Dec. 17, 1946. A. A. JOHNSON 2,412,776

WINCH

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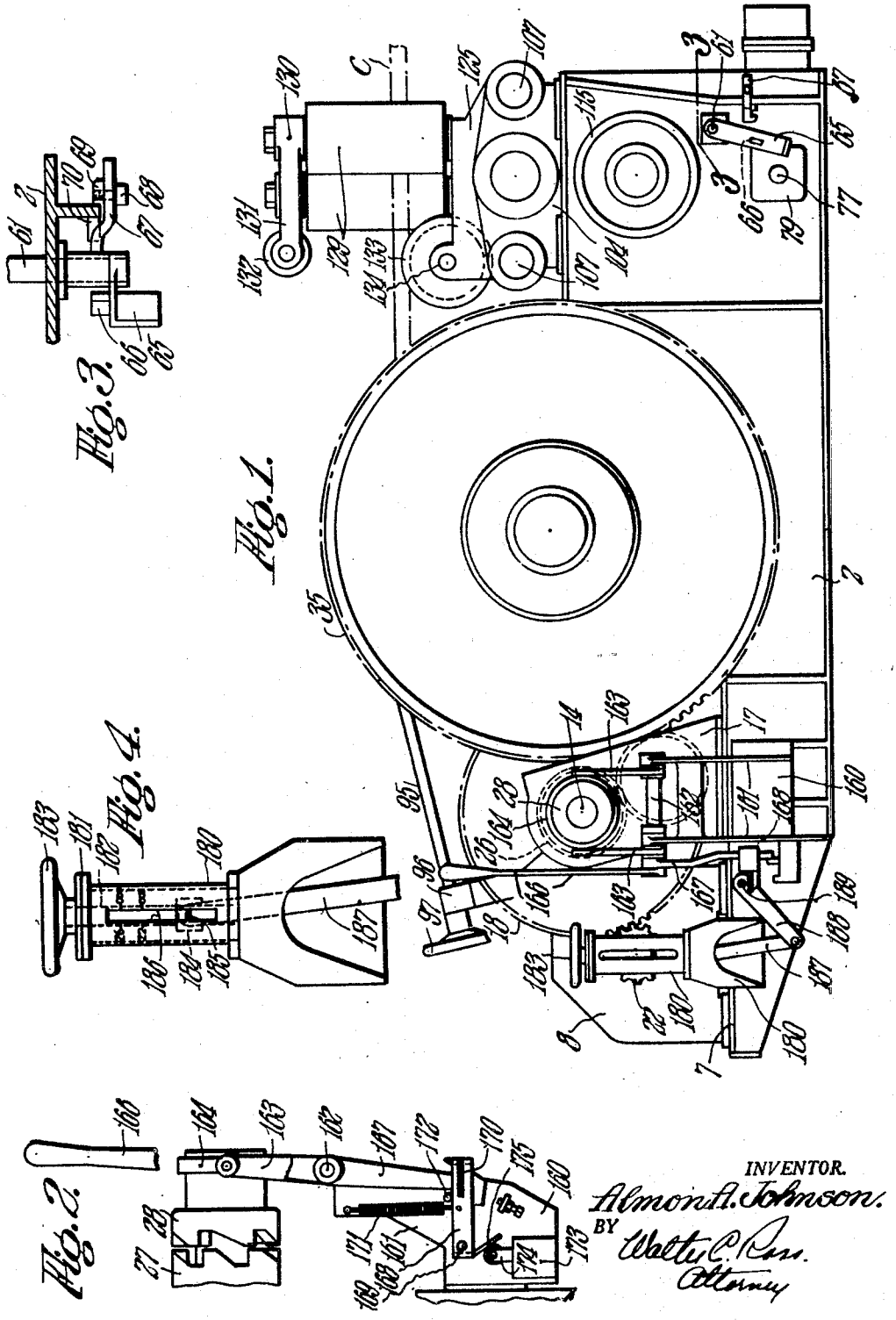


Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

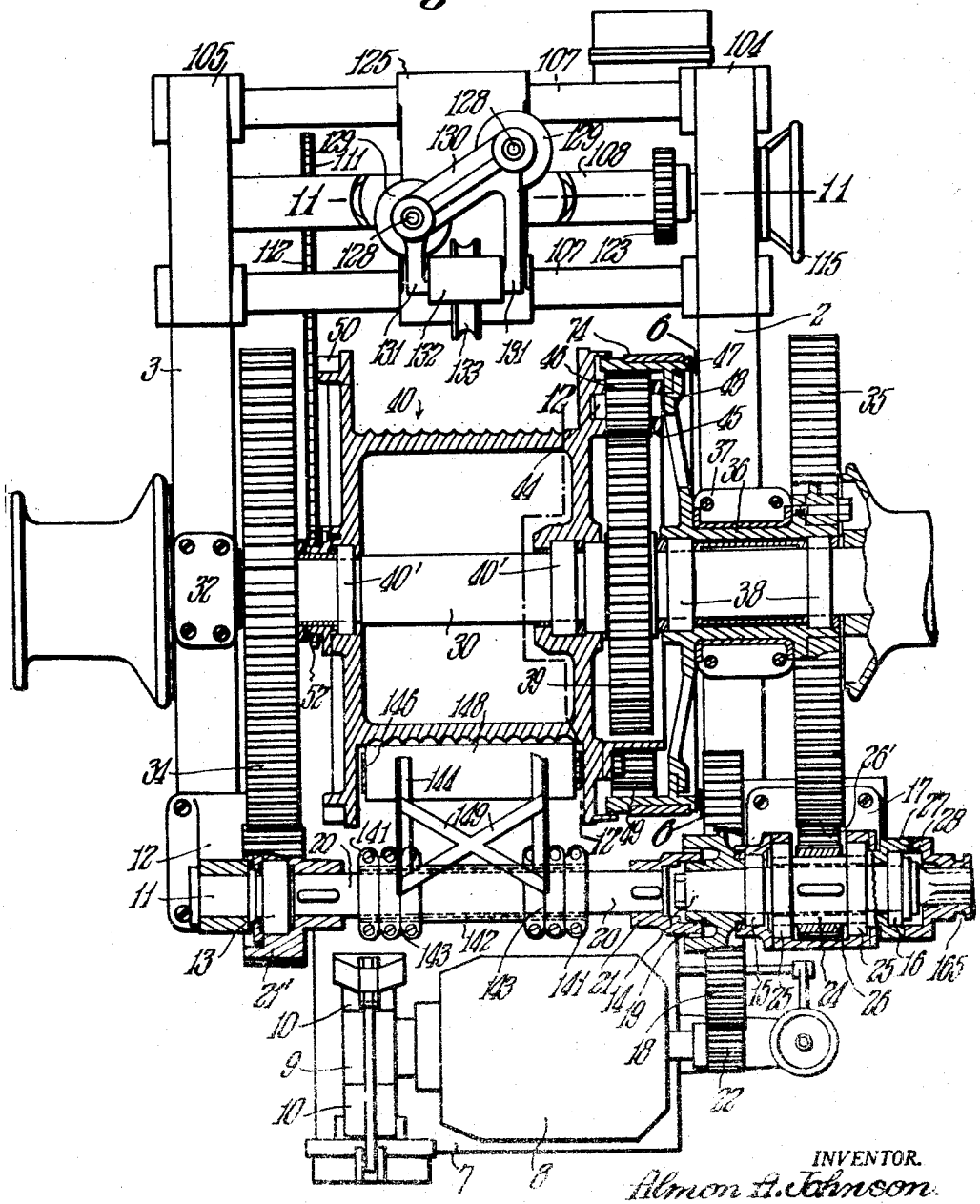
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Dec. 17, 1946. A. A. JOHNSON 2,412,776

