May 16, 1944. R. K. HATCH 2,348,904

WIRE REEL CONSTRUCTION

Filed Sept. 10, 1941 6 Sheets-Sheet 1

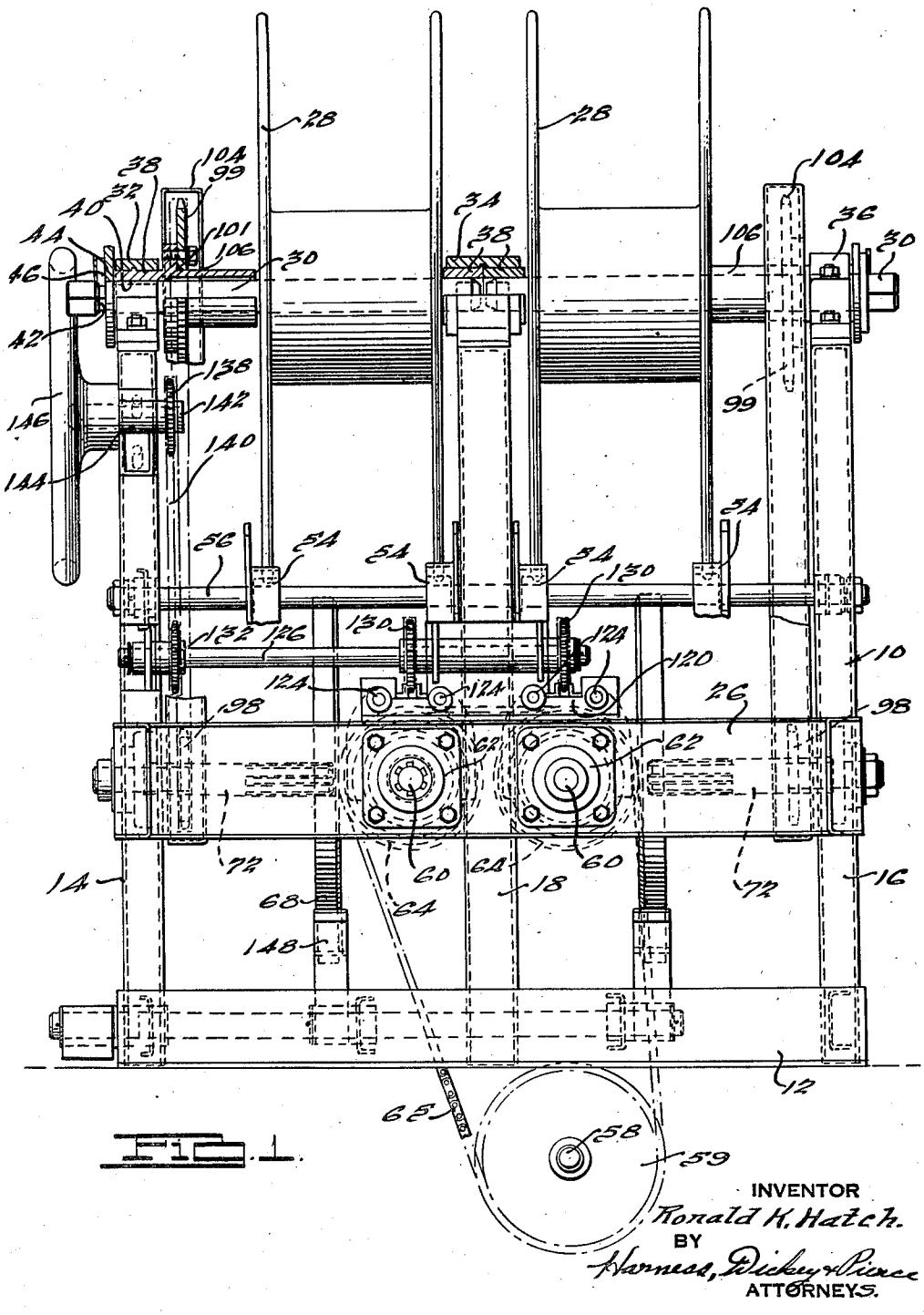


FIG. 1.

