# United States Patent [19]

**Grenn**

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[45] **Sept. 11, 1973**


[54] **WATER PUMP HOIST**


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[21] Appl. No.: **149,178**

[52] **U.S. Cl.** ..... **254/166,** 214/75 R, 134/167 C, 242/86.5

[51] **Int. Cl.** ..... **B66d 3/00**

[58] **Field of Search** ..... 254/166, 139.1, 145; 15/104.3 SN; 242/86.5; 214/75 R; 280/47.18; 134/167 C



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[57] **ABSTRACT**

A hoist for raising or lowering an electrically driven water pump into or out of a well, i.e., the pump being suspended by a length of flexible conduit. The hoist includes a main support member which is mounted on a hand truck-like base member, a pair of reels rotatably mounted on the support member, i.e., a main reel for receiving the flexible conduit and an auxiliary reel for receiving the electrical power cord, and a brake gear motor which rotatably drives the main reel selectively in forward and reverse directions, i.e., respectively winding the flexible conduit about the main reel for hoisting the pump out of the well and unwinding the conduit from the main reel for lowering the pump into the well, knockdown structure is incorporated throughout to facilitate expeditious disassembly of the various components one from the other, a feature of great importance, particularly at locations where the head of the well is enclosed in a cramped pumphouse.


**5 Claims, 15 Drawing Figures**

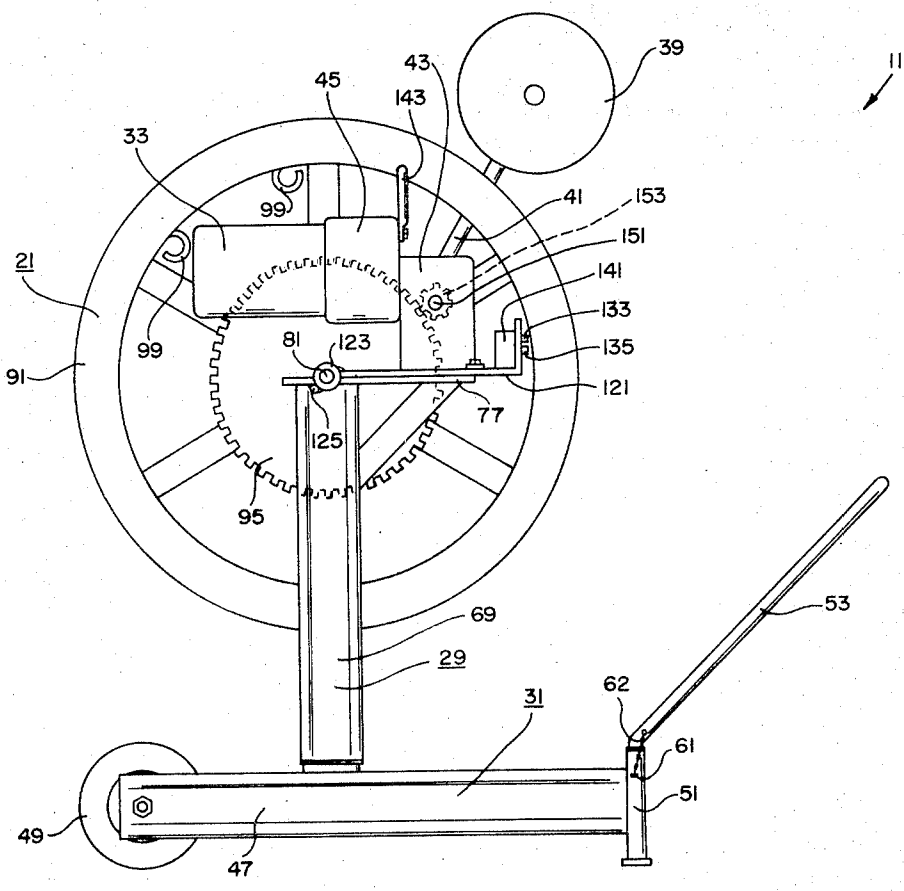


FIG. 1

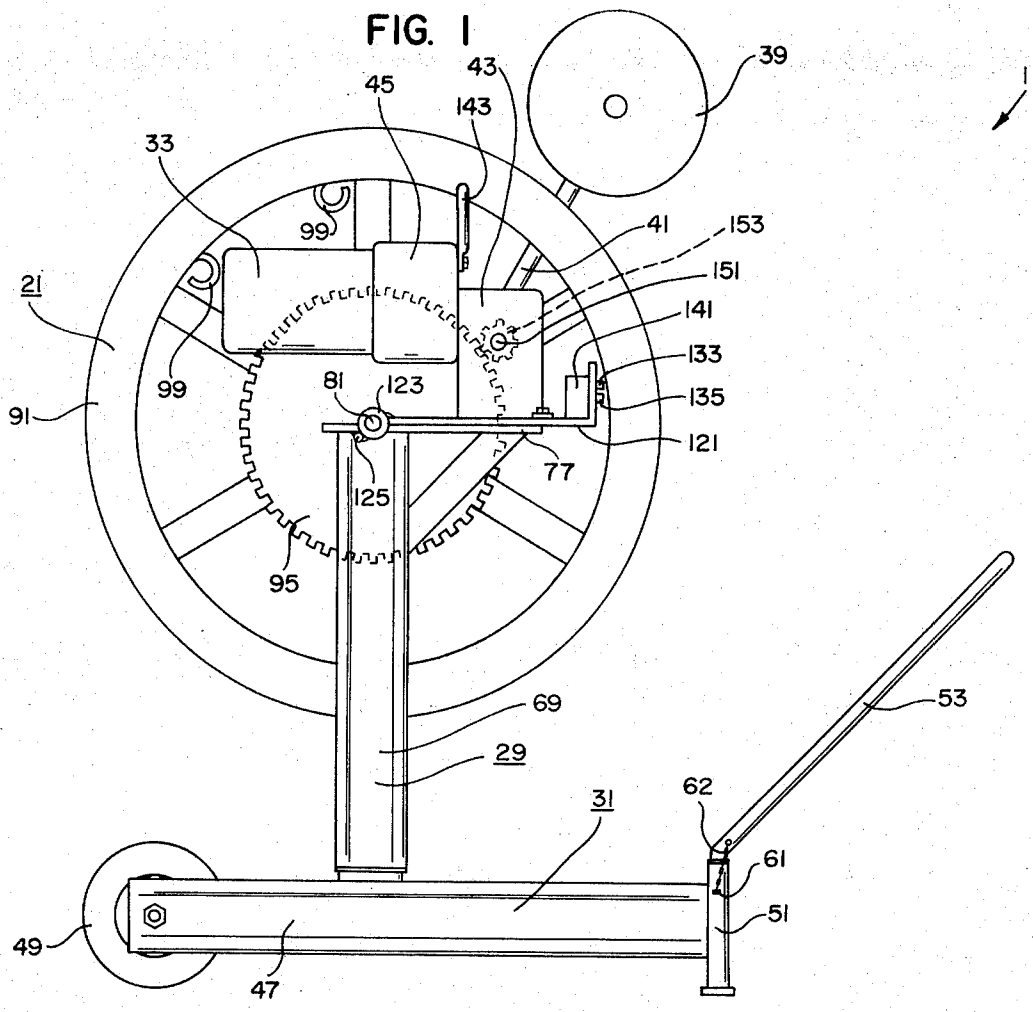
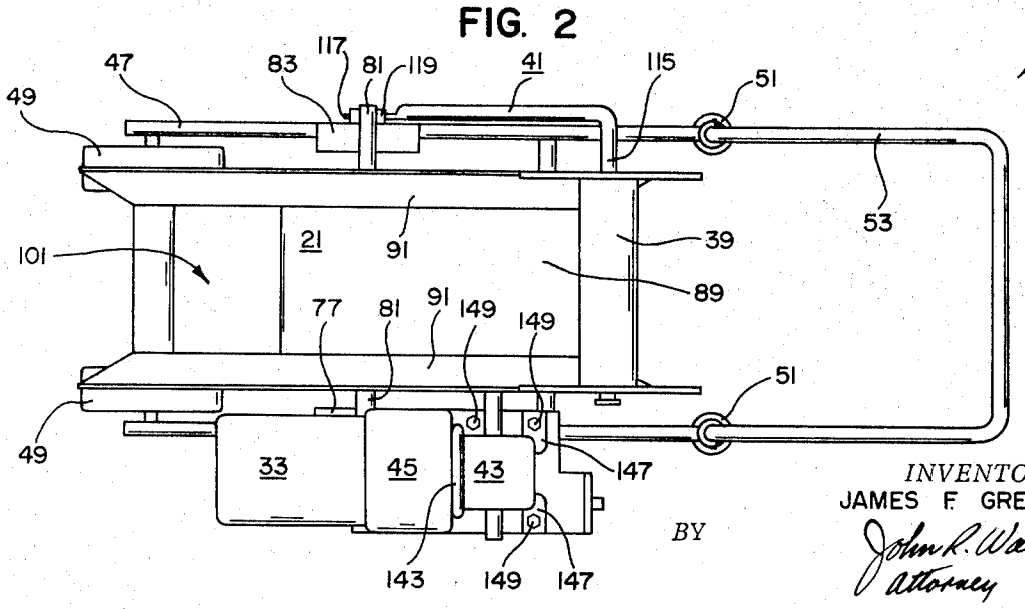