WINCH

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Fig. 5.



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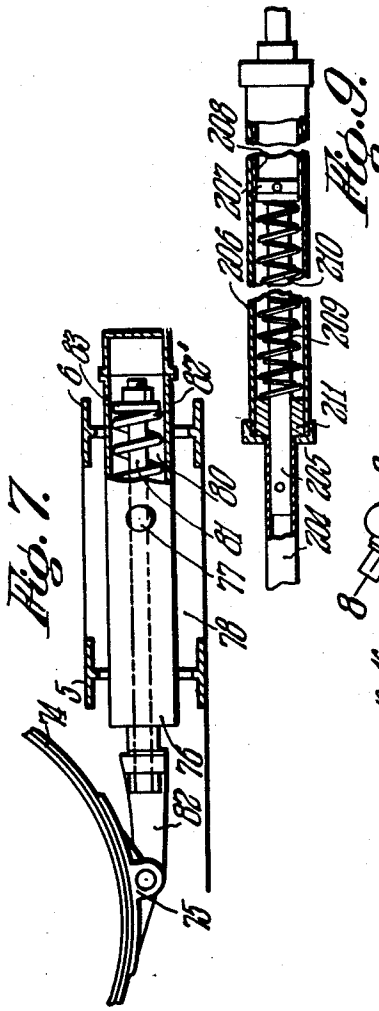


Fig. 7.

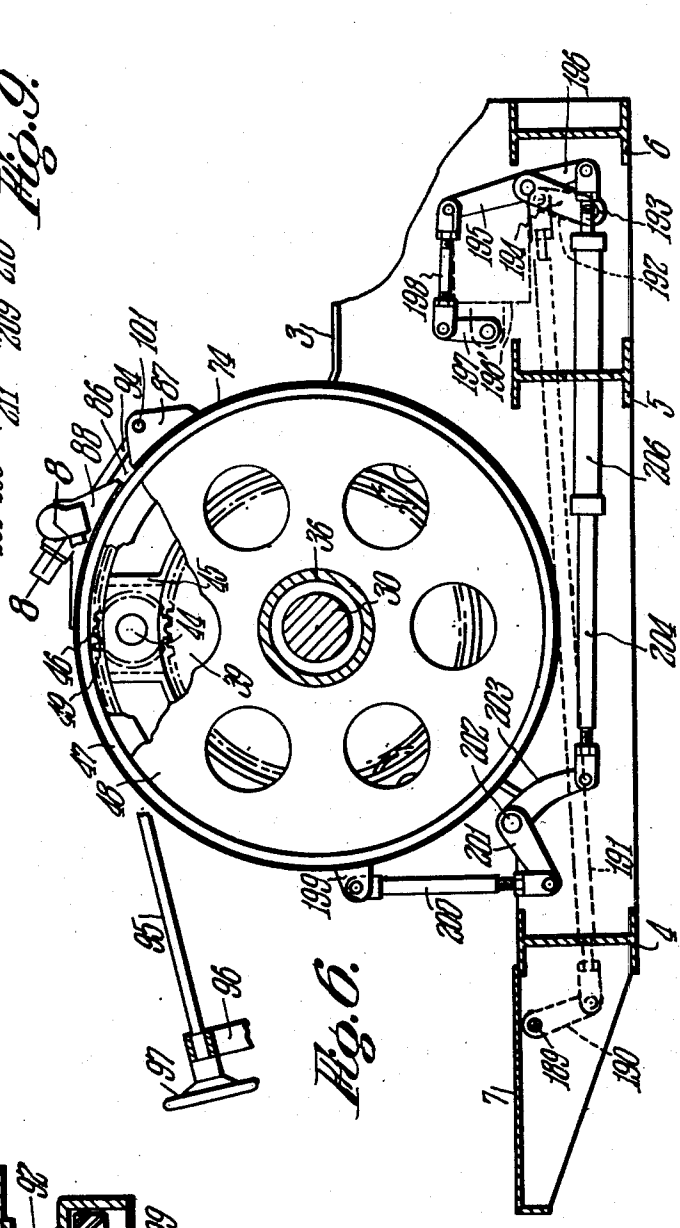


Fig. 6.

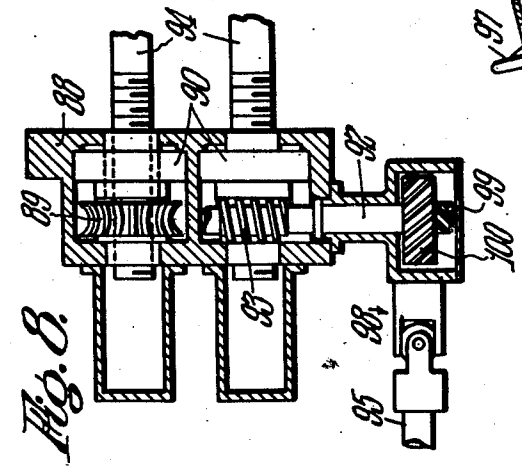


Fig. 8.