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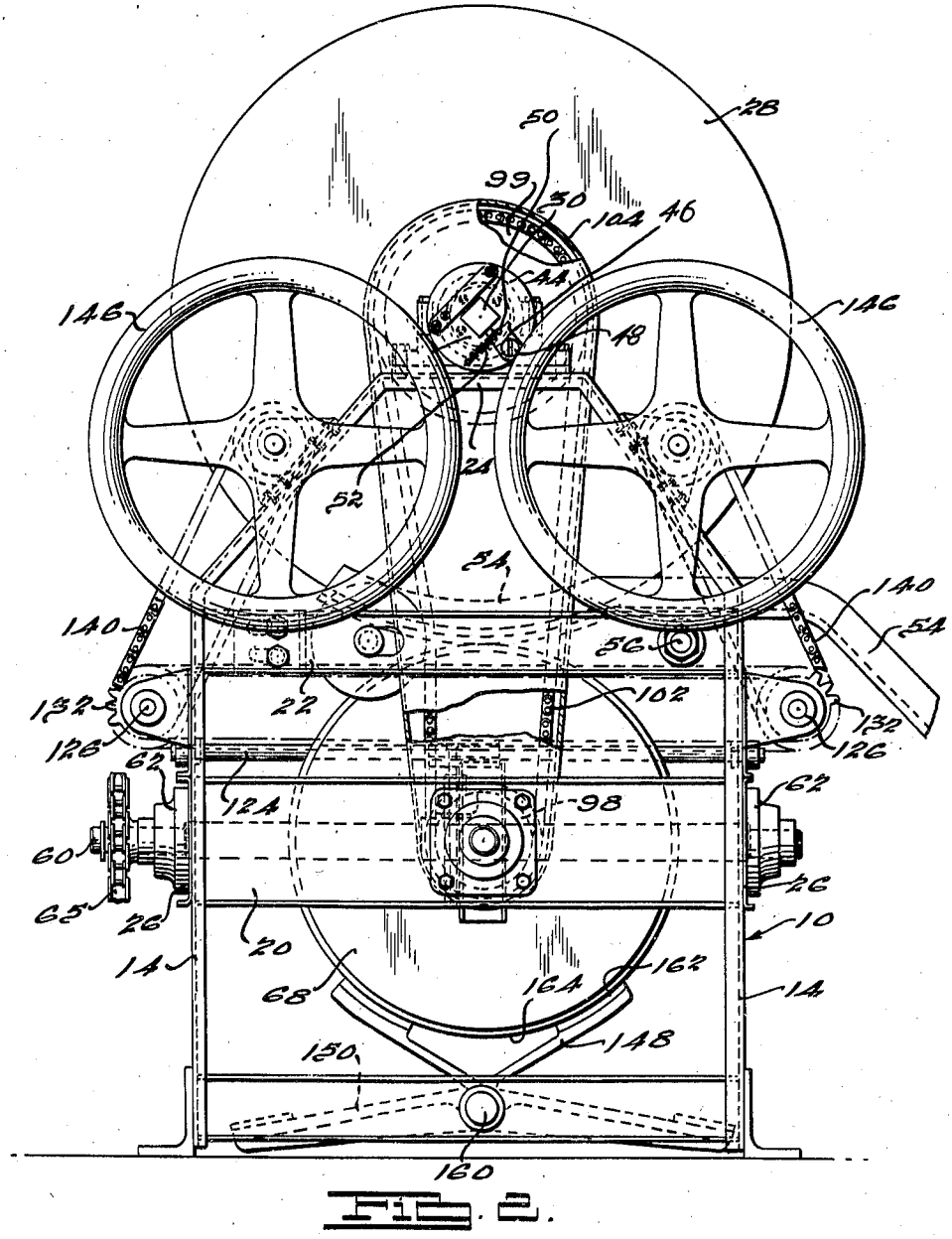


Fig. 2.

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WIRE REEL CONSTRUCTION

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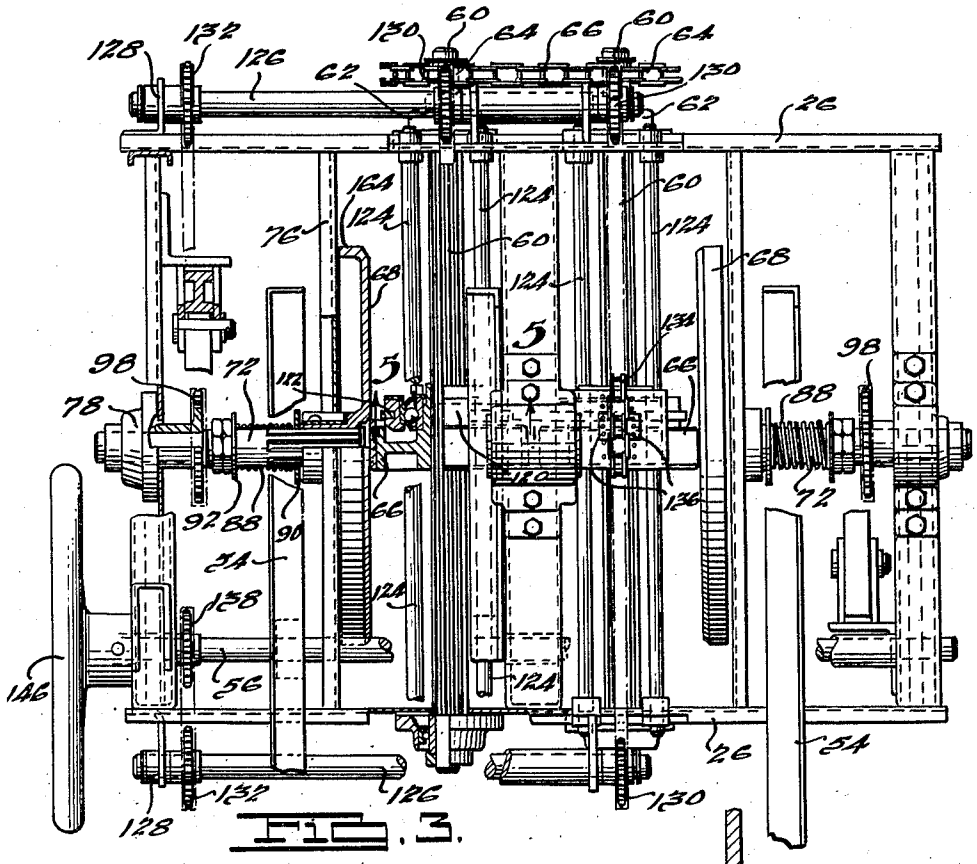


FIG. 3.