FIG. 2




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FIG. 3

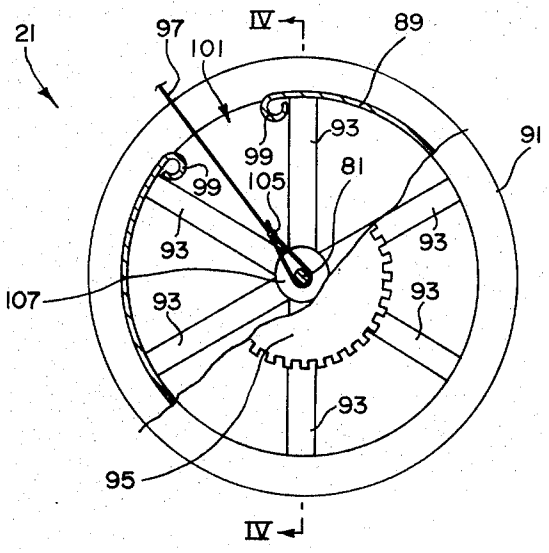



FIG. 4

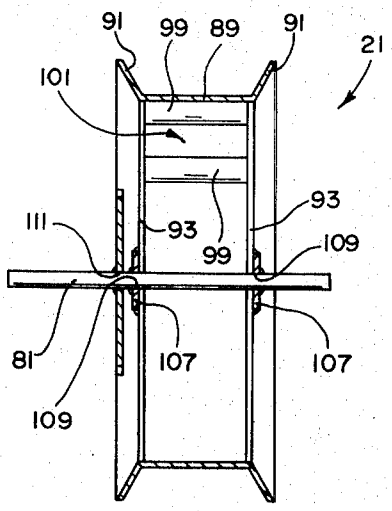



FIG. 5

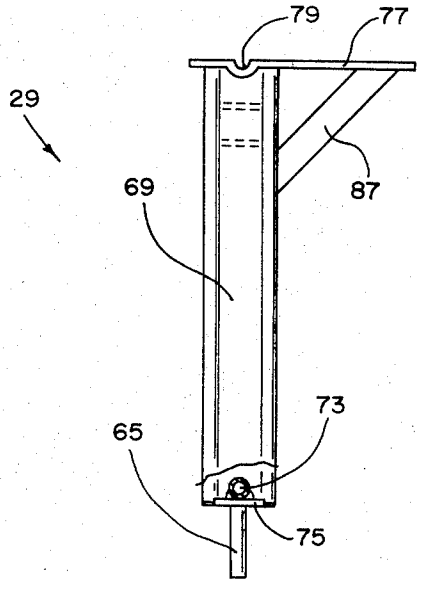



FIG. 6

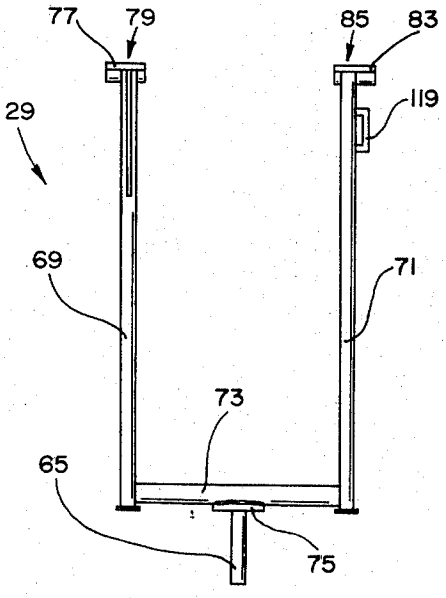



FIG. 7

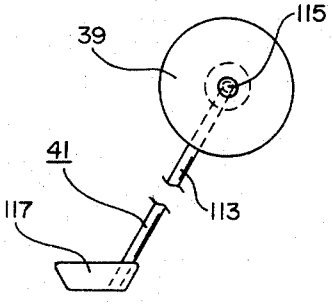
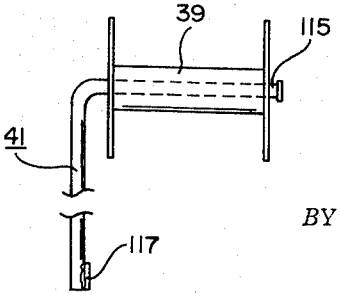



FIG. 8




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FIG. 9

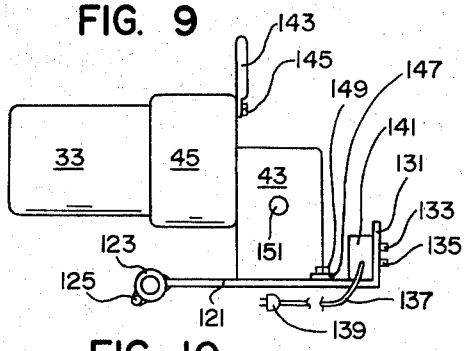



FIG. 11

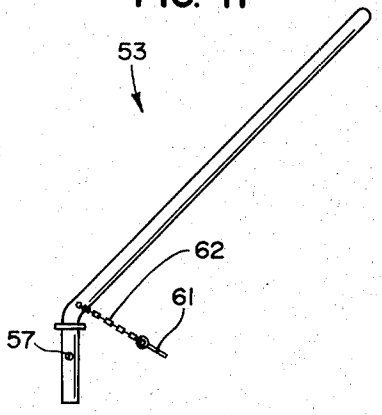



FIG. 10

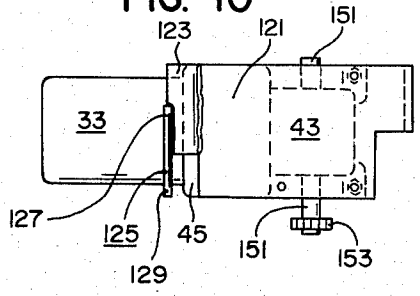



FIG. 12

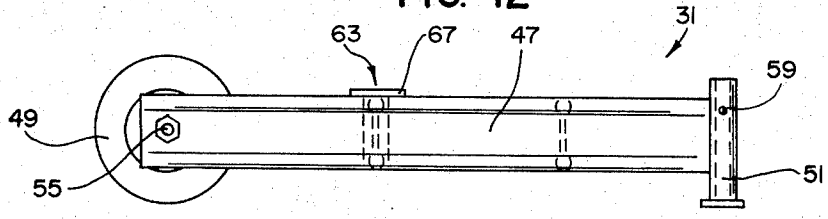
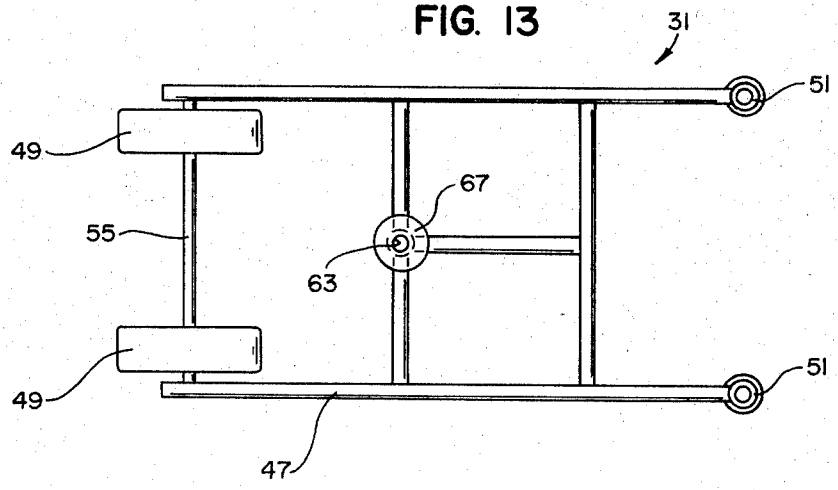