Fig. 9.

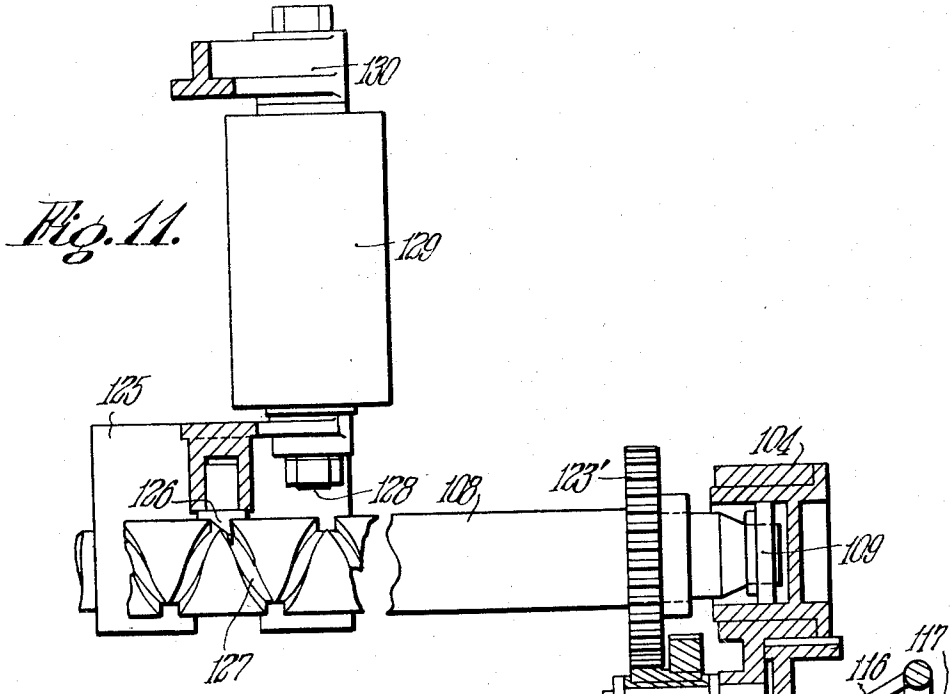
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Dec. 17, 1946. A. A. JOHNSON 2,412,776

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Fig. 11.



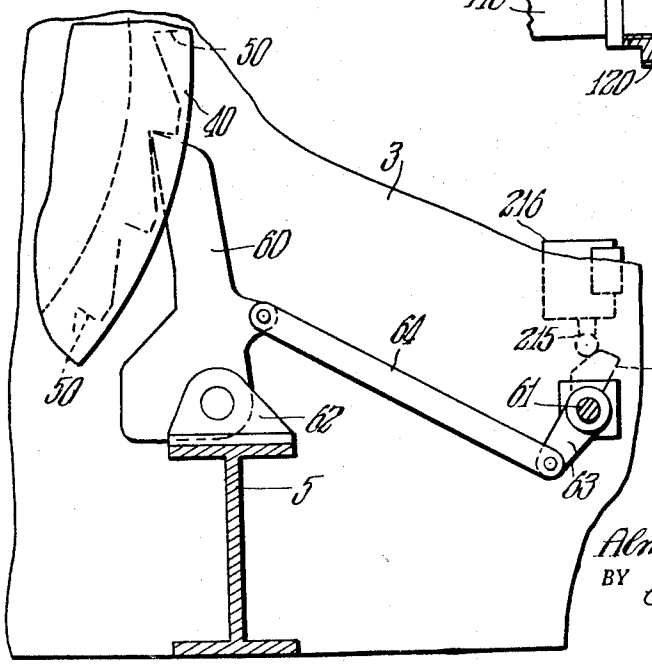


Fig. 10.

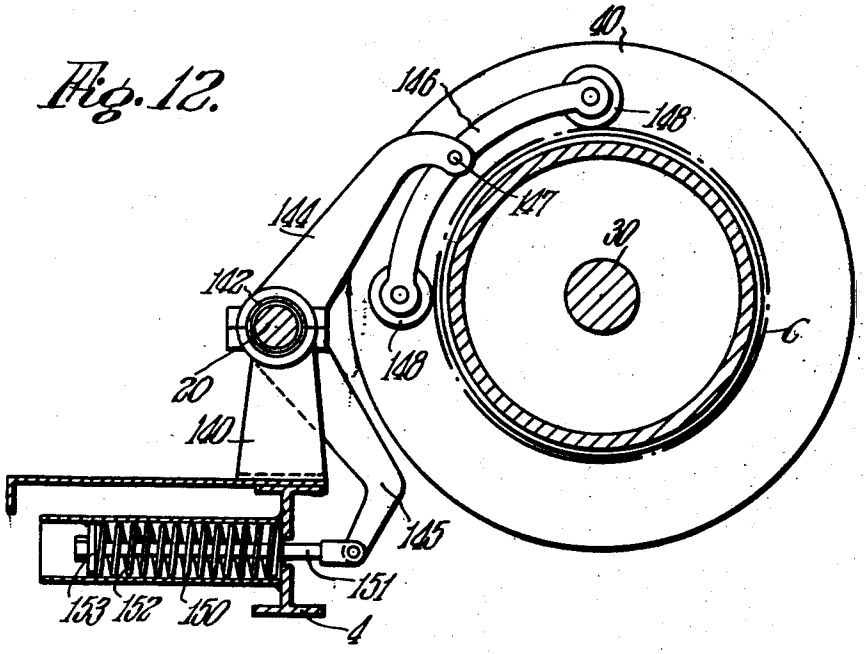
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Dec. 17, 1946. A. A. JOHNSON 2,412,776

WINCH

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Fig. 12.



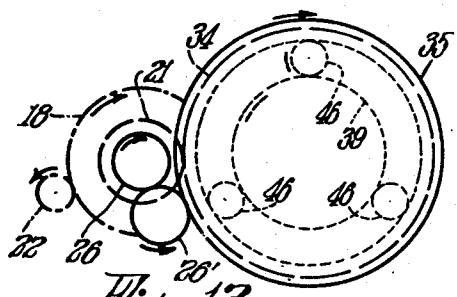


Fig. 13.