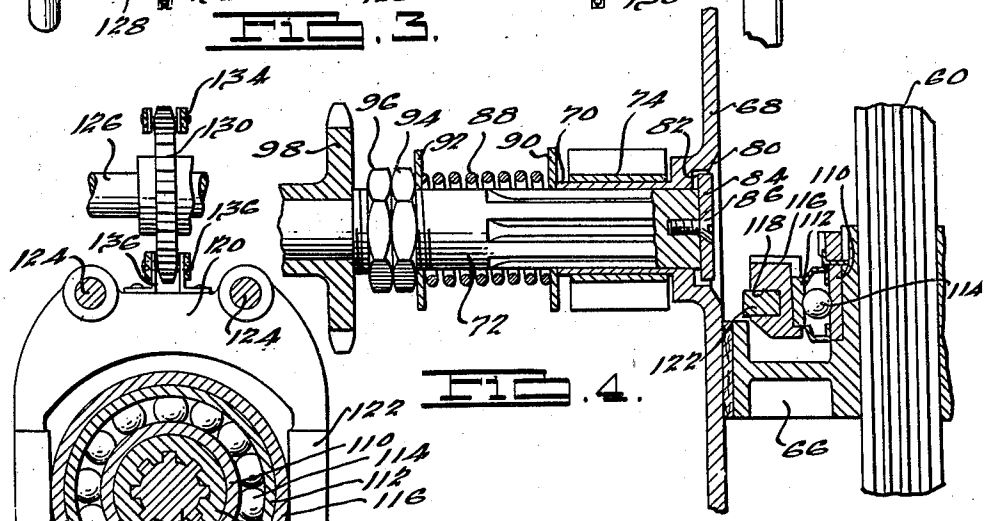


FIG. 4.

FIG. 5.

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WIRE REEL CONSTRUCTION

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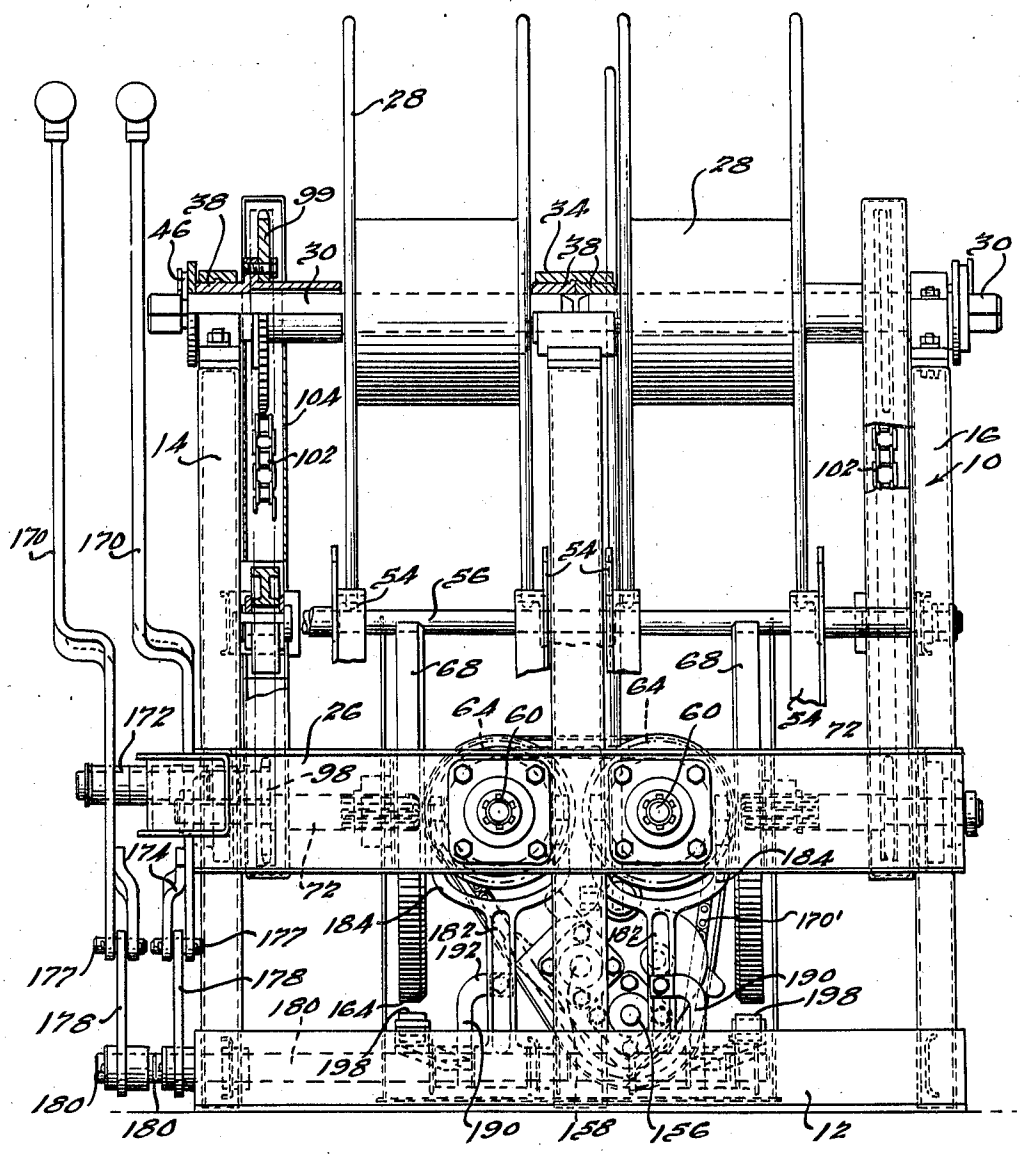


FIG. 8.

