

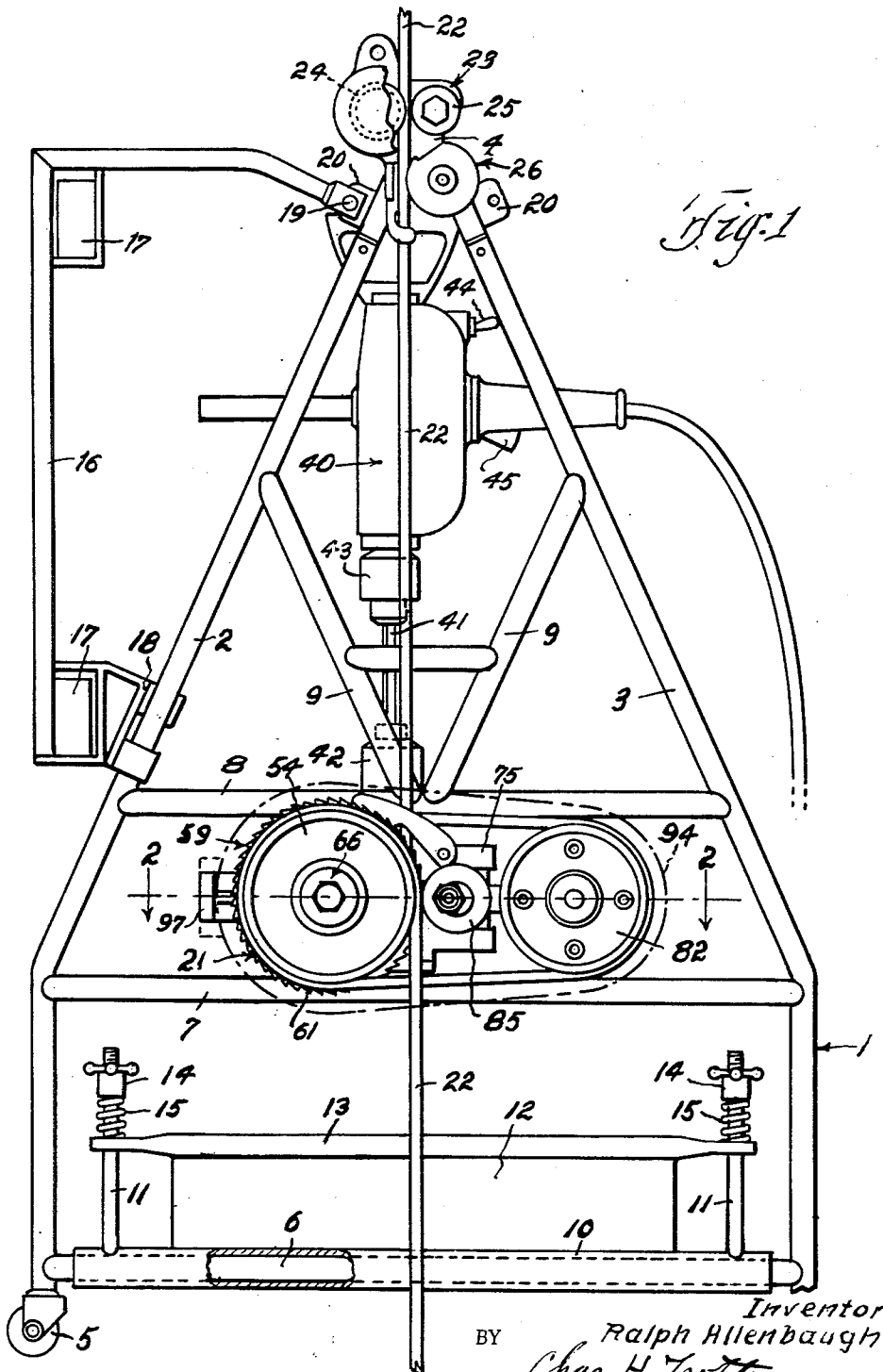
May 31, 1960

R. ALLENBAUGH
HOISTING MECHANISM

2,938,707

Filed April 1, 1958

6 Sheets-Sheet 1