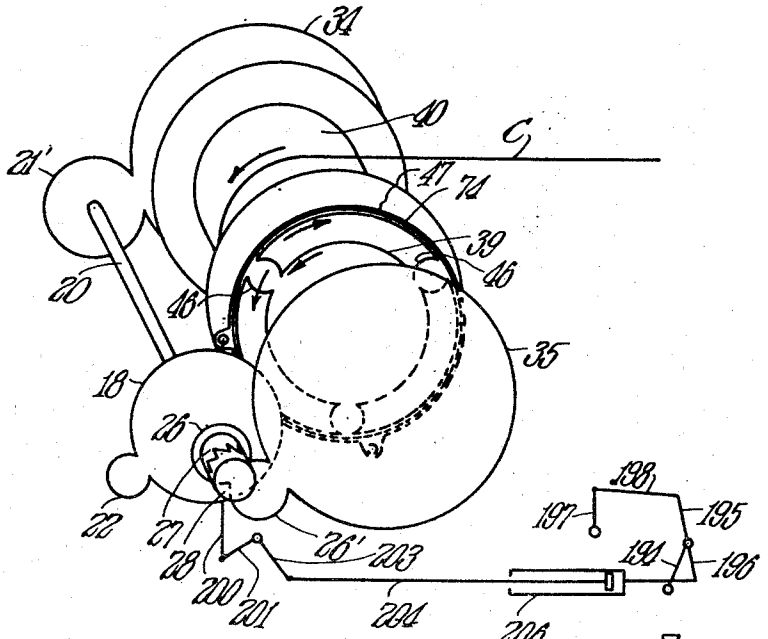
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WINCH

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Fig. 14.



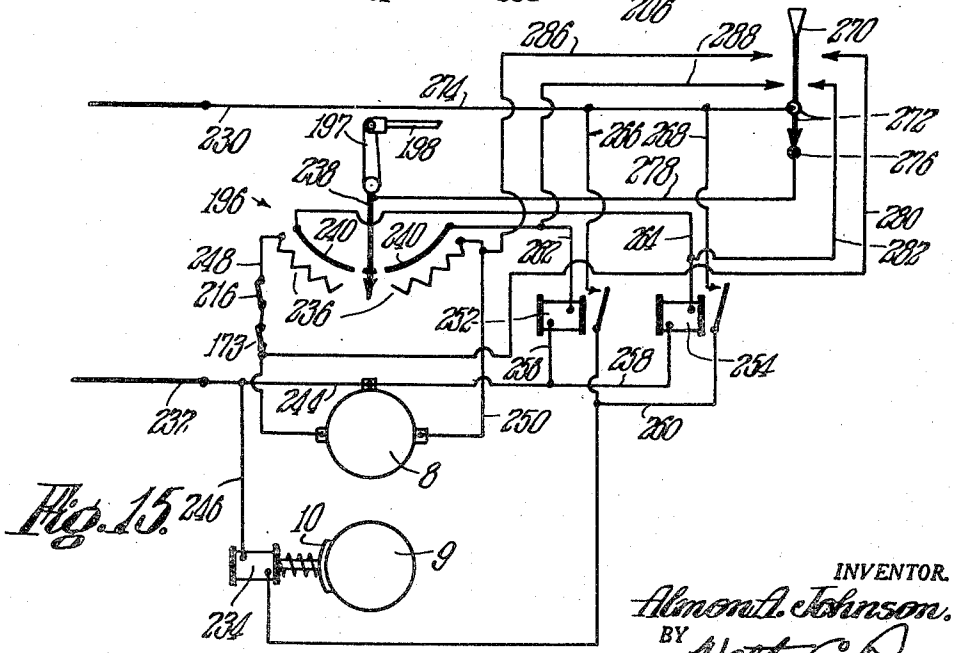


Fig. 15.

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Patented Dec. 17, 1946 2,412,776

UNITED STATES PATENT OFFICE

2,412,776

WINCH

Almon A. Johnson, Forest Hills, N. Y.

Application July 17, 1944, Serial No. 545,298

5 Claims. (Cl. 254—172)

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This invention relates to improvements in winches.

The principal objects of the invention are directed to the provision of a winch which is adapted for various purposes. It is particularly adapted for use as a stern anchor handling gear on a vessel. It is the practice to beach certain vessels by running the prow onto the beach and the winch apparatus of this invention located on the vessel at the stern is adapted to heave in a line which carries an anchor that has been dropped to the bottom thereby to pull the vessel from off the beach.

The winch of this invention is characterized by means for heaving the line at low speed with a high line pull or at high speed with a relatively lower or medium line pull thereby making it possible to exert the necessary effort to free the vessel from the beach and thereafter to rapidly wind up the line. Also with the vessel beached and the line extending from the winch to an anchor astern of the vessel means is provided whereby the line may be kept taut to prevent sidewise movements of the stern of the vessel.

Various novel objects and advantages of the winch of the invention will be hereinafter observed in the accompanying description thereof in the form at present preferred.

In the drawings:

Fig. 1 is a side elevational view of a winch embodying the novel features of the invention;

Fig. 2 is a side elevational view of the clutch shifting mechanism of the winch shown in Fig. 1;

Fig. 3 is a sectional plan view on the line 3—3 of Fig. 1;

Fig. 4 is a front elevational view of the tension control operating stand of the winch;

Fig. 5 is a plan view of the winch shown in Fig. 1 with parts in section;

Fig. 6 is a sectional elevational view on the line 6—6 of Fig. 5;

Fig. 7 is an elevational view of the mechanism yieldingly holding the brake band against movement;

Fig. 8 is a sectional view on the line 8—8 of Fig. 6;

Fig. 9 is a sectional view through one of the connections in the tension control mechanism;

Fig. 10 is an enlarged fragmentary elevational view showing means for locking the drum of the winch against rotation in one direction;

Fig. 11 is an elevational sectional view on the line 11—11 of Fig. 5;

Fig. 12 is an elevational sectional view on the line 12—12 of Fig. 5;

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Fig. 13 is a diagrammatic view showing the gearing of the winch;

Fig. 14 is a perspective diagrammatic view of the gearing to explain certain features of the invention; and

Fig. 15 is a wiring diagram.