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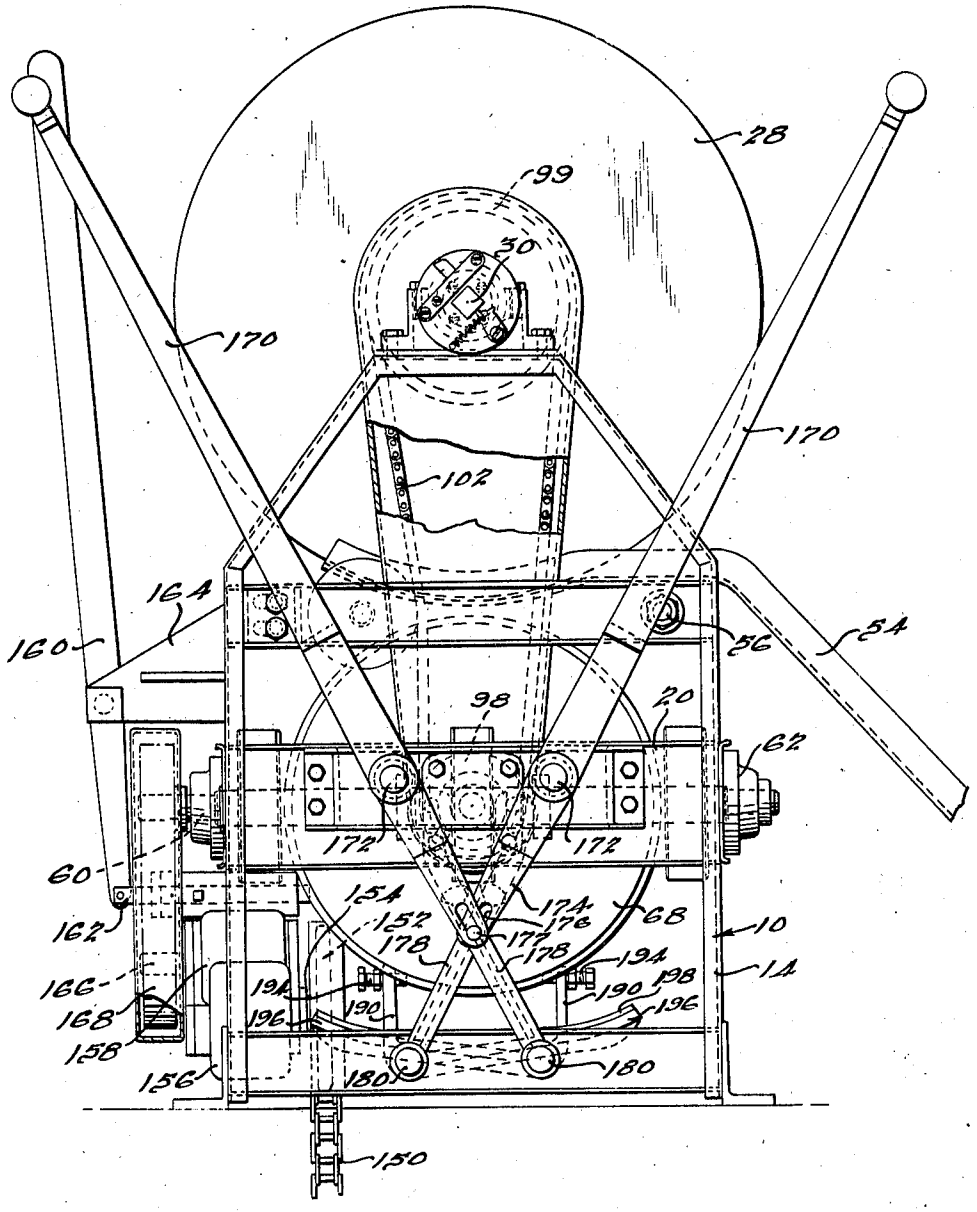


Fig. 7.

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WIRE REEL CONSTRUCTION

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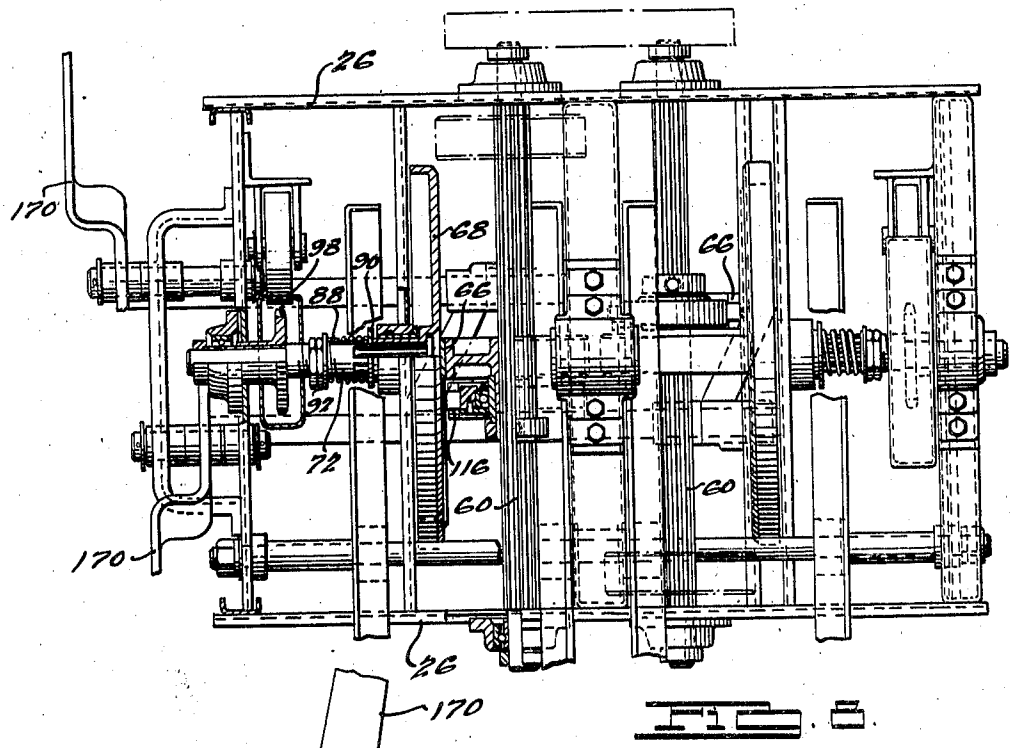


FIG. 8.