FIG. 13




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FIG. 15

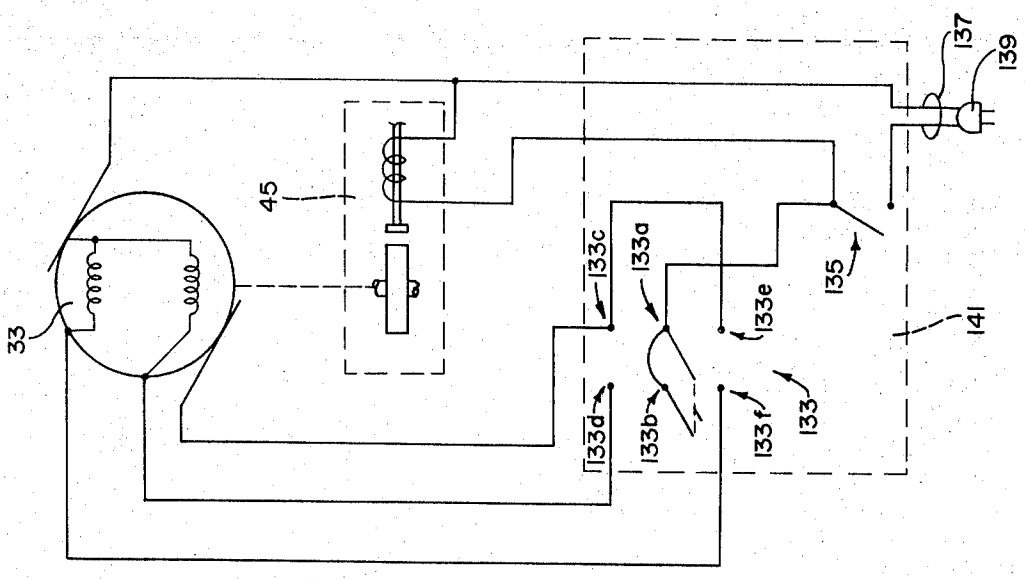
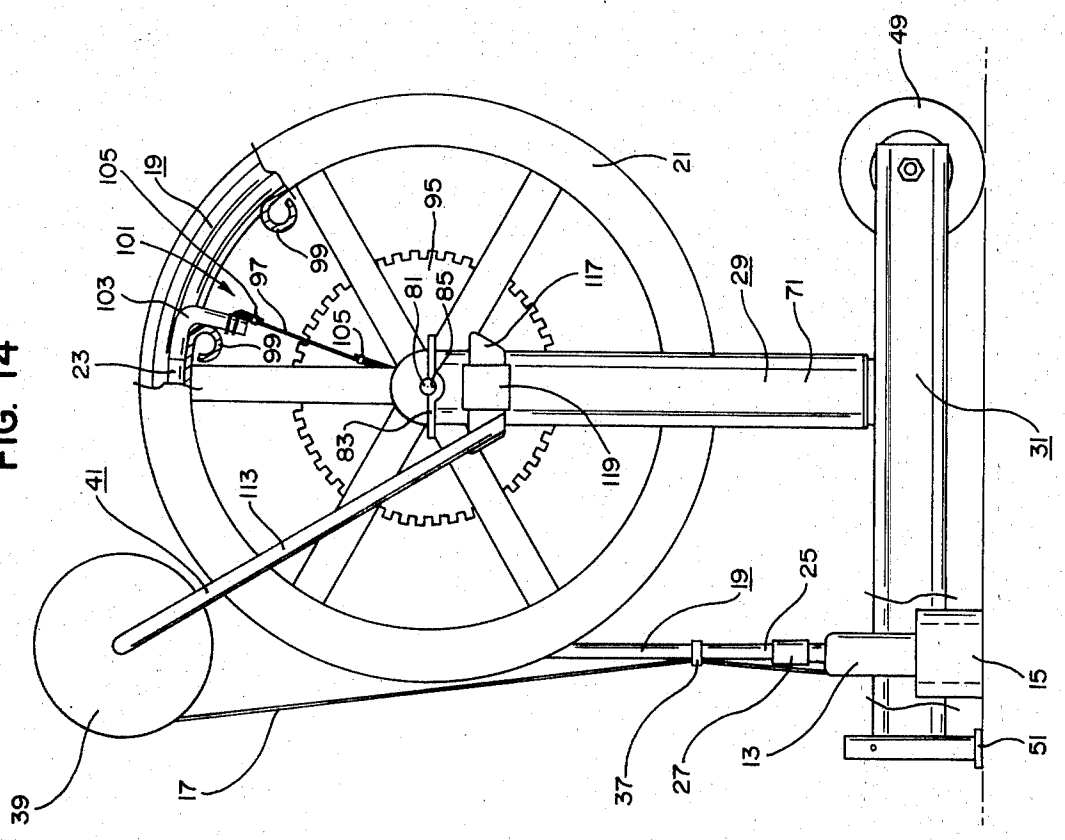



FIG. 14




11

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# WATER PUMP HOIST

## BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to water pump hoists.

2. Description of the Prior Art

The only pump hoist known to the applicant comprises a mast, i. e., a derrick or ginpole, supporting a sheave adjacent the upper end thereof for receiving a grappling line. Take up on the grappling line may be manual or a hydraulic motor may optionally be employed.

This type hoist has numerous disadvantages: First, setting up the mast is time-consuming. Secondly, the pump is usually further in the ground than is the height of the mast. Accordingly, the grapple line pulls the conduit to the top of the mast and the conduit is secured to prevent gravitation back into the well while the grappling line is attached further down on the conduit. This procedure is repeated until the pump is withdrawn from the well. Obviously, the rigidity of the conduit eventually gives way to the weight thereof and the upper end or the free end is free to flop wherever it may, oftentimes resulting in damage to the conduit, or at best, an awkward and antiquated arrangement. Thirdly, locations where the head of the well is enclosed in a cramped pumphouse may necessitate demolishing the pumphouse in order to gain access to the conduit, resulting in considerable expense which oftentimes is unavoidable.

In the event the well is a shallow well, manual labor may be employed for retrieving the pump, i. e., several men surround the wellhead and manually grip the conduit and by pulling together, physically lift the electric pump and the length of conduit which is full of water. Obviously, the men must work in unison and cannot turn loose to rest until the pump has been withdrawn.

However, it should be pointed out that the approximate weight of the pump is 65 pounds, and on deeper wells, e. g., 150 feet or more, the weight of the conduit full of water plus the weight of the pump is of such magnitude that it is practically impossible to get enough men around a well to accomplish the task manually.

A search was conducted which revealed the following two patents: the Levett U.S. Pat. No. 639,818 and the Frontz U.S. Pat. No. 2,453,979. It should be pointed out that neither of the above patents pertain to a hoist per se, but rather pertain to wire reels used in the art of constructing barbed wire fences or the like. The significant feature of these inventions appears to be: First, the portable cartlike characteristics. Secondly, structure is included which will enable the unreeling of the wire to be readily controlled so that the wire will not be paid out too fast or become entangled, i. e., drag means to prevent idle rotation of the reel on the holder is provided. This is a very important feature in the art of fence construction; however, the structural features taught in the above patents do not in any way solve the problem of hoisting an electrically driven water pump from a well, particularly a pump suspended by the conduit which carries the fluid from the pump to a redistribution point above ground. Therefore, these two patents are considered to be from non-analogous arts.

## SUMMARY OF THE INVENTION

The present invention is directed towards overcoming the above enumerated disadvantages and problems. The concept of the present invention is to first provide a reel of optimum size which may receive convolutely wound turns of the flexible conduit, i. e., considerable resiliency and/or rigidity is inherent with a conduit suitable for supporting a suspended 65 pound pump 150 feet or more below the surface. Obviously, the larger the diameter of the reel, the easier it is to wrap the conduit thereon. On the other hand, it is desirable that the main reel be small enough so that it may be suitably installed in a cramped space, e. g., a pumphouse or the like. Accordingly, I prefer that the diameter of the main reel be approximately 3 ½ to 4 feet. However, I do not want to be limited to a specific size. Therefore, main reels of various size dimensions are within the full intended spirit and scope of the present invention.