Referring now to the drawings in detail, the invention will be fully described.

A frame includes side members 2 and 3 that are secured to and held in spaced relation by transverse members 4, 5 and 6. The frame is preferably formed from metal plate and preformed sections secured together by welding.

A platform 7 extends from the rear end of the frame for supporting a motor 8 which may be of the variable speed reversible type. This motor has a brake drum 9 on its shaft on which a brake shoe or shoes 10 act. These being electrically operated prevent the shaft of the motor from rotating.

A stub shaft 11 carried by a bracket 12 secured to the frame side 3 has an anti-friction, self-aligning bearing 13 thereon, see Fig. 5. A shaft 14 is mounted by anti-friction bearings 15 and 16 in a bracket 17 secured to the frame 2 and in clutch part 27.

A gear 18 fixed on the inner end of shaft 14 is provided with internal teeth 19. A shaft 20 has a coupling 21 fixed on its right hand end which is provided with teeth meshing with the teeth 19 of the gear 18. Said coupling receives an end of the hub of gear 18 as shown. The left-hand end of the shaft 20 has a bull-pinion 21' keyed thereto that is rotatable relative to the stud 11 by means of the anti-friction bearing 13. The stud 11, shafts 14 and 20 constitute what may be called an intermediate shaft. The gear 18 is in mesh with a pinion 22 on the shaft of the motor.

A quill 24 is mounted in the bearing bracket 17 by means of anti-friction bearings 25 and it has a quill pinion 26 keyed thereto. A clutch member 27 is carried by the outer end of the quill 24 and a clutch member 28 is slidable on the end of shaft 14. Keys or splines bring about rotation of the clutch member 28 by the shaft 14. An idler gear 26' is rotatable in bracket 17 that meshes with pinion 26.

A shaft 30 is rotatable at its left end in a bearing 32 of the frame member 3 and it has a bull-gear 34 fixed thereto which meshes with pinion 21'. A quill-gear 35 has a hub part 36 associated therewith that is rotatable in a bearing 37 of frame side 2. Said shaft 30 is rotatable in the hub 36 by means of anti-friction bearings 38

and it has a sun-gear 39 fixed thereto. Said gear 35 is in mesh with idler 26'.

A drum 40 is rotatable on the shaft 30 by means of anti-friction bearings 40'. Studs 44 are carried at one end in the right hand side of the drum and at their opposite ends in a member 45 which is secured to the side of the drum. Pinions 46 on the studs 44 are in mesh with sun-gear 39. A brake drum 47 is carried by a part 48 extending from the hub 36 whereby the gear 35 and brake drum are secured together. Internal teeth 49 carried by the brake drum mesh with pinions 46.

The cable drum 40 is provided with peripherally spaced teeth 50 on its left side and a sprocket 52 is fixed thereto.

The end of a cable is secured to the cable drum and as the cable drum rotates counter-clockwise in Fig. 6 the cable is wound up, otherwise on rotation of the drum in a clockwise direction it pays the cable out.

Means for releasably holding the drum against rotation clockwise for paying out cable include a dog 60 pivoted in a bracket 62, see Fig. 10, that is adapted to engage between the teeth of the drum. A shaft 61 oscillatable in the frame sides 2 and 3 has a lever 63 fixed thereto connected by a link 64 to the dog 60. Outside the frame side 2 there is a foot lever 65 that is fixed to the shaft 61 which carries a projection 66, see Fig. 3. A latch 67 is pivoted at 68 to a block 69 fixed to frame part 2 and a rest 70 is provided for holding the latch in operative position.

As the lever 65 is moved counterclockwise the shaft 61 is moved to swing lever 63 thereby to cause link 64 to swing the dog 60 from engagement with the teeth of the cable drum. As the lever 65 is so swung the projection 66 thereof engages the hooked inner end of latch 67 whereby it is swung upwardly so that the said hooked end of the latch engages the projection and holds the lever 65 in the out position of the dog. The lock may be moved to release the lever 65 by pressing on its outer end.

A brake band 74 which may include an outer metallic band lined with suitable material is provided. A bracket 75 is secured to the lower end of the band, see Fig. 7. A spring housing 76 has trunnions 77 on opposite sides thereof that are journalled in a plate 78 and a bearing 79 fixed to the frame side 2. Said housing has two spring chambers such as 80 therein.

Rods such as 81 are carried by a cross-head 82 that is connected to the member 75 of the brake band. Springs 82' around the rods are disposed between the ends of the chambers and abutments 83 at the ends of the rods.

With the brake band 74 frictionally engaging the brake drum the springs 82' resist movement of the brake band in a clockwise direction.

As shown in Fig. 6, the brake band is split at 86 and brackets 87 and 88 are secured to opposite ends thereof. The bracket 88 has worm gears such as 89 rotatable therein by means of anti-friction bearings 90. A transverse shaft 92 carries worms 93 that mesh with the gears 89 and rods 94 are in threaded engagement with the said gears.

A shaft 95 rotatable in a bracket 96 extending from the frame side 2 has a hand wheel 97 at one end while its other end is connected by a universal joint 98 to the shaft of a gear 99 in mesh with a gear 100 on shaft 92. The rods 94 are pivotally connected at 101 to the bracket 87.

Accordingly as shaft 95 is rotated in one direction or the other, the gears 89 are rotated to move the rods 94 in one direction or the other. In this way the brake band is adjusted to release the brake drum or it is frictionally engaged, as may be desired.

Means for guiding the cable transversely of the cable drum will now be described with particular reference to Figs. 5 and 11.

Brackets 104 and 105 are carried by the frame sides 2 and 3. Spaced guide rods 107 have opposite ends fixed in the brackets and a shaft 108 has opposite ends rotatable in the bearings 104 and 105 by means of anti-friction bearings 109.

A drive shaft 110 below the shaft 108 has its rear end rotatable in the frame side 3 and it has a sprocket 111 fixed thereto. A chain 112 in engagement with sprocket 111 and the sprocket 52 associated with the drum whereby the shaft 110 is rotated by said drum.

