the outer clutch element 34 and yieldably urges the clutch elements 33 and 34 together. The clutch element 34 is provided with a weighted radial extension 41 yieldably urging this clutch element into one angular position thereof, which position is illustrated in Figure 2. An electric switch 42, of usual construction and connected in circuit with the motor 29 for controlling the same, is mounted on the casing 1 adjacent the friction clutch, above described, and is connected for operation by angular movement of the clutch element 34 by means of a connecting link 43 connected with this clutch element by a radially disposed stud 44 on this clutch element, the arrangement being such that when the clutch element 34 is in the aforementioned angular position thereof under the influence of the weighted extension 41, as shown in Figure 2, the switch 42 is open to prevent operation of the motor and when this clutch element is out of this

angular position, as shown in Figure 5, the switch 42 is closed to operate the motor.

In operation the material being unreeled causes rotation of the spindle 12 and sleeve 11 of the unreeling spindle assembly which rotation is transmitted to the clutch element 33 through the lugs 36 engaged in the openings 37, and the lugs operating on the cam surfaces 38 increase the pressure upon the clutch elements with the result that the influence of the weighted extension 41 is overcome and the clutch element 34 is moved out of the aforementioned angular position thereof and the switch 42 is closed to continue operation of the motor. This condition is maintained until the material being reeled has been unreeled, when due to the termination of the driving tension on the unreeling spindle, the collar 35 under the influence of the spring 39 and the lugs 36 bearing against the cam surfaces 38 takes a retrograde angular movement with respect to the clutch element 33 thereby releasing the pressure on the clutch elements 33 and 34 sufficiently to permit the clutch element 34 to move under the influence of the weighted extension 41 into the aforementioned angular position thereof and open the switch 42 to terminate the drive of the reeling spindle. A manually controlled switch 45 is conveniently mounted on the casing 1 and is connected in parallelism with the switch 42 for starting the motor, this switch 45 being opened after the switch 42 is closed so that the automatic control may be effective.

A manually controlled brake lever 46 is pivotally mounted on the casing 1 below the unreeling spindle assembly by means of a stud 47 and is provided with a foot 48 which is engageable on the periphery of the clutch element 33 for controlling rotation of the unreeling spindle. See Figures 2 and 5. The clutch element 34 is provided with diametrically opposite stop extensions 49 which are engageable with the head of the stud 47 to limit angular movement of this clutch element.

The feet 2 of the casing 1 are provided with bored hubs 51 disposed in parallelism with the spindle assemblies and the motor 29. A bored sleeve 52 is removably engaged in either of said bores and is provided with a shoulder formation 53 engaged with an end of the engaged hub 51 to longitudinally position this sleeve, and set screws 54 are screw-threaded radially into the hubs 51 for releasably securing the sleeve engaged in the bores thereof. A work spindle 55 is journaled in the bore of the sleeve 52, and secured on one end thereof is a pulley 56 whereby the spindle 55 may be driven from the motor 29 by means of a belt 57 trained over this pulley and the motor pulley 31. See Figures 1, 2, and 4. The end of the spindle 55 opposite that on which the pulley 56 is mounted is threaded and is provided with clamp flanges 58 and a clamp nut 59 for the mounting of various implements, such as a circular wire brush as shown in Figure 4. The pulley 56 is of a size which will pass through the bores of the hubs 51 so that the work spindle assembly may be removed from or installed on the casing 1 as a unit.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown as changes may readily be made without departing from the spirit of my invention, but having thus described my invention, I claim as new and desire to secure by Letters Patent the following:

1. In a reeling device the combination with revoluble reeling and unreeling members, of means for driving said reeling member, a device controlling the driving of said reeling member, a pair of cooperating friction clutch elements, lost motion means for driving one of said clutch elements from said unreeling member including cam means adapted for actuating this clutch element against the other clutch element with angular movement of said unreeling member with respect to said first mentioned clutch element, spring means yieldably urging said clutch elements together, yieldable means urging said other clutch element into one angular position thereof but adapted to yield to the frictional drive of the clutch, and a connection between said controlling device and said other clutch element for actuating said control means with angular movement of said other clutch element and adapted to prevent driving of said reeling element when said other clutch element is in said angular position and to permit driving of said reeling element when said other clutch element is moved out of said angular position.