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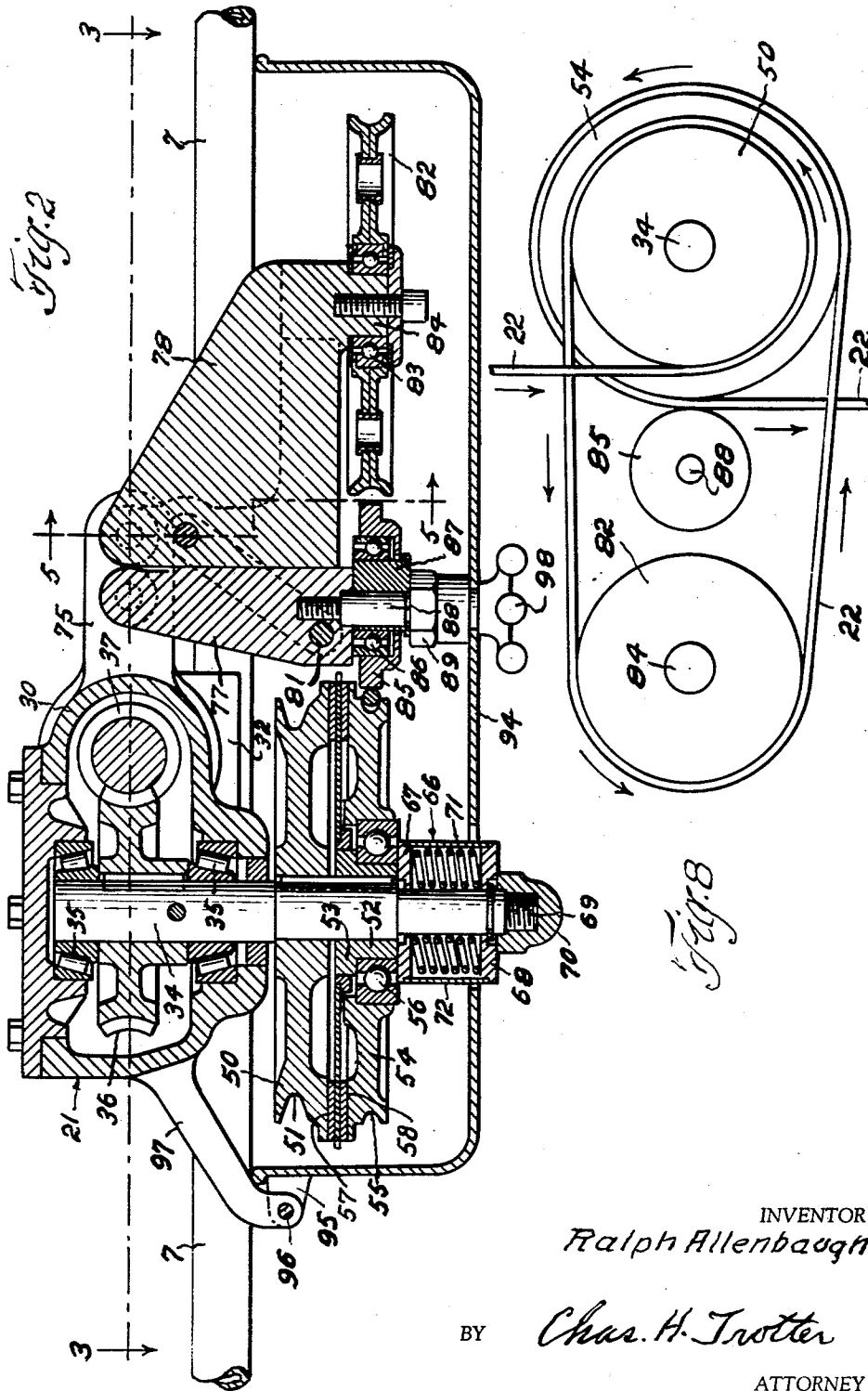
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6 Sheets-Sheet 2



