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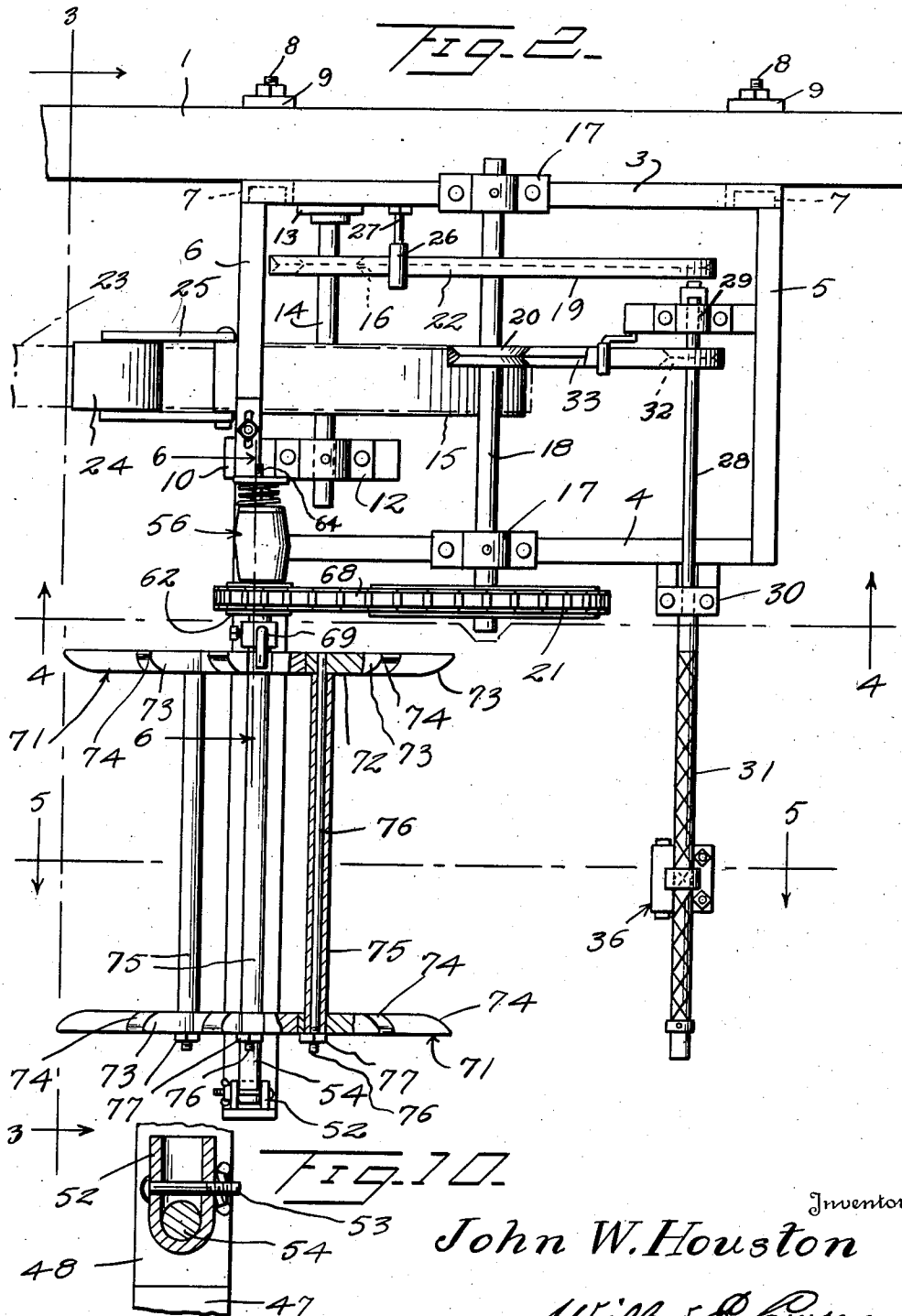
J. W. HOUSTON

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WIRE WINDING AND UNWINDING REEL