The main reel is suitably supported by a main support member which is mounted on a hand truck-like base member. An auxiliary reel is provided for receiving the electric power cord which must extend alongside the flexible conduit for operating the electrically driven pump. A brake motor assembly is also provided which rotatably drives the main reel selectively in forward and reverse directions, i. e., respectively winding the flexible conduit about the main reel for hoisting the pump out of the well and unwinding the conduit from the main reel for lowering the pump into the well.

Knockdown structure is incorporated throughout the various components of the hoist to facilitate expeditious disassembly one from the other. This is a feature of importance, particularly at locations where the head of the well is enclosed in a cramped environment, i. e., a pumphouse or the like. This feature also is particularly beneficial when the head of the well is situated at a remote or inaccessible location, e. g., a fenced enclosure having no vehicle access point or when a well is situated in a pasture which may be too wet and soggy to support a vehicle.

In other words, the weight of the completely assembled hoist is such that a vehicle probably would be required for transportation thereof. Therefore, the expeditious knockdown feature of the hoist makes it possible for the hoist to be carried to the location of the well by one man, i. e., one component at a time.

Other advantages of the hoist of the present invention are: First, the hoist includes structure which makes it possible to reach through a window or the like in a cellar to pull the flexible conduit from a wellhead situated below ground in a basement or the like. Secondly, considerable savings in time, i. e., clock-hours, is in evidence by using the hoist of the present invention. Thirdly, one man can accomplish the work of changing water submersible pumps by using the hoist of the present invention. Heretofore, several men were employed to accomplish this same task. Obviously, the savings in manhours is extremely significant. Fourthly, utilizing the hoist of the present invention affords a much safer operation in the task of changing a water pump. Additionally, the flexible conduit is fully protected against gouging or tearing, i. e., the conduit is not allowed to extend into the air as far as it will go and then flop over, as in the previously disclosed mast set up. Fifthly, the conduit is kept free of contaminants by being neatly wound on the reel rather than dragged through mud and/or animal filth or the like commonly found in the immediate area surrounding a wellhead.

The main reel is provided with an open segment to allow protruding devices to be received therein so that the remaining length of flexible conduit can be uniformly wrapped thereon in smooth convolutions. Devices which the open segment is intended to accommodate include a seal that cannot be removed, an elbow on the end of the pipe, etc.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a left side elevational view of the water pump hoist of the present invention, showing the various component parts suitably attached one to the other.

FIG. 2 is a plan view of the water pump hoist of the present invention.

FIG. 3 is a left side elevational view of the main reel assembly.

FIG. 4 is a sectional view taken as on the line IV—IV of FIG. 3.

FIG. 5 is a left side elevational view of the main support member for the hoist of the present invention.

FIG. 6 is a front elevational view of the main support member for the hoist of the present invention.

FIG. 7 is a left side elevational view of the auxiliary reel and the auxiliary support member for the hoist of the present invention.

FIG. 8 is a rear elevational view of the auxiliary hoist and the auxiliary support member for the hoist of the present invention.

FIG. 9 is a left side elevational view of the brake gear motor assembly and the platform on which it is mounted.

FIG. 10 is a bottom view of the brake gear motor assembly and the platform on which it is mounted.

FIG. 11 is a left side elevational view of the handle for the pump hoist of the present invention.

FIG. 12 is a left side elevational view of the hand truck-like base member for the hoist of the present invention.

FIG. 13 is a plan view of the base member for the hoist of the present invention.

FIG. 14 is a right side elevational view of the water pump hoist of the present invention having certain components thereof broken away and removed for simplicity of illustration, particularly showing the preferred arrangement thereof with respect to a well. The flexible conduit is shown wrapped about the main reel and the electrical cable for the pump is shown in a preferred relationship with the auxiliary reel.

FIG. 15 is a schematic showing the reversible motor, the magnetic disk brake, a pair of switches, and the preferred interconnection thereof.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGS. 1 and 14 of the drawings wherein it may be seen that the water pump hoist 11 of the present invention is adapted to be used for hoisting substantially all known domestic pumps 13 from a typical well 15. A typical pump 13, being electrically driven by a power cord of electric cable 17, is specifically constructed in an elongated manner so as to facilitate entrance into the casing of the well 15. A typical weight for a pump 13 is approximately 65 pounds. The pump 13 is suspended a predetermined distance into the well 15 by a predetermined length of a flexible conduit 19. The length of the conduit 19 is determined by the depth of the water table, i. e., a 150 foot length for the conduit 19 would not be unusual. Obviously, the weight of the pump, 150 feet of relatively heavy conduit, plus a 150 foot column of water, represents a load of great magnitude.

In addition to the flexible conduit 19, the hoist generally comprises a main reel assembly 21 for receiving convolutely wound turns of the flexible conduit 19. The flexible conduit 19 has first and second ends 23, 25 thereto with the first end 23 being attached to the main reel assembly 21 and the second end 25 having a typical coupling means 27 for attachment of the pump 13 thereto. Lowering the pump 13 a predetermined distance or submerging the pump or inlet into the well, i. e., depending upon the elevation of the water table, and subsequent activation thereof, delivers fluid, e. g., water or the like, under pressure out the first end 23 of the conduit 19. The hoist 11 additionally includes a main support member 29 rotatably supporting the main reel assembly 21, a hand truck-like base assembly 31 having the main support member 29 mounted thereon, and a prime mover 33 rotatably driving the main reel 21 selectively in forward and reverse directions. Unwinding the flexible conduit 19 from the reel 21 lowers the pump 13 into the well 15 and winding the flexible conduit 19 about the main reel 21 hoists the pump 13 out of the well 15.

The prime mover 33 preferably constitutes a typical electrical motor like the Dayton electric motors shown in the catalog published by W. W. Grainger, Inc., 339 South Front Street, Memphis, Tennessee. I have found that a one-half horsepower motor 33 having 1,725 rpm is adequate when certain structure yet to be disclosed is incorporated with my water pump hoist 11.