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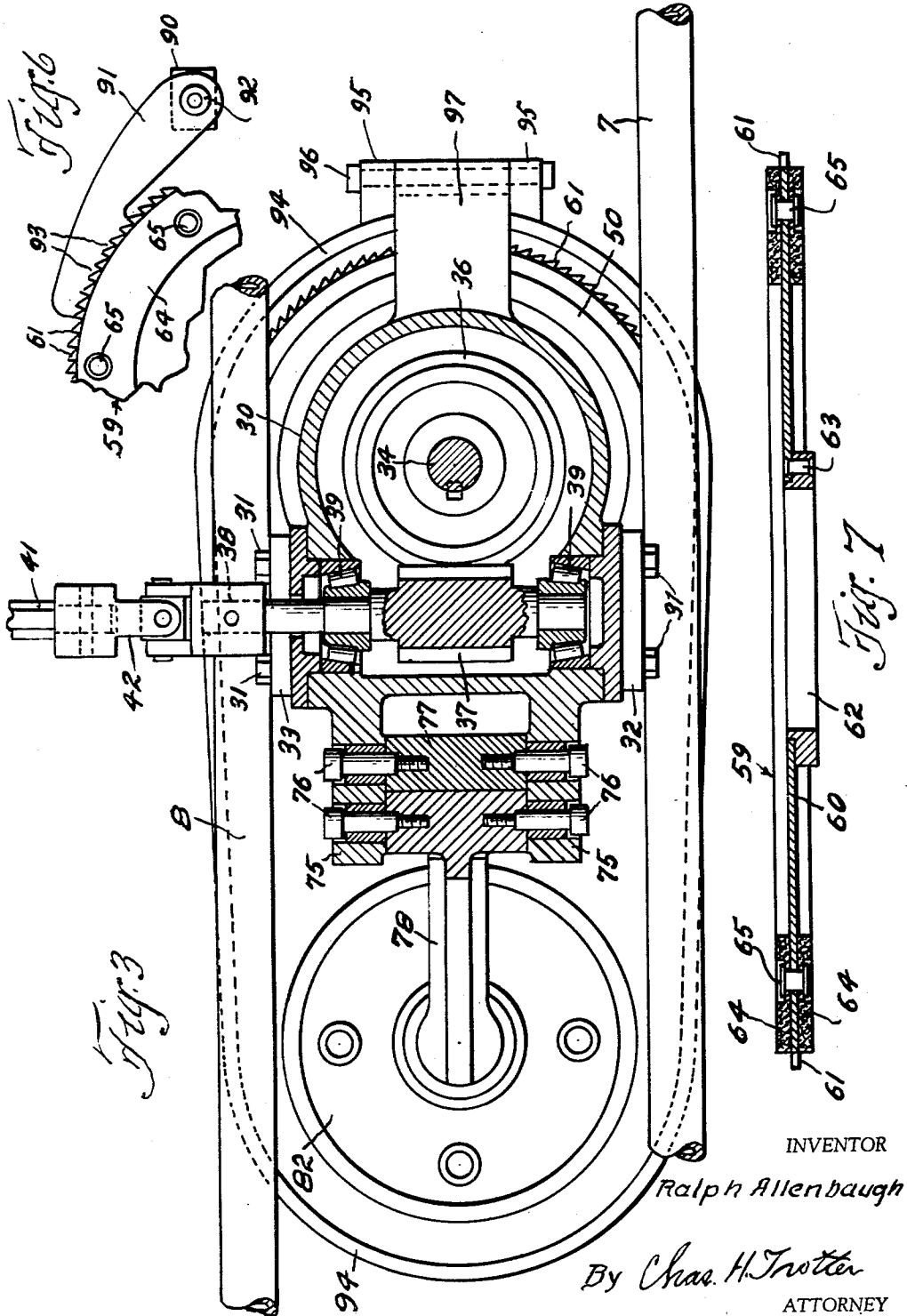
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