Filed Jan. 8, 1944

4 Sheets-Sheet 2



Inventor

John W. Houston

By

Wilfred Lawson

Attorney

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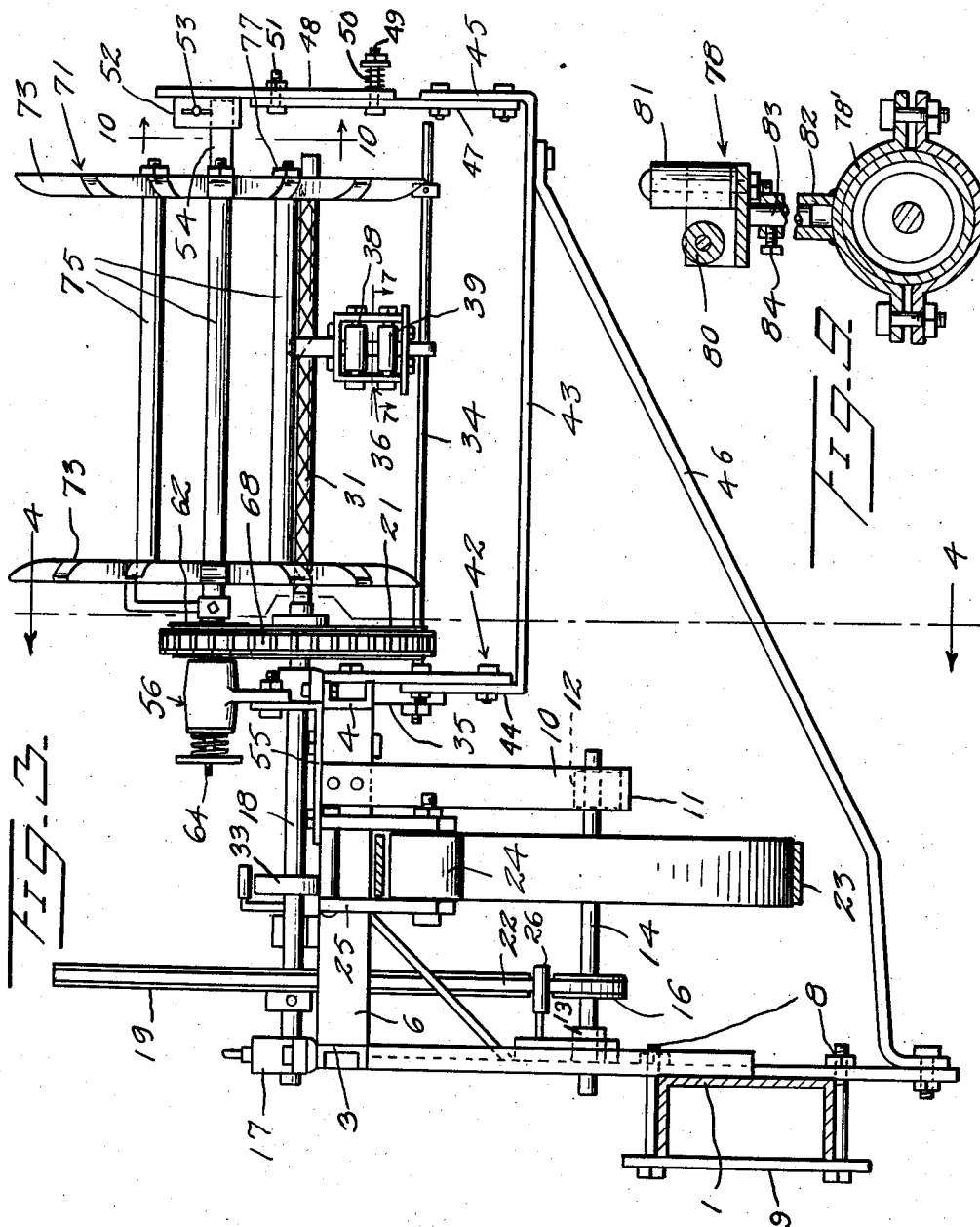
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Inventor