It should be pointed out that the typical pump 13 is usually powered by the power cord 17 which extends alongside the flexible conduit 19, i. e., having a length substantially equal thereto. In this regard, the electric cable 17 preferably is attached at random distances along the length thereof to the flexible conduit 19 as the conduit 19 is lowered, by a wrapping of the tape as shown by the numeral 37, in a manner obvious to those skilled in the art.

The hoist 11 of the present invention preferably additionally includes an auxiliary reel 39 for wrapping the electric cable 17 thereon, i. e., installing the tape 37 as the work progresses. The auxiliary reel 39 is rotatably supported by an auxiliary support member 41 which in turn is supported by the main support member 29, in a manner yet to be described.

The hoist 11 additionally includes a speed reducing assembly 43 for providing optimum torque to lift the pump 13 and the long length of flexible conduit 19. The speed reducing assembly 43 preferably is interposed between the motor 33 and the main reel assembly 21. It should be understood that various speed reducing assemblies may be used for this purpose having different specifications without departing from the spirit and scope of the present invention. However, I prefer to use a speed reducer offered by the Dayton electric motors which is also listed in the previously mentioned Grainger catalog. More specifically, I have found that a speed reducer having a ratio of 48:1 is well suited with the remaining structure of the pump hoist 11 of the present invention. In other words, the output rpm of the speed reducing assembly 43 is substantially 36 rpm with a nominal 610 inch-pounds of torque.

The hoist 11 additionally incluides a brake assembly 45 for controllably stopping and holding the prime mover or motor 33 so that the weight of the pump 13 and the flexible conduit 19 will not cause them to gravitate downwardly into the well 15 when the motor 33 is periodically de-energized for various reasons. More specifically, the brake assembly 45 preferably is of the magnetic disk brake type like the Dayton electric motor equipment which is also listed in the above-mentioned Grainger catalog. The brake assembly 45 is conveniently fitted between the motor 33 and the speed reducing assembly 43 as best illustrated in FIG. 9 of the drawings. The brake assembly 45 includes a fail safe feature which engages the brake and holds the load under power-off conditions and is automatically released when power is applied, in a manner yet to be described. It should be understood that various brake assemblies may be utilized for this purpose having different specifications without departing from the spirit and scope of the present invention. In this regard the Dayton magnetic disk assembly which is herein disclosed and well suited for this purpose has a three foot-pound rating.

The hand truck-like base member 31 for the hoist 11 includes a horizontally disposed frame member 47 having a pair of wheels 49 rotatably attached to the one end thereof. The other end of the frame 47 has fixedly attached thereto a pair of legs 51. The member 47 includes handle means 53, i. e., the handle means 53 preferably being U-shaped and having the opposite ends thereof removably attached to the legs 51 in a convenient manner to facilitate expeditious disassembly thereof. The handle 53 preferably has a shape substantially as best illustrated in FIGS. 1, 2 and 11 of the drawings.

More specifically, the member 47 includes a boxlike construction having a shape substantially as best illustrated in FIGS. 12 and 13 of the drawings. Additionally, the wheels 49 are suitably attached to the member 47 in any well known manner, e. g., as by axles 55. Further, the legs 51 preferably are tubular in construction so as to provide a complementary socket for receiving the opposite ends of the handle means 53. Adjacent the opposite ends of the handle means 53 are a pair of transverse apertures 57. The legs 51 also are provided with a pair of transverse apertures 59, i. e., respectively the apertures 57 are in alignment with the apertures 59 when the handle means 53 is suitably received by the legs 51. A pair of pins 61 respectively extend through the apertures 57, 59 to secure the handle 53 to the member 47, in a manner obvious to those skilled in the art. The pins 61 preferably are attached to the handle 53 in any well known manner, e. g., as by chains 62.

The main support member 29 is pivotally attached to the frame member 47 by providing the frame member 47 with a socket 63 and the support member 29 with a pin 65. A circular bearing surface 67 preferably is positioned adjacent the upper edge of the socket 63 and fixedly attached thereto in any well known manner, e. g., welding or the like.

The bifurcated main support member 29 includes left and right stanchions 69, 71 interconnected at the lower ends thereof by a horizontal member 73, being attached thereto in any well known manner, as by welding or the like, as best illustrated in FIGS. 5 and 6 of the drawings. The pin 65 is fixedly attached to the horizontal member 73 centrally thereof in any well known manner, as by welding or the like. A second circular bearing surface 75, being positioned adjacent the upper end of the pin 65, is fixedly attached thereto in any well known manner, as by welding or the like.

The socket 63, being complementarily sized with the pin 65, removably receives the pin 65, i. e., the second bearing surface 75 contiguously engaging the first bearing surface 67. It should be obvious to those skilled in the art that it may be desirable that a thrust bearing (not shown) be interposed between the bearing surfaces 67, 75 in order to minimize friction as the pin 65 pivots in the socket 63. However, I have found that when the bearing surfaces 67, 75, the socket 63, and the pin 65 are suitably lubricated, that a thrust bearing is not necessary. Accordingly, the socket 63, the coacting pin 65, and the bearing surfaces 67, 75 generally comprise swivel means for pivoting the main reel 21 about a vertical axis so that the main reel 21 may be pivoted back and forth to convolutely wrap the flexible conduit 19 with uniform turns thereon as the main reel 21 is rotatably driven, in a manner yet to be fully described.

The upper end of the left stanchion 69 terminates with a horizontally disposed first platform or platelike member 77. The first platform 77 is provided with a semi-cylindrical bearing surface 79 for rotatably receiving one end of a shaft 81. The upper end of the right stanchion 71 terminates with a platelike member 83, the platelike member or platform 77 is much longer than is the platform 83, for reasons yet to be disclosed. The platelike member 83 is provided with a semi-cylindrical bearing surface 85 which is axially aligned with the bearing surface 79 for rotatably receiving the opposite end of the shaft 81.

The support member 29 additionally includes a gusset plate 87, i. e., having the one end thereof fixedly attached to the outer end of the first platform 77 and the other end thereof fixedly attached to the left stanchion 69 in any well known manner, as by welding or the like.

The main reel assembly 21 includes a concentric cylinder member 89, a pair of outwardly canted flange members 91, a plurality of spokelike members 93, a large spur gear member 95, and a wire rope member 97.

The cylinder 89 and the flange members 91 may be formed integrally in a manner obvious to those skilled in the art or they may be formed separately and fixedly attached thereto as by welding or the like. In either vent, the cylinder member 89 preferably is constructed so as to include a pair of inwardly folded portions 99 which partially define an open segment 101 thereof.