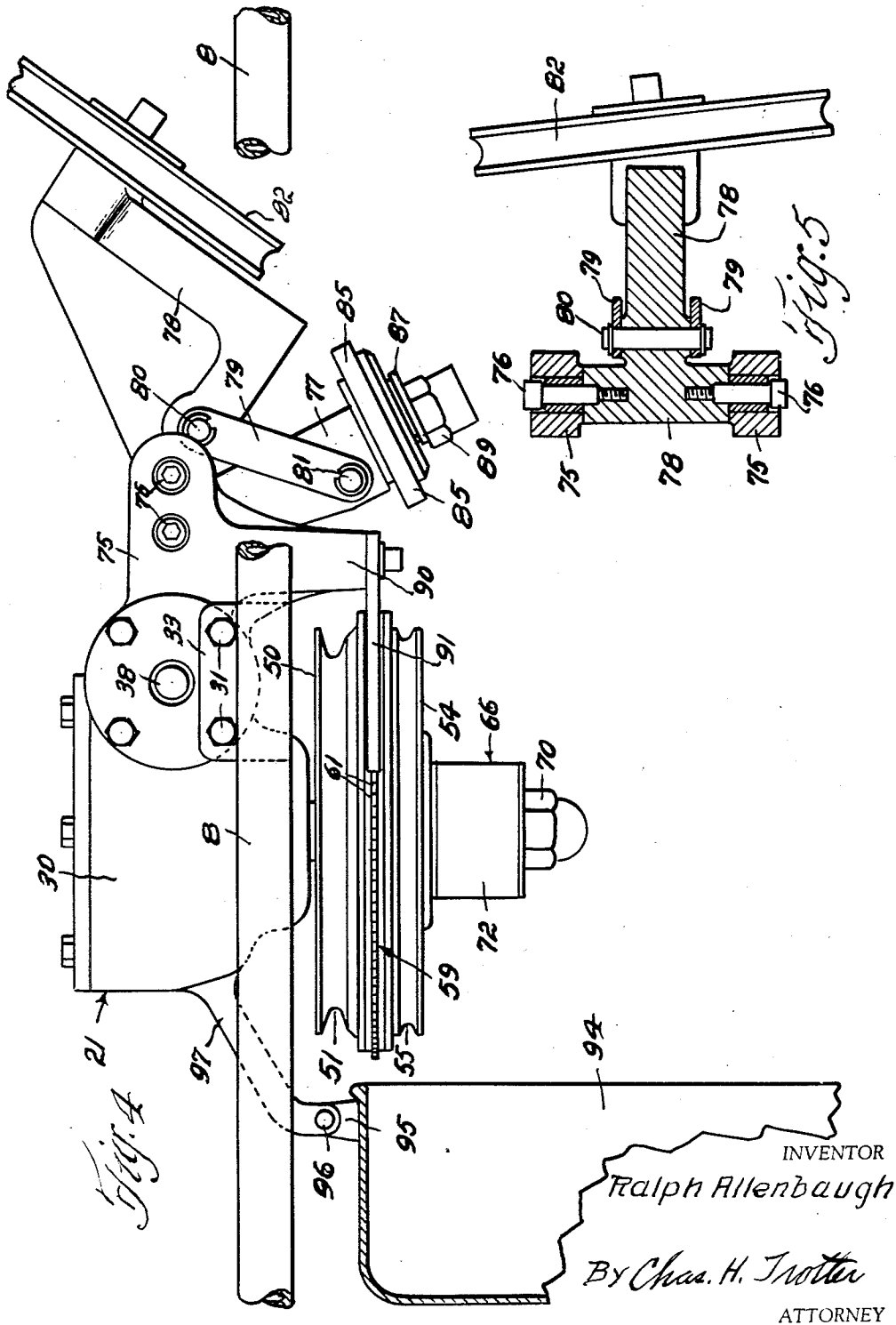
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