The forward end of the drive shaft 110 is rotatable in a sleeve 114 that is rotatable in the bracket 104. A hand wheel 115 is fixed to the outer end of the sleeve 114 and a clutch member 116 is slidable in and out on the outer end of shaft 110. A key 117 fixed on said shaft 110 prevents rotation of the member 116 relative to the shaft and a member 118 fixed on the shaft has teeth which are engageable with teeth on member 116. When the member 116 is in clutching position the sleeve 114 is rotated by the shaft 110. When in an outer position, the sleeve and 110 are disconnected. In this position the sleeve may be rotated by the hand wheel 115.

A gear 120 is fixed to the sleeve 114 which meshes with a gear 121 fixed to a gear 122. Said gears 121 and 122 are rotatable on a stud 123 of bracket 104 and the latter gear 122 is in mesh with a gear 123' fixed to shaft 108. Thus with the member 116 in clutching position the shaft 108 is rotated by the drive shaft 110.

A carriage 125 is slidable on the rods 107 and a dog 126 pivoted in the carriage works in a right and left hand spiral groove 127 of shaft 108. As said shaft 108 rotates the carriage is moved back and forth therealong.

Vertically extending rods 128 carried by the carriage have rolls 129 thereon and an upper member 130 associated with said rods 128 has arms 131 between which a roll 132 is journalled. A sheave 133 is journalled at 134 in the carriage.

A cable is represented by C and it passes between the rolls 129 which cooperate with the sheave 133 to guide the cable onto the drum as the carriage moves back and forth during rotation of the drum.

Means for bearing on the cable to insure that the cable is wound snugly on the drum will now be described with reference to Figs. 5 and 12.

A bracket 140 is secured to the transverse member 4 and it has spaced bearing parts 141 in which are disposed opposite ends of a tube 142. The tube 142 surrounds but is out of contact with shaft 20.

Hubs 143 are clamped to the end portions of tube 142 and have upper and lower arms 144 and 145 extending therefrom. Side plates 146 are pivoted at 147 to the arms 144 and have rolls 148 rotatable in opposite ends thereof. Transverse members 149 extend between the members 144 to provide therewith a rigid structure.

A spring housing 150 is secured to the frame part 4 and a rod 151 pivoted to the lower end of arm 145 has a spring 152 therearound that is disposed between an abutment 153 thereon and frame part 4. The spring 152 urges the arm 145 clockwise so that arms 144 act on the members

146 thereby to cause rolls 148 to bear on cable on the drum and cause it to be snugly wound thereon.

Means for operating clutch member 28 will now be described with reference to Figs. 1 and 2.

A bracket 160 secured to frame side 2 has upwardly extending side plates 161 in the upper ends of which a shaft 162 is oscillatable. Levers 163 fixed to the shaft 162 have a ring 164 pivoted in their upper ends which is disposed in a groove 165 of the clutch member 28. A lever 166 arranged for manual engagement has a depending part 167. A foot treadle 168 is pivoted at 169 and has side parts at opposite sides of part 167 and a foot engageable member 170. A spring 171 has its upper end secured to one of the members 161 and its lower end secured to treadle 168 to urge said treadle upwardly against a stop 172.

A switch device 173 is secured to one of the plates 161 and it has a movable member 174 engageable by a cam 175 of treadle 168. As the treadle 168 is moved downwardly the part 174 of the switch is actuated. The lever 166 is moved inwardly to engage clutch 28 with clutch 27 and the treadle 168 may be depressed so as to lie below the lower end of lever 167 and hold the lever 167 in clutch engaging position.

The tension control mechanism will now be described with particular reference to Figs. 1, 4 and 6.

A stand 180 is secured to the frame side 2 which is tubular in form and carries a cap 181 on its upper side. A shaft 182 rotatable therein has a hand wheel 183 fixed thereto for rotating the same. Said shaft 182 is threaded and a nut 184 in threaded engagement therewith carries an index 185 that is disposed in a vertical slot 186 so as to be registerable with indicia on the stand.

A link 187 has its upper end pivoted to the block 184 and its lower end pivotally connected to a lever 188 that is fixed to the front end of a transverse shaft 189 journalled in the frame. A lever 190 fixed to the rear end of said shaft 189 has a rod 191 pivotally connected thereto at its one end. Said rod 191 has its opposite end pivotally connected to a lever 192 which is fixed to a shaft 193 journalled in frame side 3. A lever 194 is also fixed to shaft 193. A lever having an upper part 195 and a lower part 196 is pivoted to the upper end of lever 194.

A control mechanism 196' is secured to the outerside of frame side 3 and it has a lever 197 fixed to a shaft for operating the same, that is disposed inside of frame side 3. A connecter 198 connects the lever 197 to the lever 195.

Lugs 199 carried by the brake band 74 are connected by a rod 200 to a lever 201 fixed to a shaft 202 rotatable in the frame. A downwardly depending lever 203 is also fixed to shaft 202 and it is connected by the connector mechanism 204 to the lever 196.

The member 204 has a rod 205 fixed thereto that is reciprocable in a tube 206, see Fig. 9. The inner end of rod 205 carries a head 207 that is slidable in a lining 208 of the tube 206 and concentrically arranged springs 209 and 210 surrounding the rod 205 are disposed between the head 207 and the stuffing box construction 211 of the tube 206.

The switch device 216 shown in Fig. 10 may be called a dog limit switch and has a lever 215 operable by a cam 217 fixed to shaft 61. This device is included in circuits and operated in such a way as to open the circuits so that the drum may not

be rotated counterclockwise or in paying out direction while dog 60 is holding the drum against rotation.

The switch device 173 of Fig. 2 is also included in circuits, to be described, and has a lever engageable by a part 175 of lever 167.

The diagram of Fig. 15 will now be described.

Lines of a power supply are shown at 230 and 232. The motor is shown at 8 and the brake drum associated therewith at 9. A brake shoe 10 is held in engagement with the brake 9, as shown, and a solenoid for releasing the brake shoe is shown at 234.

The control mechanism 196 may include resistance members 236 and a swingable arm 238 for traversing the same that is actuated by the lever 197. Contact bars 240 are also traversed by said arm 236.

Line 232 is connected to the motor by 244 and to one side of solenoid 234 by 246. A line 248 connects an end of one resistance to the motor. A connection 250 extends between the other resistance and the motor.