From FIG. 3 of the drawings, it may be seen that the open segment 101 allows the passing therethrough of the wire rope member 97, the wire rope member 97 having a predetermined length so that the hoist 11 may be positioned aboveground and the wire rope member 97 extending belowground into a basement or the like to facilitate replacement of a pump 13 from a well 15 being adjacent the floor of a basement.

From FIG. 14 of the drawings, it may be seen that the open segment 101 allows the passing therethrough of certain enlarged protruding ancillary members of the flexible conduit 19, e. g., an elbow 103 as depicted.

In other words, the length of the wire rope member 97 may vary depending upon the location of the well 15. Irrespective of the length of the wire rope member 97, one end thereof is fixedly attached to the shaft 81

and the other end thereof is free to grippingly engage the one end of the flexible conduit **19** or ancillary members thereof, as above-described. The wire rope member **97** may be attached to the shaft **81** in any well known manner. I prefer that a portion thereof be doubled back and that a solderless connector **105** common in the art of electrical connectors be suitably attached thereto, in a manner obvious to those skilled in the art. It may be desirable to form a loop at the free end of the member **97** by using a second connector **105**, as shown in FIG. **14**.

The outer ends of the spokelike members **93** are fixedly attached to the inner side of the cylinder **89** in any well known manner, as by welding or the like. The inner ends of the spokelike members **93** converge at a pair of hub members **107** and are fixedly attached thereto as by welding or the like. The hub members **107**, being concentrically arranged with respect to the cylinder and flanges **89, 91**, are provided with suitable concentric apertures **109** for receiving the shaft **81**, substantially as depicted in FIG. **4** of the drawings. The hub members **107** are fixedly attached to the shaft **81** in any well known manner, as by welding or the like.

The large spur gear **95**, being concentrically arranged with respect to the cylinder and flange members **89, 91**, is provided with a concentric aperture **111** for receiving the shaft **81** and is fixedly attached thereto as by welding or the like.

In assembling the hoist **11**, the left and right stanchions **69, 71** of the main support member **29** straddle the main reel assembly **21**, i. e., the main reel assembly being positioned with the large spur gear **95** thereof being adjacent the first horizontal platform **77** for reasons yet to be disclosed.

In other words, the arrangement whereby shaft **81** is simply resting upon the bearing surfaces **79, 85** constitutes knockdown means to facilitate expeditious disassembly of the main reel assembly **21** from the main reel support member **29**.

The auxiliary support member **41** includes a mid-portion **113**, an axle portion **115** perpendicular to and fixedly attached to the upper end of the mid-portion **113** for rotatably supporting the auxiliary reel **39**, and a platelike shoe portion **117** fixedly attached as by welding or the like to the lower end of the mid-portion **113** and preferably having a shape substantially as depicted in FIGS. **7** and **8** of the drawings.

The right stanchion **71** includes a straplike stirrup **119** for removably receiving the shoe portion **117** of the auxiliary support member **41**. In other words, the straplike stirrup **119** and the shoe portion **117** constitute knockdown means to facilitate expeditious disassembly of the auxiliary support member **41** from the main support member **29**. FIG. **2** of the drawings depicts the preferred arrangement of the auxiliary support member **41**, i. e., the axle portion **115** thereof being turned inwardly so that the auxiliary reel **39** assumes a position thereon immediately above the main reel assembly **21**.

The hoist **11** includes a second horizontally disposed platform **121** contiguously engaging and being supported by the first platform **77** in a manner yet to be described. The second platform **121** includes a tubular bushing portion **123** which is fixedly attached at the one end thereof as best illustrated in FIG. **9** of the drawings.

In other words, the bushing **123** circumferentially engages or is rotatably received by one end of the shaft **81**.

The main reel assembly **21** is secured to the main support member **29** by a pin **125** i. e., the pin **125** being fixedly attached to the bushing **123** in any well known manner, as by welding or the like. More specifically, the pin **125** has a proximal and distal ends **127, 129** thereto. The proximal end **127** is fixedly attached to the bushing **123** so that the distal end **129** extends inwardly beyond the bushing **123** a predetermined distance, i. e., the pin **125** being radially arranged about the bushing **123** so that the distal end **129** thereof engages a portion of the underneath surface of the first platform **77**, as best viewed in FIGS. **1, 9** and **10** of the drawings.

The platform **121** preferably includes a turned up vertical portion **131**, i. e., the portion **131** constituting a panel for mounting a pair of electrical switches **133, 135** thereon for functional purposes yet to be disclosed.

It should be understood that the above-described bushing **123**, the pin **125**, a portion of the axle **81**, and a portion of the first platform **77** constitute knockdown means to facilitate expeditious disassembly of the second platform **121** from the main reel support member **29**.

From FIG. **9** of the drawings, it may be seen that a power cable **137** having a typical plug **139** attached to the one end thereof, leads to a junction box **141**, i. e., the junction box **141** being attached to the back side of the panel **131**. The motor **33**, the magnetic disk brake **45**, and the speed reducer **43**, when mated together in a manner prescribed by the Dayton Electric Motor Co., constitute a brake gear motor means having a shape substantially as depicted in FIG. **9** of the drawings. I prefer to include a handle **143** to facilitate installation thereof, i. e., the handle **143** having U-shaped structure is fixedly attached to the disk brake **45** by a pair of bolts **145** as best shown in FIG. **9** of the drawings.

The speed reducer **43** is provided with a typical mounting base having a plurality of lugs **147**. The brake gear motor means, or more specifically, the speed reducer **43**, is fixedly attached to the second platform **121** by a plurality of attachment bolts **149**, i. e., platform **121** being provided with a plurality of apertures (not shown) but being in alignment with the lugs **147** for receiving the attachment bolts **149** in a manner obvious to those skilled in the art.

In this regard, it may be desirable to have at least one of the attachment bolts **149** or a separate bolt, not shown extend through both the second platform **121** and the first platform **77**, i. e., the first platform **77** being provided with a suitable aperture (not shown) but being in alignment with one of the lugs **147**.

The speed reducer **43** has a rotatably driven output shaft **151**. One end of the shaft **151** carries a small diameter spur gear **153**, i. e., the gear **153** being fixedly attached to the shaft **151** in any well known manner.