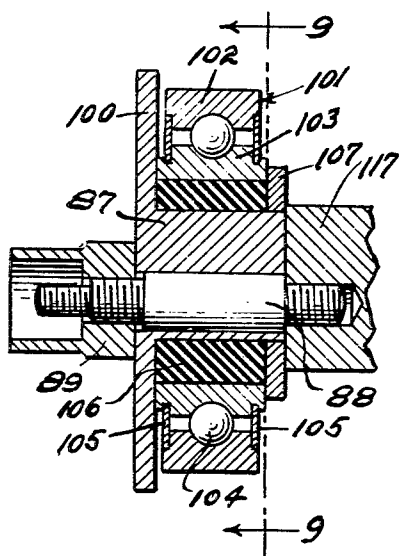
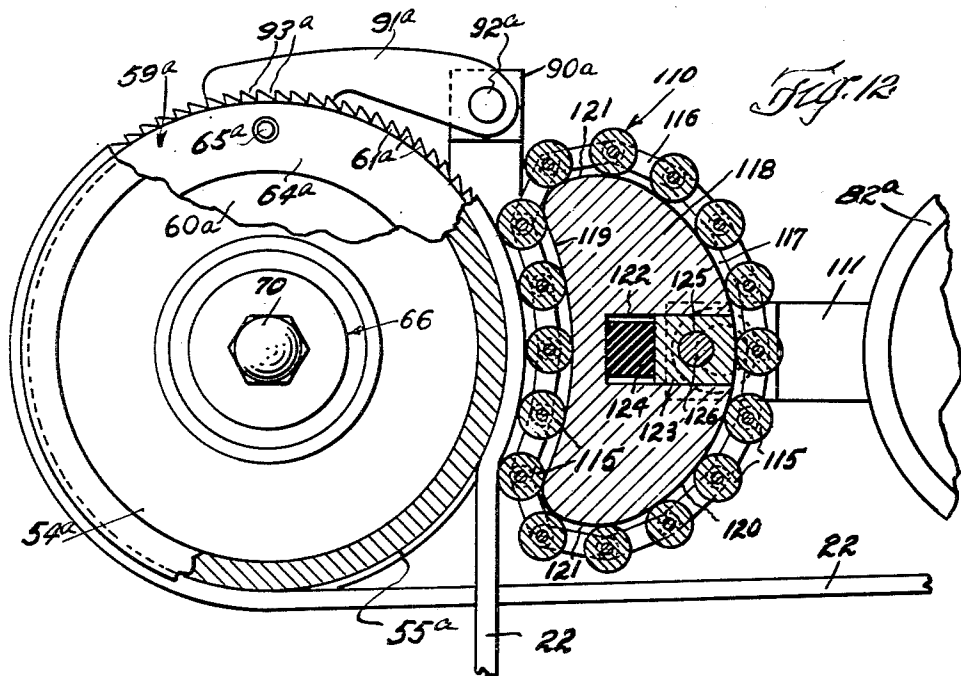
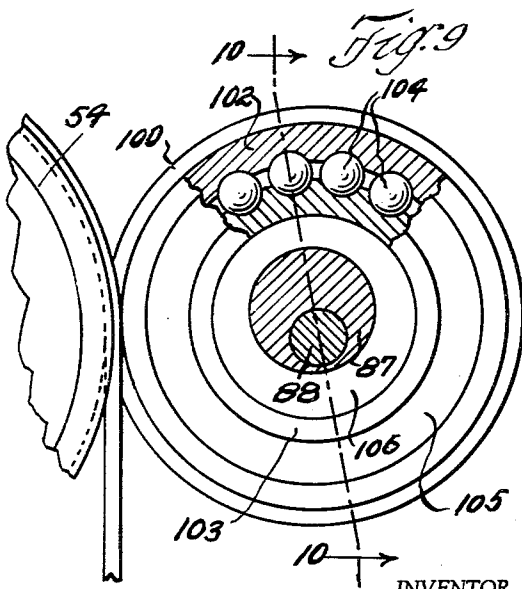