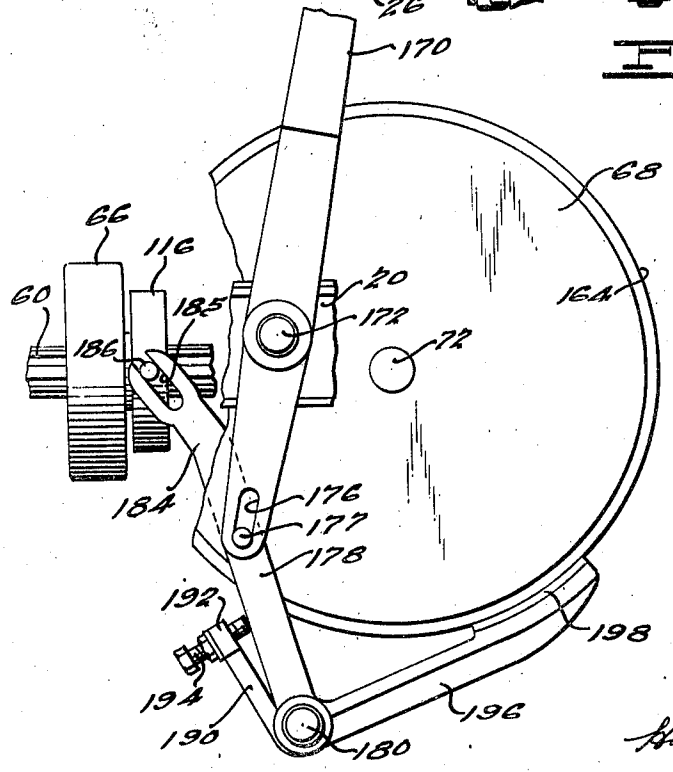


FIG. 9.

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UNITED STATES PATENT OFFICE

2,348,904

WIRE REEL CONSTRUCTION

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Application September 10, 1941, Serial No. 410,304

3 Claims. (Cl. 254—187)

The present invention relates to winches and particularly relates to wire reel winches which are adapted for mounting on automotive vehicles.

One of the primary objects of the present invention is to provide improvements in the drives for wire reels.

Another object of the invention is to provide improvements in drives for devices of the type mentioned in which the speed of the wire may be kept constant as the wire winds up or pays out on the reel.

Another object of the invention is to provide a friction drive for devices of the type mentioned in which there is a predetermined, constant pressure between the driving and driven elements of the drive when in operation, and wherein such pressure may be adjusted to the desired amount.

Another object of the invention is to provide improvements in devices of the type mentioned by which a constant pull may be applied to the wire, and in the event the pull of the wire exceeds a predetermined amount, the drive is relieved during the period of excess pull so that such excess pull will not break the wire.

Another object of the invention is to provide improvements in the operating mechanism for wire reels, whereby a brake is applied when the driving means reaches full reel position.

Other objects of the invention will become apparent from the following specification, the drawings relating thereto, and from the claims hereinafter set forth.

In the drawings, in which like numerals are used to designate like parts in the several views throughout:

Figure 1 is a side elevational view, with parts in cross-section, of one embodiment of a wire reel having incorporated therein features of the present invention;

Fig. 2 is an end elevational view of the structure shown in Fig. 1;

Fig. 3 is a top plan view with parts broken away and parts illustrated in cross-section of the structure shown in Fig. 1;

Fig. 4 is an enlarged vertical cross-sectional view of portions of the construction shown in Fig. 3;

Fig. 5 is an enlarged cross-sectional view, taken substantially along line 5—5 of Fig. 3;

Fig. 6 is a view similar to Fig. 1, illustrating a modified form of the present invention;

Fig. 7 is an end elevational view, with parts removed, of the structure shown in Fig. 6;

Fig. 8 is a top plan view, with parts broken away, and parts in cross-section, of the structure shown in Fig. 6;

Fig. 9 is a diagrammatic, elevational view, with parts broken away, illustrating certain details of the structure shown in Figs. 6 to 8 and showing the parts in a different operating position.

In certain respects, the present invention relates to improvements over the structure disclosed in the Heath Patent No. 2,008,612, granted July 16, 1935.

Referring to the drawings and referring particularly to Figs. 1 through 5 thereof, one embodiment of applicant's invention is illustrated which comprises a wire reel unit adapted to be mounted on the chassis of an automotive vehicle, or the like. Such unit includes a standard generally indicated at 10 which is frame-like in form and which includes a rectangular base 12, upright end members 14 and 16, and a central upstanding member 18. The end members 14 and 16 include transversely extending channel-shaped members 20 and 22 and a horizontal top member 24. Longitudinally extending frame members 26 connect the end members 14 and 16, are spaced above the rectangular bottom 12, and are disposed at the front and rear side of the frame.