The small diameter spur gear **153** meshingly engages the large diameter spur gear **95**, thus causing the main reel **21** to rotate, i. e., when the motor **33** is energized in a manner yet to be fully described. It wil be understood that the distance between spur gear **95** and bushing **123** is fixed at a predetermined distance so that upon placing bushing **123** over axle **81**, the spur gear is properly positioned relative to gear **95**.

Particular attention is now directed toward FIG. **15** of the drawings wherein it may be seen that the

switches 133, 135 and numerous conductors interconnected therewith constitute a means for operably energizing the brake gear motor means selectively in forward and reverse directions for respectively winding and unwinding the flexible conduit about the main reel assembly. More specifically, the plug 139 is intended to be received in any convenient outlet, e. g., preferably 115 volts AC. Accordingly, the power cable 137 carries current to the junction box 141. Contained within the junction box 141 are the switches 133, 135. The switch 133 preferably is a double pole double throw switch, and the switch 135 preferably is a single pole single throw switch. One of the conductors of the power cable 137 is connected to one terminal of the switch 135. The other conductor of the cable 137 is connected to a common point which connects to one side of the magnetic disk brake 45 and to one side of the motor 33.

The other terminal of the switch 135 is connected to the other side of the brake 45 and to a terminal 133*a* for the switch 133. In other words, closing the switch 135 energizes the solenoid-like winding for the brake 45 which releases the friction, thus allowing the shaft 151 to be free to rotate, in a manner obvious to those skilled in the art. Additionally, voltage is placed on the contacts 133*a*, 133*b* of the switch 133. Moving the switch 133 to the forward position (upward as shown in FIG. 15) completes a circuit respectively between the contacts 133*a*, 133*c*; 133*b*, 133*d* for energizing the motor 33, i. e., in a forward direction. More specifically, voltage is placed across the forward winding and the armature winding of the motor 33.

Placing the switch in the opposite or reverse position respectively closes the contact 133*a*, 133*e*; 133*b*, 133*f* which energizes the motor 33 in a reverse direction. More specifically, voltage is placed across the reverse winding and the armature winding of the motor 33 in the usual manner for reversible motors and is well known to those skilled in the art.

From the above disclosure, it should be apparent to those skilled in the art that when the hoist is to be used for hoisting (as opposed to lowering) a pump from a well, the switch 133 would be placed in the appropriate position, e. g., the aforementioned forward position. Subsequently thereto, the switch 135 is used as an on and off switch, i. e., closing the switch 135 simultaneously releases the brake 45 and energizes the motor 33 in the forward direction as above described.

On the other hand, when the hoist 11 is to be used for lowering a pump into a well, the switch 133 is placed in the opposite or reverse position. Subsequently thereto, the switch 135 is again used as an on and off switch, i. e., closing the switch 135 simultaneously releases the brake 45 and energizes the motor 33 in the reverse direction.

The output rpm of the gear 153, as earlier stated, is a nominal 36 rpm and the torque is a nominal 610 inch-pound. However, the rpm of the main reel 21 is considerably less, i. e., since the gear 95 has a greater radius than does the gear 153. The rpm of the gear 95 is decreased and the torque is proportionately increased, in a manner obvious to those skilled in the art. Accordingly, the gear ratio between the gears 95, 153 is selected so that the hoist 11 may readily lift the anticipated load.

Although the invention has been described and illustrated with respect to a preferred embodiment thereof, it is not to be so limited since changes and modifications may be made therein which are within the full intended scope of the invention.

I claim:

1. A hoist for a water pump which may be suspended in a well by a predetermined length of flexible conduit, said hoist comprising a hand truck, a horizontally disposed shaft means, bifurcated main support means mounted on said hand truck and including left and right stanchions, the upper ends of said left and right stanchions terminating with semi-cylindrical bearing surfaces, said shaft being rotatably received upon said bearing surfaces, said left stanchion additionally including a first horizontally disposed platform positioned adjacent the upper end thereof, main reel means for receiving convolute windings of the flexible conduit, said left and right stanchions of said main support means straddling said main reel means with said shaft means extending through said main reel means concentrically thereof and being fixedly attached thereto, large diameter spur gear means concentrically disposed relative to said shaft means and fixedly coupled thereto, a second horizontally disposed platform contiguously engaging and supported by said first platform, said second platform including tubular bushing means fixedly attached at one end thereof, said bushing means rotatably receiving one end of said shaft means, pin means fixedly attached to said bushing means to secure said main reel means to said main support means, said pin means having proximal and distal ends thereto, said proximal end of said pin means being fixedly attached to said bushing means and said distal end thereof extending inwardly beyond said bushing means a predetermined distance and being radially arranged about said bushing means so that said distal end thereof engages a portion of the underneath surface of said first platform, brake gearmotor means mounted on said second platform, said brake gearmotor means including a rotatably driven small diameter spur gear means, said small spur gear means meshingly engaging said large spur gear means so that rotation of said small spur gear means causes said main reel means to rotate, and means for operably energizing said brake gearmotor means selectively in forward and reverse directions for respectively winding and unwinding the flexible conduit about said main reel means.

2. The hoist of claim 1 in which is included auxiliary reel means for wrapping certain ancillary structure thereon, and auxiliary support means for rotatably supporting said auxiliary reel means on said main support means, said auxiliary support means includes knockdown means to facilitate expeditious disassembly of said auxiliary support means from said main support means.

3. The hoist of claim 1 in which is included swivel means for pivoting said main reel means about a vertical axis so that said main reel means may be swiveled back and forth to convolutely wrap uniformly thereon a plurality of turns of the flexible conduit as said main reel means is rotatably driven.

4. The hoist of claim 3 in which said main reel means includes a concentric cylinder member; a pair of outwardly canted annular flange members, means supporting said cylinder member a predetermined distance outwardly from said shaft, and a wire rope member; said cylinder member including a pair of inwardly folded portions partially defining an open segment of said cylinder member, said open segment allowing the

passing therethrough of said wire rope member and enlarged protruding ancillary members of the flexible conduit, said wire rope having the one end thereof fixedly attached to said shaft and the other end thereof being free to grippingly engage the one end of the flexible conduit.

5. The hoist of claim 4 in which said main reel support means additionally includes knockdown means to facilitate expeditious disassembly of said second platform from said main reel support means.

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