Relays 252 and 254 have one side connected to 244 by lines 256 and 258. The movable members of the relays, as shown, are connected to solenoid 234 by 260. The other side of the relays are connected to the bars 240 by 262 and 264. Lines 266 and 268 connect the contacts of relays to power line 230 through 274. The components described constitute the automatic tension control features later to be referred to.

A manual control may include a lever 270 pivoted at 272 and connected to line 230 by 274. The lever 270 is shown in neutral position and is in contact with a contact 276 that is connected by 278 to 238. Contacts on one side of lever 270 are connected by 280 and 282 to 248 and 264 and contacts on the other side are connected by 286 and 288 to 250 and 262.

In describing the operation of the apparatus it will be assumed that the same is secured to the stern portion of a ship for hauling the ship from the beach after its prow has been beached thereon.

To accomplish this the cable has an anchor fast to its free end. The cable is wound up on the drum and the anchor is let go when the ship is the desired distance from the beach, say several boat lengths.

To drop the anchor the brake band 74 is released by manipulation of hand wheel 97 with the clutch members 27 and 28 disengaged as in Fig. 2. The cable-drum rotates clockwise or in paying-out direction, the anchor bringing up on the bottom.

Slack cable may be taken up by operation of the motor and if necessary prior to releasing the anchor the motor may be operated to raise the anchor from any rest that it may be supported by in order to free the anchor for letting it go.

With the ship on the beach and the line extending from the drum to the anchor the stern of the ship may be moved back and forth by wind or wash so that the ship pivots on its prow. This in some cases is objectionable and is overcome by the tension control mechanism.

The brake band is tightened on the drum by wheel 97 and the motor, of course, is held against rotation by its brake so that movements of the ship put a strain on the cable. Such a strain tends to rotate the brake drum in paying-out direction so that planet pinions carried thereby and meshing with the now stationary sun-gear 39 tends to move the ring gear 49 and with it the

brake and brake-band 74. The springs 82, see Fig. 7, are adapted to prevent rotation of the brake-band up to the certain strain on the cable for which they are intended. When the certain strain is exceeded, however, the brake-band is moved so that through the connections and levers 200, 201, 206, 196, 195, 198, 197 (see Fig. 6), the mechanism 196 is operated.

With the ship beached the tension adjusting means is set so that the tension on the cable and the springs 82 are in balance. The members 240 and 236 at one side of movable member 238 of mechanism 196 may be for energizing the motor for paying out rotation of the cable drum while the corresponding elements on the opposite side of member 238 are for heaving-in rotation of said motor and cable drum. The central position of member may be called the "neutral" or "off" position.

Assuming the vessel is acted upon by wind or waves to cause it to swing and produce an excessive strain on the line, the brake-band is moved clockwise by the brake so as to operate member 238, through the connections described, and swing it into contact with 236 and 240 for energizing of the motor in paying out rotation. Thus the drum is operated to pay out cable to relieve the excess strain.

When the excess strain subsides, the ship tends to move back to its original position, due to line tension, and as the force of the springs 82' becomes greater than the line tension so that the brake-band moves counter-clockwise the contact arm 238 contacts 236 and 240 for energizing the motor in heaving-in rotation of the drum so as to recover cable paid out.

That is, when the excess strain subsides so that strain on the cable become normal, contact arm 238 moves to "neutral" or "off" position. This de-energizes motor and solenoid brake so as to stop the winch and hold the strain.

The manual control may be operated at any time for either paying out or heaving-in cable, and when operated the automatic tension control is cut out.

The automatic tension control may be adjusted by moving member 184 up and down, see Fig. 4. As said member is moved up or down it, through link 187, lever 188, shaft 189, lever 190, rod 191 and levers 192 and 194 shifts the pivotal connection of lever 194 with lever 195 and 196 so that movement of the brake-band operates on lever 197 according to the adjustment. That is, the brake-band may actuate lever 197 and arm 238 so as to produce a greater or less motor torque by moving arm 238 relative thereto in such a way that it cuts out more resistance in the motor circuit for additional torque. Thus the tension control may be adjusted so that when a certain predetermined tension on the cable is exceeded the control mechanism is put into operation for paying out and heaving in cable.

When the apparatus is to haul the ship from the beach, the cable-drum is rotated in heaving in direction, first at low speed and high line pull and subsequently at a higher speed with lower line pull. To accomplish this the brake-band 74 is disengaged from the brake-drum 47, the motor brake solenoid 234 and the motor 8 are energized, and the clutch members 27 and 28 are engaged.

Under these conditions the sun gear 39, through gears 34, 21', 18 and 22 connecting it to the motor, is rotated counterclockwise as shown by the full line arrow in Fig. 14.

Ring-gear 49, carried by the brake-drum 47, when the brake-band 74 is disengaged from said brake-drum 47, is free to rotate but is connected to the sun-gear 39 through planet-gears 46. Also said ring gear is connected through gears 35, 26', 26 and disengageable clutch members 27 and 28 to the intermediate shaft construction.

The rotation of ring-gear 47 and gear 35 fixed thereto is limited to a speed less than that of the sun-gear 39 due to the greater gearing ratio between 35 and the intermediate shaft relative to the ratio between the sun-gear 39 and said shaft.

The ring-gear tends to retreat in a clockwise direction because of pull on the cable but its speed being dependent on the ratio between gears 35 and 26, the result is that under a pull on the cable within the capacity of the apparatus the axes of pinions 46 are rotated counterclockwise thereby to rotate the cable drum in that direction or in heaving in direction at low speed and high line pull. Thereby the ship is pulled free of the beach.

When the ship is free of the beach less torque is necessary so that the cable will usually develop slack. It is desired to speed up the heaving-in operation and prevent fouling of the cable. To accomplish this as stated the apparatus is adapted for operation at high speed.

For high speed operation with the motor brake off and the motor operating in heaving-in direction the brake band 74, which has been released from brake drum 47 for low speed operation, is tightened by manipulation of the band wheel 97 to arrest rotation of the brake drum 47 and thereby the ring-gear 49. The sun-gear 39 driven from the motor through gears 34, 21', 18 and 22 causes the planet pinions 46 which are rotatable on the cable-drum to roll on or to rotate relative to the now stationary ring-gear 49 thereby to rotate the cable-drum in heaving-in or counterclockwise directions at high speed with lower line pull.