John W. Houston

By *Wilfred Lawson*

Attorney

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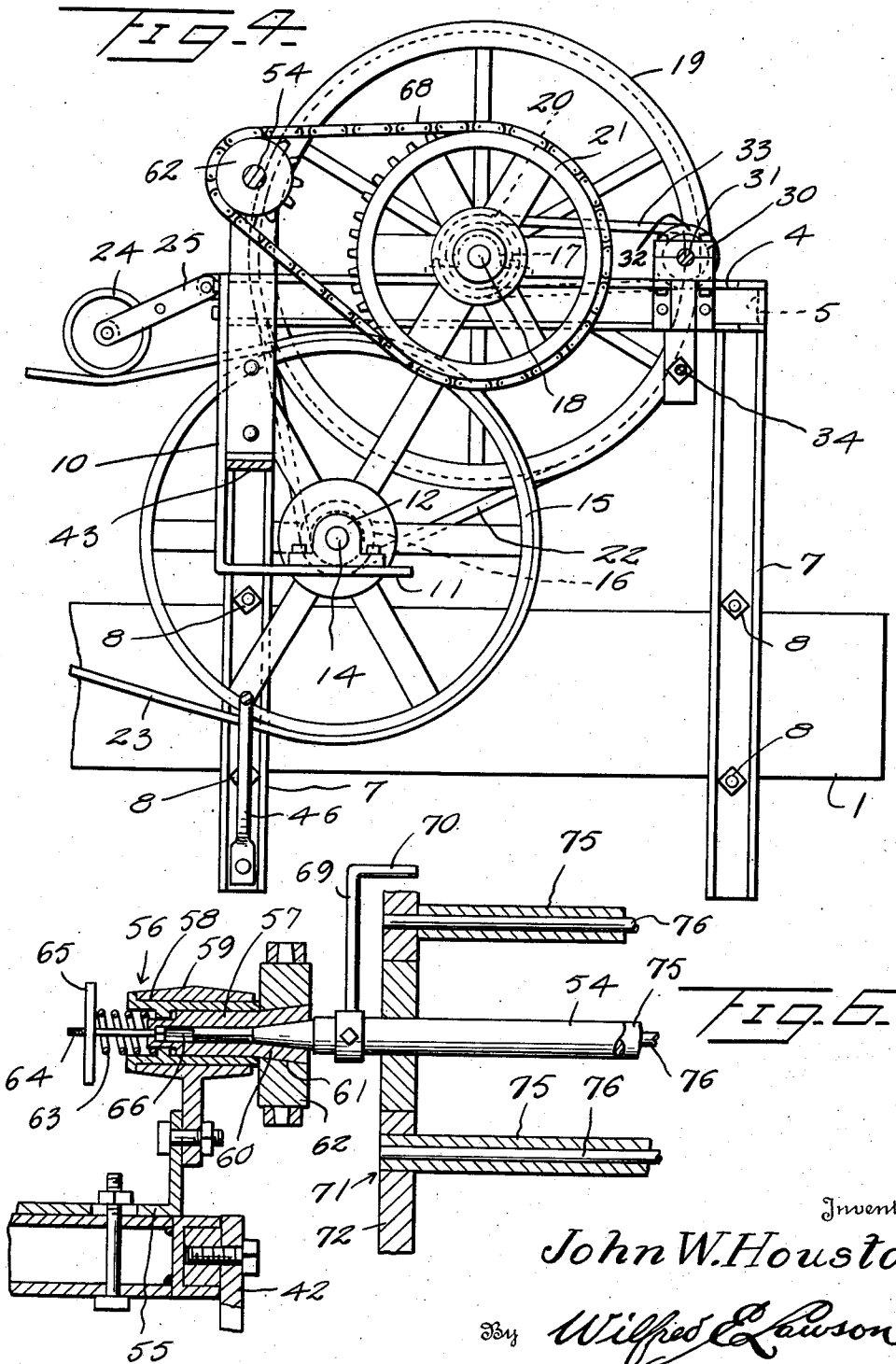
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Inventor

John W. Houston

By

Wilfred E. Lawson

Attorney

## UNITED STATES PATENT OFFICE

2,391,240

## WIRE WINDING AND UNWINDING REEL

John W. Houston, Tama, Iowa

Application January 8, 1944, Serial No. 517,565

6 Claims. (Cl. 242—54)

This invention relates generally to the class of winding and reeling and pertains particularly to an improved power operated wire reel.

A principal object of the present invention is to provide a novel power operated reel structure designed to be mounted upon a tractor frame to be operated from the belt pulley of the tractor whereby wire may be conveniently and evenly wound up upon a reel or may be unwound or paid out from the reel smoothly and without difficulty as desired.