2. In a reeling device the combination with revoluble reeling and unreeling members, of an electric motor for driving said reeling member, an electric switch controlling said motor, a pair of cooperating friction clutch elements, lost motion means for driving one of said clutch elements from said unreeling member including cam means for actuating this clutch element against the other clutch element with angular movement of said unreeling member with respect to said first mentioned clutch element, spring means yieldably urging said clutch elements together, weight means yieldably urging said other clutch element into one angular position thereof, a connection between said switch and said other clutch element for actuating said switch with angular movement of said other clutch element to open the switch under the influence of said weight means and to close the switch under the influence of the frictional drive of said clutch elements, a

second manually controlled electric switch connected in parallelism with said first mentioned switch, and a manually controlled brake associated with said first mentioned clutch element.

3. In a reeling device the combination of an exteriorly mounted revoluble sleeve, a spindle having an end reel mount portion and adapted for removable engagement in the bore of said sleeve, a key structure between said sleeve and spindle engaged in said bore for rotatably fixing the sleeve and spindle and adapted to permit removal of the spindle from the sleeve, a shoulder formation on said spindle adjacent said reel mount portion adapted to abut an end of said sleeve, and a collar screwthreaded on said spindle and adapted to abut the other end of said sleeve for cooperation with said shoulder formation to longitudinally fix said sleeve and spindle.

4. In a reeling device the combination of a bored support, a sleeve removably engaged in the bore of said support, releasable means securing said sleeve engaged in said bore, a second smaller sleeve, anti-friction bearing means carrying said second sleeve for rotation in said first mentioned sleeve, said second sleeve extending outwardly beyond said first mentioned sleeve, a bored driving pulley slidably keyed on the extending portion of said second sleeve, a spindle having an end reel mount portion and adapted for removable engagement in the bore of said second sleeve, a key structure between said second sleeve and spindle for rotatably fixing this sleeve and the spindle, a shoulder formation on said spindle adjacent said reel mount portion adapted to abut non-extending end of said second sleeve, and a collar screwthreaded on said spindle and adapted to abut the extending end of said second sleeve for cooperation with said shoulder formation to longitudinally fix said second sleeve and said spindle and to engage the corresponding end of said pulley to maintain it on said second sleeve.

5. In a reeling device the combination of a revolubly mounted concentrically bored member, a spindle adapted for removable engagement in the bore of said member and having a reduced end reel mount portion and provided with a keyway extending from a point inwardly of the reel mount portion thereof to said reel mount portion, a reel driving key removably engaged in said keyway and extending from a point inwardly of said reel mount portion into said reel mount portion, a collar removably engaged on said spindle inwardly of said reel mount portion and overlying said key, a set screw screwthreaded into said collar and adapted to abut said key, a pin removably engaged in transverse bores in said collar and spindle, and a second collar screwthreaded on said spindle and adapted to clamp said bored member between it and said first mentioned collar.

6. In a reeling device the combination of a revolubly mounted sleeve provided with an internal keyway, a spindle adapted for removable engagement in the bore of said sleeve and having a reduced end reel mount portion and a second larger reduced portion immediately inward of said reel mount portion and provided with a second keyway extending from a point inwardly of said second reduced portion into said reel mount portion, a reel driving key removably engaged in said second keyway and extending along said second reduced portion of the spindle into said reel mount portion thereof, a collar removably engaged on said second reduced portion of the spindle and overlying said key, a set screw screwthreaded into said collar and adapted to abut said key, a tapered pin removably engaged in corresponding transverse bores in said collar and spindle, a second collar screwthreaded on said spindle and adapted to clamp said sleeve between it and said first mentioned collar, and a second key engageable in both of said keyways.

In witness whereof I hereunto affix my signature this 14th day of May, 1927.

LE ROY M. FULTON.