A pair of wire reels 28 are mounted upon the standard and the mountings and drives for each of the reels are substantially identical, the construction being symmetrical in form. Each of the reels is mounted upon a square shaft 30; and aligned bearings 32, 34, and 36 are mounted upon the upper horizontal portions of members 14, 18, and 16, respectively. Each of such bearings is provided with a circular bearing opening therethrough and is adapted to rotatably receive therein a bearing element 38. There are two of such bearing elements received within the central bearing 34, each of which is adapted to receive therein the inner end of one of the shafts 30. The bearing elements 38 are provided with square, broached apertures 40 therethrough which slidably receive therein the square shaft 30. Each of the reels is likewise provided with an axial opening therethrough which is likewise square for the reception of the square shaft 30. It will thus be seen that if the bearing elements 38 in the end bearings 32 and 36 are rotated, the shaft, and consequently the spool 28, are driven.

The shafts 30 are so constructed and arranged with respect to the reels 28 and to the bearing elements that they may be readily removed therefrom so that the reels may be quickly removed and replaced. The outer ends of the shafts 30 project beyond the ends of the bearings

32 and 36 and are formed with an annular groove 42 therein. A plate member 44 is connected to the frame and has a latch 46 which has one end thereof pivotally connected to the plate 44 by means of a pin 48. The opposite end of the latch 46 is provided with a pin 50 through which a spiral spring 52 is secured, with the opposite end thereof attached to the plate 44. Thus, the latch 46 is urged into the annular groove 42 so that the shaft 30 cannot be axially displaced.

The reels 28 may thus be removed from their mounting in the standard by releasing the latch 46 and withdrawing the square shafts 30.

In order to support the reels when the shafts are removed or being removed and to support the reels and align them with the shafts when the reels are being mounted, skids 54 are provided. Such skids 54 are disposed adjacent the peripheries of the reels 28 and are pivotally mounted upon a transversely extending shaft 56 which is mounted in the end members of the standard. The skids 54 are generally similar to those disclosed in the Heath patent referred to above and are elongated in form and are so positioned as to form track-ways for supporting the reels when they are being removed from the standard or mounted thereto. The skids 54 are fixed against axial displacement on the shaft 56, so that they will remain properly positioned in respect to the peripheral edges of the reels.

In order to controllably drive each of the reels, independent means are provided by which a constant pull may be applied to the wire. The drives for each of the reels are similar to each other so that detailed description of one will be sufficient for an understanding of the drives for both.

The source of power for driving both of the reels may be taken from the power take-off of an automotive engine, when the unit is mounted upon an automotive vehicle, or may be taken from an independent power unit when the reel is not mounted upon a truck. The shaft of the power take-off is indicated at 58 and has a sprocket wheel 59 keyed thereto for rotation therewith. A pair of drive shafts 60 is mounted on the standard having the ends of each of such shafts disposed within bearings 62 which are mounted upon the frame members 26. Driving sprockets 64 are keyed to the shaft 60; and a sprocket chain 65 is trained about the sprockets 64 and about the sprockets 59 for driving the shafts 60.

Each of the shafts 60 is splined throughout the major portion of its length between the frame members 26 and has mounted thereon a driving wheel 66. Such wheel 66 has a longitudinally grooved central bore therethrough, which is complementary in shape to the cross-sectional configuration of the splined shaft 60, so that such wheel is driven upon rotation of the shaft 60 and may be moved axially thereof. The peripheral surface of the wheel 66 is adapted to frictionally engage the front face of a driven disc 68 so that the wheel 66 drives the disc 68 when in engagement therewith. The speed of drive of the disc 68 is determined by the radial position of the driving wheel 66 with respect to the axis of the disc 68.

The disc 68 has a hub portion 70 which is keyed to a splined portion of a shaft 72. The splined portion of the shaft 72 is received within the hub portion 70 so that the disc 68 may move axially with respect to the shaft, but is driven thereby. The hub portion 70 of the disc 68 is mounted within a bearing 74 which is mounted upon a frame member 76, extending between the frame members 26 and connected thereto.

The opposite end of the shaft 72 is mounted within a suitable bearing 78 which, in turn, is mounted upon one of the end members 14 and 16.

The disc member 68 is provided with a central, tapered recess 80 formed in the front face thereof which joins with an annular central recess 82. An annular, stop disc 84 is fixed to the front end of the shaft 72 by means of a screw 86 in order to limit the axial movement of the disc member 68 in one direction, or in the direction toward the wheel 66. When the wheel 66 is so positioned that it is aligned with the axis of the shaft 72, such wheel is received within the tapered recess 80 and is out of engagement with the disc 68. When, however, the wheel 66 is moved to either side of the axis of the shaft 72, it frictionally engages the face of the disc 68. When on one side of the axis, the wheel 66 drives the disc 68 in one direction; and when on the other side of the axis, the wheel 66 drives the disc 68 in the opposite direction. The speed of the wire may thus be kept constant for either reeling or paying out by the radial position of the wheel 66 with respect to the axis of the disc.

In order to resiliently urge the members 66 and 68 into frictional engagement with each other, so that there is a predetermined, constant pressure between these members and by which the pressure may be adjusted to the desired amount, resilient means are provided which include a spiral spring 88 which embraces the shaft 72. One of the ends of such spring abuts against a washer 90 which surrounds shaft 72 and which, in turn, abuts against the inner end of the hub portion 70 of the disc 68. The opposite end of the spring 88 abuts against another washer 92, surrounding shaft 72, which is adjustably limited in its movement by means of a nut 94 and a lock nut 96 which are received upon the threaded portion of the shaft 72. Thus, by adjusting the nuts 94 and 96 the pressure of the spring 88 may be adjustably varied so as to predetermine the driving pressure between members 66 and 68.