Another object of the invention is to provide a tractor carried power operated wire reel having associated therewith means for evenly feeding the wire to a reel whereby the wire will be evenly wound up on the reel.

Still another object of the invention is to provide a power operated reel of the character described in which there is provided a novel reel unit which may be readily applied to a previously wound roll of wire whereby such roll may be conveniently mounted in the machine to be evenly unwound as desired.

Still another object of the invention is to provide a power operated wire reeling and unreeling apparatus with means for guiding the wire onto the reel when winding up, so that barbed wire may be handled without damaging the barbs thereof.

Other objects and advantages of the invention will become apparent as the description of the invention proceeds and the invention will be best understood from a consideration of the following detailed description taken with the accompanying drawings with the understanding that minor changes and modifications may be made in the invention so long as such changes or modifications do not depart from the spirit of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a diagrammatic view in top plan of a tractor showing a mounting position for the wire winding and unwinding reel constituting the present invention together with the power take off and the axle supported wire lined support.

Figure 2 is a view in top plan of the wire winding and unwinding reel, parts of the reel structure being in section.

Figure 3 is a view in elevation of the winding and unwinding reel structure, viewing the same from the rear, the view being a section transversely of the tractor supporting frame taken substantially on the line 3—3 of Figure 2.

Figure 4 is a sectional view taken substantially upon the line 4—4 of Figure 2.

Figure 5 is a view in transverse section of the demountable spool structure.

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 2.

Figure 7 is a sectional view taken horizontally through the wire lined guide, substantially on the line 7—7 of Figure 3.

Figure 8 is a view in elevation of the rear axle supported line guide.

Figure 9 is a vertical section taken substantially on the line 9—9 of Figure 8.

Figure 10 is a sectional view taken substantially on the line 10—10 of Figure 3.

Referring now more particularly to the drawings wherein like numerals indicate corresponding parts throughout the several views, the numeral 1 generally designates a tractor frame upon the side of which the winding and reeling mechanism of the present invention is designed to be secured to be driven by the usual power take off pulley 2 which is conventionally illustrated as extending outwardly from a side of the tractor frame.

The mechanism embodying the present invention is designed so that it may be mounted directly upon the side of the frame or it may be mounted upon a suitable supporting arm or bracket secured to the front of the frame and extending forwardly therefrom. However the description will be confined to the mounting of the mechanism frame directly upon the side of the tractor frame, it being understood, however, that in giving such a description and in illustrating such mounting there is no intention to limit the invention in any respect as to the manner of supporting it upon the tractor frame.

In accordance with the present invention there is provided a rectangular frame formed of suitable material and comprising the inner and outer side bars 3 and 4 respectively and the front and rear bars 5 and 6 respectively. This frame is horizontally supported at a side of the tractor by means of the standards 7 which are secured against the outer side of the side beam of the chassis frame of the tractor by the clamp bolts 8 and bars 9 which extend across the chassis frame beam.

Secured to the rear bar 6 of the frame is a depending bracket arm 10 at the lower end of which is the rearwardly extending horizontal support 11 which has secured upon the top side a shaft bearing 12. In alinement with this bearing 12 there is secured to the adjacent rear standard 7 a bearing 13 and between these bearings is supported a pulley wheel shaft 14 upon which is mounted

a relatively large pulley wheel 15 and a smaller pulley wheel 16, the latter wheel being preferably channelled to receive a V belt.

Upon the top of the frame there are supported, by the inner and outer frame bars 3 and 4, the shaft bearings 17 which support a driven shaft 18. This driven shaft has mounted thereon the relatively large pulley wheel 19 which is grooved to take a V belt, together with a drive pulley 20 for operation of the level winding mechanism and a socket gear 21 which is disposed upon the outer side of the frame bar 6.

The pulleys 16 and 19 are coupled together by the V belt 22 while the pulley 15 is designed to be coupled with the power take off pulley 2 of the tractor by the belt 23. This belt is maintained under proper tension by the tension roller 24 which is mounted upon a suitable bracket arm 25 secured to the rear side of the frame bar 6 as illustrated.

The V belt 22 is also maintained under the proper tension by a tension roller 26 carried by a suitable arm 27 secured to the frame above the bearing 13.

At the front of the frame there is supported the level winding screw shaft 28 between the bearings 29 and 30. The bearing 30 is disposed at the outer side of the frame and supports also the inner end of the double or endless screw 31 which extends horizontally outwardly from the frame.