Fig. 10



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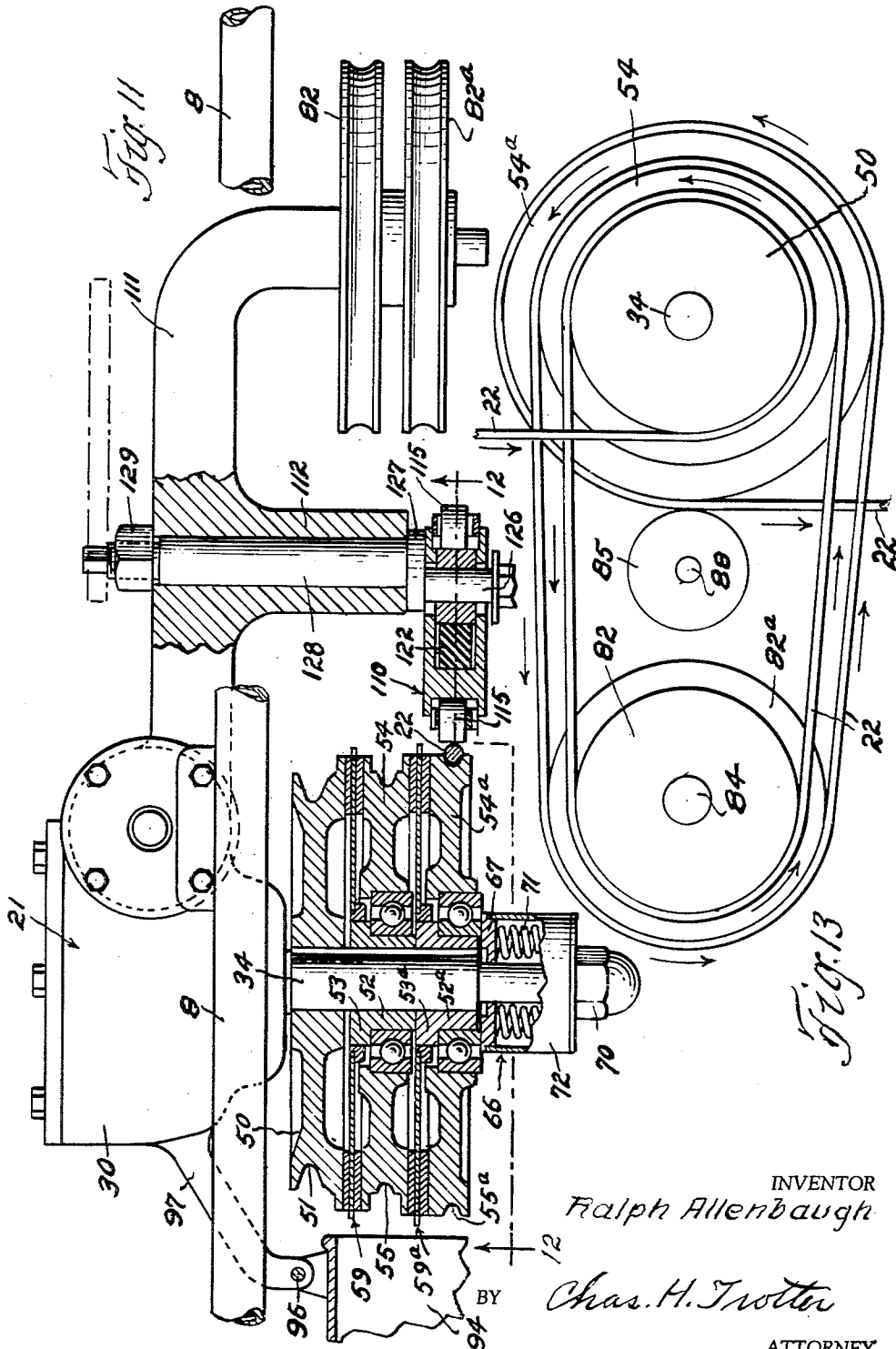
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HOISTING MECHANISM

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6 Sheets-Sheet 6



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2,938,707

HOISTING MECHANISM

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Filed Apr. 1, 1958, Ser. No. 725,561

13 Claims. (Cl. 254—150)

This invention relates to a power actuating hoisting mechanism. The mechanism is especially designed for use with swing stage scaffolds which are adapted to be suspended beside a wall for use during construction, repair and painting work. Swing stage scaffolds generally comprise a pair of spaced stirrups by and between which is supported a swing stage plank. The stirrups are suspended from overhead supporting means and are adapted to be raised and lowered by block and tackle mechanisms. According to the present invention, one hoisting mechanism is incorporated in each of the stirrups and the scaffold is suspended by a pair of spaced parallel single strands of cable which depend from a pair of fixed overhead supports. But although the mechanism was especially designed for use with swing stage scaffolds, it is equally well adapted for use with suspended cages; and for operating temporary hoists or elevators such as are used in construction work.