The drive from shaft 72 is transferred to the shaft 30 so as to drive the reel 28 by means of a sprocket wheel 98, which is keyed to the shaft 72 and a sprocket wheel 99 which is mounted upon an annular portion 101 of the adjacent end bearing 38. A sprocket chain 102 is trained about the sprockets 98 and 99, and such sprockets and chain may be enclosed within a suitable housing 104.

A tubular portion 106, which is integral with member 32, is disposed in surrounding relationship to the shaft 30 to a position close to the adjacent side of the reel 28.

It will thus be seen that when the shaft 60 is driven, the disc 68 is driven at a speed depending upon the position of the member 66 with respect to the member 68. The shaft 30 and its reel 28 are correspondingly driven through the bearing 38 and the associated driving mechanisms with shaft 72.

The resilient means for urging the disc 68 into frictional engagement with the wheel 66 provide a construction by which a constant pull may be applied to the wire, and in the event the pull of the wire exceeds a predetermined amount, the drive is relieved during this period of excess pull so that such excess pull will not break the wire. The reason for this is that the ratio of the diameter of the driving and driven discs is proportional

to the wire radius on the reel at the various positions.

Easily operable means are provided for varying the positions of the member 66 along the shaft 60, and, therefore, with respect to the element 68, so that the speed of the drive may be varied in order to keep the speed of the incoming wire substantially constant as such wire winds up on the reel.

Such means to include a ball bearing assembly mounted in embraced relationship to the hub portion of the wheel 66 and secured thereto. The ball bearing unit comprises an inner, annular cage member 110 which embraces the hub portion of the wheel 66 and an outer cage member 112, with ball bearings 114 disposed therebetween. The outer cage member 112 is embraced by an annular member 116 which is provided with an annular groove 118 therein.

A shifting yoke member 120 is provided which has depending fingers 122. Such fingers are received within the annular groove 118 so as to engage the side walls of the groove 118 and to move, or shift, the wheel 66 as the yoke member 120 is shifted. Such yoke member 120 is slidably mounted upon a pair of parallel shafts 124 which are disposed above the shaft 60 and parallel thereto. The ends of the shafts 124 may be suitably mounted upon the frame members 26. Shafts 126 are disposed along the sides of the frame members 26, on the outer sides thereof, and are mounted within the suitable bearing brackets 128. Such shafts have sprockets 132 keyed thereto and sprockets 130 mounted thereon which are keyed to the shaft on one side of the unit and idle on the opposite side. There are thus a pair of oppositely aligned sprockets 130 which have a sprocket chain 134 trained therearound. One of the links of the sprocket chain 134 is connected to the yoke member 120 by means of angle brackets 136. When the sprockets 130 are turned in either direction, the yoke 120 is moved in a corresponding direction, along the rods 124, to thereby shift the drive wheel 66 along the shaft 60.

The sprocket 132 is connected to another sprocket 138, by means of a sprocket chain 140. The sprocket 138 is keyed to a stub shaft 142 which is mounted within a suitable bearing bracket 144 and which has the opposite end connected to a hand wheel 146. Thus, when the wheel 146 is turned, which may be conveniently done by the operator, the member 66 is shifted axially of the shaft 60 through the mechanism described above.

As mentioned above, it will be understood that the drives for the two reels 28, and including the means for varying the speeds of such drive, are similar for both of the reels.

One of the sprockets 130 for each of the reels 28 is an idler sprocket and is not keyed to the shaft 126. It will be understood that one of the wheels 146 is for shifting one of the reels while the other wheel is for shifting the other reel. The sprocket 130 on the side of the frame opposite to that of its wheel 146 is the idler sprocket while that sprocket on the shaft adjacent its wheel 146 is keyed to the shaft 126.

A brake is provided for braking the disc 68 and includes a braking portion 148 and a foot pedal portion 150. Such brake may be pivotally mounted upon a shaft 160 which may have the ends thereof received within suitable bearing brackets mounted on the frame. The braking portion 148 has a shoe surface 162 which is adapted to frictionally engage the peripheral edge 164 of the disc 68. There is, of course, one of such brakes provided for each of the discs 68 and such brakes are preferably arranged in the reverse positions as shown in Fig. 2.

Referring to Figs. 6 to 9, a modified form of the present invention is illustrated. In the structure here illustrated, the mounting frame, the reels, the mounting for the reels, and the drive for the reels, are substantially the same as in the embodiment described above. The specific differences in this embodiment relate particularly to the means for shifting the driving element 66, the means connecting the power take-off to the drive shafts 60, and the means for automatically applying a brake to the peripheral surfaces 164 of the driven disc 68.

A sprocket chain 150, corresponding to the sprocket chain 65 above described, is connected to the power take-off sprocket 152 which is mounted upon a shaft 154. The shaft 154 is part of a gear reduction unit indicated at 156, such unit being mounted upon the frame 10. The gear reduction unit 156 is of conventional construction and is connected in a conventional manner with a conventional reversing gear box 158. Such gear box 158 has the usual shifting lever 160 connected thereto through a link 162. The shifting lever 160 is pivotally connected to a suitable bracket 164 which is mounted upon one of the uprights of the frame.

A shaft 166 projects outwardly from the gear box 158 and is operatively associated therewith so as to drive a sprocket wheel 168, which is keyed to the shaft. The sprocket chain 170' is trained about the sprocket wheel 168 and about the sprockets 64 for driving shafts 60. The wheel 66 is thus driven and in turn drives the disc 68 at a speed and direction depending upon the position of such wheel 66 with respect to the axis of the shaft 72.