The tightening of the brake band 74 which slows down and ultimately stops the brake drum and ring-gear carried thereby so that gear 26 and clutch member 27 come to rest. As the cable drum accelerates to high speed the clutch-member 28 overrides clutch member 27 so that it is thrown outwardly by 27 thereby disconnecting pinion 26 from the intermediate shaft.

When the clutch members 27 and 28 are disengaged as in Fig. 2, the lower end of lever 167 is disposed within the U-shaped lever 168. To throw the clutch members into engagement for low speed operation the lever 168 is depressed and lever 166 is moved to the left, whereupon its lower end 167 is disposed over the outer end part of lever 170 which is urged upwardly thereagainst by spring 171.

When the rotation of cable drum accelerates from low to high speed as aforesaid, so as to throw clutch member 28 outwardly and thereby swing the lever 167 inwardly, the said lever 167 passes from off lever 168 which is urged upwardly by spring 171 to the position shown.

It may be noted that with the brake-band disengaged from the brake-drum and the clutch members disengaged that the cable-drum is free for rotation by the pull of the cable while with the cable-drum held stationary the motor and intermediate shaft may be rotated.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being

indicated by the appended claims rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. The combination in apparatus of the class described of a prime mover and a cable drum rotatable in paying-out and heaving-in directions with operative connections comprising, an intermediate shaft and a drum shaft on which said cable drum is rotatable, gearing positively connecting said shafts, a sun-gear fixed on said drum shaft, a ring gear rotatable relative to said drum shaft, other gearing connected to said ring gear including a driving gear rotatable on said intermediate shaft, pinions rotatable on said drum engaging said sun and ring gears, releasable clutch means for engaging said driving gear and intermediate shaft, and holding means for releasably engaging and holding said ring gear against rotation, all adapted and arranged whereby with the holding means released and said clutch means engaged said ring-gear may be driven from the driving gear at a speed relative to that of the sun-gear as it is driven from the intermediate shaft so that the cable drum is rotated by the pinions at a low speed, while when said ring-gear is held the drum is rotated at a relatively higher speed.

2. The combination in apparatus of the class described of a prime mover and a cable drum rotatable in paying-out and heaving-in directions with operative connections comprising, an intermediate shaft and a drum shaft on which said cable drum is rotatable, gearing positively connecting said shafts, a sun-gear fixed on said drum shaft, a ring gear rotatable on said drum shaft, other gearing connected to said ring gear including a driving gear rotatable on said intermediate shaft, pinions rotatable on said drum engaging said sun and ring gears, clutch means for engaging said driving gear and intermediate shaft, and holding means for releasably engaging and holding said ring gear against rotation, all adapted and arranged whereby with the holding means released and said clutch means engaged said ring-gear may be driven by the said pinions with the clutch means restraining free rotation thereof so that the drum is rotated by the pinions at a low speed, while when said ring-gear is held the drum is rotated at a relatively higher speed, said clutch means adapted to disengage at said higher speed.

3. Apparatus of the class described comprising in combination, a drum-shaft, a drum rotatable thereon, a rotatable intermediate shaft, intermeshing gears fixed on said drum and intermediate shafts, a sun-gear fixed on said drum shaft, a driving gear rotatable on said intermediate shaft, one way clutch means for releasably clutching said driving gear to said intermediate shaft including engageable parts fixed to said gear and shaft, fixed together gears rotatable on the drum shaft including a ring-gear and a driven gear operatively connected to the driving gear, planet pinions on the cable drum meshing with the sun and ring gears, a brake-drum fixed to the ring gear, a brake-band releasably engageable with said drum to hold it and said ring-gear against rotation, all adapted and arranged whereby on rotation of the intermediate shaft with the brake-drum released and the clutch means engaged the ring gear will be rotated at a speed relative to that of the sun-gear so that through the planet pinions the cable-drum is rotated at low speed, while when the brake-drum is held against rotation said cable drum is rotated at high speed and said clutch means is automatically disengaged by the part thereof fixed to said intermediate shaft overriding the part fixed to said driving gear.

4. Apparatus of the class described comprising in combination, a drum-shaft, a cable drum rotatable thereon, a rotatable intermediate shaft, intermeshing gears fixed on said drum and intermediate shafts at one side of said cable drum, a sun-gear fixed to said drum shaft at the other side of said cable drum, a driving gear rotatable on said intermediate shaft, one-way clutch means for releasably clutching said driving gear to said intermediate shaft, fixed together gears rotatable on the drum shaft at said other side of the drum including a ring-gear and a driven gear operably connected to the driving gear, pinions on the cable drum meshing with the sun and ring gears, a brake-drum fixed to the ring gear, a brake-band releasably engageable with said brake drum to hold it and said ring-gear against rotation, all adapted and arranged whereby on rotation of the intermediate shaft when the brake-drum is released and the clutch means is engaged the ring gear may be rotated at a speed relative to that of the sun-gear so as to rotate the cable-drum through the planet pinions at low speed while when the brake-drum is held against rotation said cable-drum is rotated at high speed and said clutch means is automatically disengaged.

5. Apparatus of the class described comprising in combination, a drum-shaft, a cable drum rotatable thereon, a rotatable intermediate shaft, intermeshing gears fixed on said drum and intermediate shafts, a sun-gear fixed to said drum shaft, a driving gear rotatable on said intermediate shaft, one-way clutch means for releasably clutching said driving gear to said intermediate shaft, fixed together gears rotatable on the drum shaft including a ring-gear and a driven gear operatively connected to the driving gear, pinions on the cable drum meshing with the sun and ring gears, a brake-drum fixed to the ring gear, a brake-band releasably engageable with said drum to hold it and said ring-gear against rotation, all adapted and arranged whereby on rotation of the intermediate shaft when the brake-drum is released and the clutch means is engaged the ring gear may be permitted to rotate at a slower speed than that at which the sun-gear is rotated thereby to rotate the cable-drum at low speed, while when the brake-drum is held against rotation said cable drum is rotated at high speed and said clutch means is disengaged, a motor operatively connected to said intermediate shaft, circuit means connected to said motor including variable control resistance means to vary the torque of said motor, and tension control means operably connected to said control means.

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