The shaft 28 carries the driven pulley 32 which is connected by a belt 33 with the pulley 20 so that the shafts 18 and 28 rotate together, the shaft 18 driving the hereinafter described reel unit while the shaft 28 turns the endless screw 31 as stated.

Disposed beneath and in parallel relation with the screw 31 is a guide bar 34, the inner end of which is secured to the hanging bracket 35 which is attached to the outer bar 4 of the frame.

Interposed between the guide bar 34 and the screw 31 is the wire guide unit which is generally designated 36. This unit comprises a vertically disposed frame 37 within which are rotatably supported upon the vertically spaced horizontal bolts 38, the guide rollers 39 which are formed of rubber.

The lower side of the frame 36 carries a foot 40 which is recessed to engage over the guide bar 34 along which the foot slides.

Extending upwardly from the guide unit frame 37 is a slotted arm 41 in which is carried the usual mutilated nut, not shown, which cooperates with a double or endless screw such as that here illustrated whereby upon continuous rotation of the screw in one direction the nut, not shown, and the parts attached thereto, in the present case the guide unit frame and rollers, will be moved first to one end of the screw and then back to the opposite end and so on as long as the screw is turning. The construction and operation of a level winding screw and nut of this character is well known and therefore it is believed that a further description and illustration of the same is unnecessary.

At the rear of the frame there is secured to the outer bar 4 the reel frame which is generally designated 42 and which comprises the horizontal arm 43 and the inner and outer upturned portions 44 and 45 respectively, the portion 44 being secured to the outer side bar 4 of the main frame, at the outer end of the rear bar 6.

A suitable bracing means 46 is preferably connected between the lower end of the standard 7

and the outer end of the arm 43 of the reel frame as illustrated.

At the outer end of the reel frame arm there is secured to the upwardly extending portion 45 an extension splice 47, against the outer side of which is disposed the vertical post 48. The post 48 is pivotally attached to the splice 47, at the lower end of the post by the bolt 49 and is constantly urged in against the splice 47 by the spring 50. Above the bolt 49 the post is detachably coupled to the splice 47 by the removable bolt 51 whereby, upon removal, the post can be oscillated on the bolt 49 and can be shifted outwardly against the tension of the spring 50 for the purpose hereinafter described.

Upon the upper end of the post 48 there is secured, upon the inner side of the post, a bearing cradle 52, the top of which is open but has extending thereacross the removable cotter pin 53 or other suitable means for retaining in position in the bearing saddle the outer end of the reel shaft 54.

Inwardly from the bearing cradle 52 and in alinement therewith there is supported upon the main frame of the mechanism, by the adjustable bracket 55 which is secured to the main frame, a slip clutch unit 56 in which the other end of the reel shaft 54 is mounted.

The slip clutch 56 is of standard design and comprises the telescopically joined relatively movable inner and outer sleeves 57 and 58 respectively which are mounted for turning in a cylindrical housing 59 which is secured to the supporting bracket 55 as shown in Figure 6. The inner sleeve 57 has a flared end 60 which is loosely connected in a tapered central opening 61 of a sprocket gear wheel 62. This gear wheel is drawn by the flared end of the inner sleeve against the adjacent end of the outer sleeve by a spring 63 which forms a connection between the sleeves at the ends remote from the gear through the medium of a threaded bolt 64 and an adjustment or tension wheel 65.

The end of the inner sleeve 57 to which the sprocket gear wheel 62 is connected, is open and provided with a socket 66 of polygonal cross section to receive the tapered or reduced inner end of the shaft 54 which is of corresponding shape so that a driving connection will be formed between the sleeve and the shaft. It will be readily apparent that upon suitably turning the tension wheel 65 the sprocket gear wheel 62 can be tightly gripped between the two sleeves which rotate in the housing 59 so that rotary movement may be transmitted to this gear and to the shaft 54, from the driving gear 21 through the medium of the connecting sprocket chain 68, but if excessive drag is applied to the shaft 54 and gear wheel 62, slipping may occur to protect the parts from damage.

The reel shaft has secured thereto for adjustment longitudinally thereof a driving arm 69 which extends radially from the shaft and which at its outer end has the angularly turned terminal portion 70 which is directed toward the outer end of the reel shaft.