The means for shifting the wheels 66 are substantially identical for each of the reels so that a description of one will be sufficient for an understanding of the details of both. Each of such shifting means includes a shifting lever 170 which is pivotally connected to the frame member 20 by means of a pivot shaft 172 spaced upwardly from the lower end thereof.

An outwardly offset member 174 is welded to the lower end of the member 170 and is substantially parallel thereto providing a space therebetween. Elongated, aligned slots 176 are provided in the members 170 and 174 adjacent the lower ends thereof and receive therethrough a pin member 177. Such pin member extends through a pivot aperture formed in the upper end of a link 178 which is received within the space between the member 174 and the lower end of lever 170. The member 178 slopes downwardly in a direction opposite to that of the normal position of the lever 170, as best shown in Fig. 9. The lower end of such member 178 is keyed to a pivot shaft 180 which may be mounted in suitable brackets and which extends across the frame to a position underneath its corresponding shaft 60.

A yoke arm 182 is provided with a hub portion which embraces the shaft 180 and is keyed thereto. The upper end of the yoke arm is formed with upwardly extending fingers 184 having the upper ends thereof formed with a forked groove as shown at 185 and which extend upwardly to diametrically opposed positions adjacent the member 116. Such member 116 is

provided with diametrically opposed, outwardly projecting pins 186 which are adapted to be slidably received within the slotted forks 185.

It will thus be seen that as the lever 170 is shifted, the lever 178 is rocked, thus rocking the shaft 180 and rocking the yoke member 182, to thereby shift the wheel 66 axially of the shaft 60, to thereby vary the speed of the drum 68.

In this construction, in order to keep the throw of the levers 170 within practical limits, the wheel 66 can only be shifted on one side of the shaft 72. Thus, the lever 170 will not reverse the direction of rotation of the disc 63, but such reversal is effected by the lever 160 through its connection to the reversing gear box unit 158.

Means are provided for automatically braking the drum 68. Such means includes an actuating lever 190 having an integral hub portion which is rotatably mounted upon the shaft 180. The upper end of the member 190 projects to a position behind the upstanding portion of the member 182, as indicated at 192, and is provided with an adjustable set screw 194. Thus, as the wheel 66 is shifted to a position toward the periphery of the disc 68, the member 182 will abut against the set screw 194, thus rocking the arm 190 and the integral hub portion thereof. A laterally offset brake arm 196 is also formed integrally with the hub portion and extends laterally to a position under the peripheral portion 164 of the disc 68. Such adjacent portion is provided with a brake shoe 198 which is adapted to frictionally engage the peripheral edge 164 to brake the disc.

It will be seen that by setting the screw 194 to a predetermined position the brake will be automatically applied when the wheel 66 reaches a predetermined position with respect to the drum 68. The speed of the drum is controlled by the operator depending upon the amount of wire wound on the reel or upon the position of the incoming wire with respect to the peripheral edge of the reel, so that the structure just described provides a brake which would be automatically applied when the wire reaches a predetermined position on the reel.

As stated above, it is to be understood that a similar means, including the lever, associated actuating mechanism and braking means is provided for each reel. In the embodiment described, one of the levers is disclosed as extending in one direction and the other lever 170 in the opposite direction, but it will be understood that such levers may be otherwise positioned, for example, one may be placed at one end of the frame and the other at the opposite end, with the associated operating elements correspondingly repositioned.

What is claimed is:

1. A reel winch construction comprising a standard, a driving shaft mounted on said standard and adapted to have a wire reel mounted thereon, and friction means for driving said shaft, said last named means including a disc and wheel in frictional driving engagement with each other, means mounting said wheel for movement between the center and periphery of said disc, and means for shifting said wheel along the face of said disc to thereby vary the driving speed, said last named means including a yoke arm operatively connected to said wheel, a pair of spaced wheels mounted on said standard, an endless belt trained over said pair of wheels and connected to said yoke, and manual means for turning one of said pair of wheels to shift said yoke to thereby vary the speed of said drive.

2. A reel winch construction comprising a standard, a drive shaft mounted on said standard and adapted to have a wire reel mounted thereon, and friction means for driving said shaft, said last named means including a disc and wheel in frictional driving engagement with each other, means mounting said wheel for movement between the center and periphery of said disc, and means for shifting said wheel along the face of the disc to thereby vary the driving speed, said last named means including a yoke arm, roller bearing means operatively connecting said yoke arm to said wheel, a pair of spaced wheels mounted on said standard, an endless belt trained over said pair of wheels and disposed transversely of said disc, means connecting said belt to said yoke, and manual means for turning one of said pair of wheels to shift said yoke in either direction to thereby vary the speed of said drive.

3. A reel winch construction comprising a standard, a drive shaft mounted on said standard and adapted to have a wire reel mounted thereon, and friction means for driving said shaft, said last named means including a disc and wheel in frictional driving engagement with each other, means mounting said wheel for movement between the center and periphery of said disc, and means for shifting said wheel along the face of the disc to thereby vary the driving speed, said last named means including a yoke arm, roller bearing means operatively connecting said yoke arm to said wheel, a pair of spaced wheels mounted on said standard, an endless belt trained over said pair of wheels and disposed transversely of said disc, means connecting said belt to said yoke, a hand wheel remotely located with respect to one of said pair of wheels, and means including an endless belt connecting said hand wheel to said one of said pair of wheels to shift said yoke upon turning of said hand wheel to thereby vary the speed of said drive.

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