The numeral 71 generally designates the wire reeling spool which is provided for mounting upon the reel shaft 54. This spool is so designed that it may be readily applied to a roll of wire to be mounted upon the shaft 54 or it may be mounted empty on the shaft and wire wound up thereon, and then removed from the shaft and separated from the roll of wire for reuse.

The winding spool comprises the two end or

hub discs 72 each of which has a number of radially extending arms 73 which are turned or flared outwardly at their free ends as indicated at 74. The center of each hub disc is provided with a suitable opening to receive the shaft 54 and one hub disc has secured therein around the central or shaft opening, the ends of a number of tubes 75 which are equi-distantly spaced around the shaft opening and which extend parallel to the axis of the shaft opening. The other hub disc has secured therein in spaced relation around the shaft opening, the series of rods 76. These rods are equal in number to the tubes and are spaced the same distance from the axial center of the spool so that the assembly of the two spool sections, one comprising an end disc carrying the tubes 75 and the other comprising the other end disc and rods 76, may be readily accomplished by extending the free ends of the rods 76 through the tubes so that the free ends of the rods will project beyond the outer side of the disc to which the tubes are attached, to receive the securing nuts 77. In this manner the two sections of the spool are rigidly joined together and the spool may be readily placed upon the shaft 54.

To place the spool upon the shaft 54 the shaft supporting post 48 is released for turning upon the bolt 49 by removing the bolt 51. This permits the post to be oscillated to one side whereupon the reduced or tapered end of the shaft 54 may be inserted into the socket of the slip clutch. The reel or spool may then be placed upon the shaft or, if desired, the spool may be mounted upon the shaft before the shaft is coupled with the slip clutch, whereupon by pulling the post 48 outwardly against the tension of the spring 50, the post may be swung back into a position where the outer end of the shaft 54 can be readily engaged in the bearing cradle 52. The post securing bolt 51 is then replaced and the reel or spool is properly supported in position to have wire wound up thereon or to pay out wire from a roll which may have been previously mounted upon the spool.

In mounting the spool upon the shaft, the angularly turned end of the arm 70 is engaged between a pair of the arms 73 of the adjacent end of the spool. Thus the spool is properly coupled with the shaft so that upon rotation of the latter the proper turning of the spool will be accomplished.

It will be readily apparent that where the spool is to be employed for unwinding or paying out wire the tubes of one spool section will be extended through the core of the roll of wire and the other spool section then couples with the first section, the roll and spool then being mounted upon the shaft.

In paying out wire or unwinding from a roll the slip clutch tension wheel will be turned so as to release the frictional connection between the clutch sprocket gear 62 and the inner sleeve 57 of the clutch. Thus the reel will be free to turn independently of the other rotary parts of the mechanism.

The wire will be paid out from the reel from the rear of the tractor and, where it might be necessary to mount the mechanism out in front of the tractor frame, it is desirable to have a suitable roller support such as is indicated at 78, mounted upon the rear axle housing 78' of the tractor or any other suitable location, across which to carry the wire. This wire support 78 preferably comprises an upwardly opening frame

79 between the sides of which is rotatably supported the roller 80 and at each end of which roller is mounted for turning on a vertical axis, a guide roller 81. A depending post 83 is preferably carried by the frame 79 to engage in a sleeve 82 which is secured in a suitable manner to the rear axle housing 78' so that oscillation of the frame on a vertical axis may be had or if such oscillation is not desirable the frame may be secured by the use of set screw 84 threaded into the sleeve 82 for engagement with the post 83.

When wire is to be wound up upon a spool mounted on the shaft 54 such wire is fed to the spool through the guide unit 36, between the rollers 39 thereof. By the use of relatively soft rubber rollers it will be readily apparent that barbed wire may be wound up without injury to the points of the barbs and since the unit 36 forms a part of the level winding means operated by the screw 31 and the nut carried by the arm 41, it will be seen that the wire will be evenly wound on the spool. For proper accomplishment of such winding it will be understood that the tension wheel 65 of the slip clutch will be tightened up so as to establish the desired driving coupling between the sprocket gear 62 and the inner sleeve 57 with which the spool reel 54 is directly coupled. In the event that the rotation of the spool tends to overrun the forward movement of the carrying tractor it will be seen that tension will be placed upon the wire and in this event, if the slip clutch is properly adjusted, slippage will occur between the clutch gear 62 and the inner clutch sleeve so that the wire will not be broken or other damage will not be done either to the mechanism or to whatever structure the wire might be attached to.

It will be readily seen from the foregoing that in the present invention there has been provided a relatively simple but strong, durable and reliable mechanism which can be readily mounted upon a tractor frame and operated from the belt pulley means of the tractor for effecting the level winding up on a spool of wire or other stranded material. Also there has been provided a novel knock down reel spool which can be easily and quickly separated from a roll of wire which has been wound up thereon or which can be just as easily applied to an already wound roll of wire for mounting upon the mechanism.

I claim:

1. A wire winding and unwinding mechanism comprising a supporting structure, a slip clutch rotatably supported on the said structure having a socketed driven member, a frame attached to said supporting structure and having an upstanding post having an end spaced from said socketed member, a bearing carried by said upstanding post and aligned with said driven member, a reel shaft adapted to have one end operatively coupled in said socketed member and having its other end rotatably supported in said bearing, means for turning said clutch to impart turning movement to the shaft, and said post being shiftably supported by the frame for moving the bearing out of alignment with the driven member.

2. A winding and unwinding reel comprising a main supporting frame, a rotatable slip clutch supported upon said frame and including a wheel and a socketed member designed to be frictionally coupled together, the slip clutch including means for tightening and loosening the frictional connection between the socketed member and wheel, means for transmitting rotary motion to said wheel, a reel frame connected to the main frame and having a portion disposed in spaced

relation with the socketed member, a bearing carried by the said portion of the reel frame, a shaft adapted to have one end operatively coupled in said socketed member and its other end mounted in said bearing, a reel removably supported upon said shaft, and means carried by the shaft and readily detachably coupled with the reel for imparting turning movement to the reel from the shaft.

3. A winding and unwinding means, comprising a frame, a pair of aligned bearings carried thereby, a rotary clutch unit comprising a sleeve rotatably supported in one bearing, a tubular member having one end disposed in said sleeve for axial movement therein, the other end of the member being tapered and of circular cross section, a wheel having a tapered opening therethrough in which the tapered end of said member is engaged, said wheel being of a character to have rotary power applied thereto, yieldable means coupling the tubular member and sleeve together and constantly urging movement of the tubular member in a direction to move the tapered end toward the adjacent end of the sleeve and maintaining the wheel bound between the sleeve and member, a shaft having one end formed for engagement in the tubular member and having its other end supported in the other bearing, and a reel carried on the shaft for turning therewith.

4. A structure as set forth in claim 3, in which the said yieldable means comprises a stem connected with the tubular member and extending axially therefrom beyond the end of the sleeve remote from the wheel, a hand wheel threaded on said stem, and a spring interposed between the hand wheel and the adjacent tubular member.

5. A slip clutch structure comprising a bearing, a sleeve rotatably supported in the bearing and

having at one end thereof an internal flange, a tubular member having one end extended into the sleeve from the end remote from the flange and terminating short of said flange, the other end of the tubular member being formed to provide a tapered head of circular cross section, a wheel having a tapered opening in which said head engages, the wheel being frictionally held between the head and the adjacent end of the sleeve, said tubular member being formed for driving connection with a rotary element, a stem connected with the said one end of the tubular member and extending axially therefrom through and beyond the adjacent end of the sleeve, the stem being threaded, a hand wheel threaded on the stem, and a spring encircling the stem and bearing at one end against said internal flange and bearing at its other end against said hand wheel.

6. A winding and unwinding mechanism, comprising a frame, a pair of bearings supported by the frame, a clutch unit rotatably supported by one bearing and including a pair of coupled axially shiftable members and a spring means yieldably drawing said members one into the other, a driving wheel frictionally held between said members solely by the action of said spring means, a shaft having one end secured in one of the clutch members for turning movement therewith and having its other end rotatably supported in the other bearing, a reel supported upon the shaft and adapted to be shifted longitudinally thereon for removal therefrom, and a driving arm secured to the shaft between the reel and the clutch and extending radially of the shaft and terminating in a lateral extension having detachable connection with the adjacent end of the reel.

JOHN W. HOUSTON.