The hoisting mechanism of this invention is so constructed and arranged that it, in effect, climbs up and down a single strand of suspended cable. Various other power operated hoisting mechanisms which operate in this general manner have been designed, but all of them have certain inherent defects such as excessive cable wear, complicated construction, excessive weight, and high cost of construction.

The principal object of this invention is therefore to provide a hoisting mechanism of the aforesaid character which is of simple construction, is light in weight, is very efficient in operation, and is relatively inexpensive to manufacture.

As shown herein the hoisting mechanism comprises a casing which is adapted to be permanently secured to a vertically disposed supporting frame, such as the stirrup of a swing stage scaffold, adjacent the lower end thereof. A horizontally disposed shaft is rotatably mounted in this casing with one end thereof extending out from the casing. The shaft has a worm gear secured thereto, within the casing, through which the shaft is rotated in either direction by a meshing worm which is adapted to be rotated by a reversible electric motor through suitable reduction gearing.

A traction pulley is keyed to the outer section of the shaft adjacent the casing, and a tension pulley of slightly greater diameter than the traction pulley is rotatably mounted on the shaft adjacent the traction pulley. The traction and tension pulleys are provided with opposed smooth faces between which is interposed friction disk clutch means which comprises a thin metal disk which is rotatably mounted on the shaft and is faced on each side thereof with friction brake material. Spring means is mounted on the end of the shaft by which the traction and tension pulleys and the interposed clutch disk are all yieldingly held in firm contact with each other. The periphery of the clutch disk is provided with ratchet teeth which are engaged by a pivoted pawl mounted on the casing. This construction is such that the tension pulley is rotated by the traction pulley through the clutch

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means when the traction pulley is rotated in one direction, and when the traction pulley is rotated in the opposite direction the tension pulley is held against rotation by the engagement of the pawl with the ratchet teeth on the clutch disk.

A guide pulley is rotatably mounted, by suitable means, at one side of and in spaced relation to the traction and tension pulleys; and cable guide means is mounted on the frame at the upper end thereof in vertically spaced relation to the periphery of the traction pulley.

In use the cable extends down through the cable guide means and then down under and up around the traction pulley. From the top of the traction pulley the cable extends over and down around the guide pulley which is provided to guide the cable from the traction pulley onto the tension pulley. From the guide pulley the cable extends under and up around the tension pulley and then hangs loosely downwardly therefrom. Adjustable cable pressure means is provided by which the cable is yieldingly held in firm contact with the tension pulley. When the traction pulley is rotated in a direction to raise the mechanism (clockwise as shown in the drawing) the tension pulley will be rotated in the same direction by the traction pulley through the friction clutch disk. The cable will thereby be wound onto the traction pulley from the bottom thereof and withdrawn from the top of the traction pulley under tension at the same rate by the tension pulley which always maintains the cable in firm contact with the periphery of the traction pulley. This is due to the diameter of the tension pulley being slightly greater than the diameter of the traction pulley. The tension pulley is therefore rotated at the same peripheral speed as the traction pulley but at a slightly lesser r.p.m., there being a slight slippage between the tension pulley and the clutch disk and/or between the traction pulley and the clutch disk. The tension applied to the cable by the tension pulley is dependent upon the adjustment of the spring means by which the opposed faces of the traction and tension pulleys are held in yielding contact with the faces of the clutch disk.

When the traction pulley is rotated in a direction to lower the mechanism (counter-clockwise as shown in the drawing) the clutch disk is held stationary by the ratchet and pawl means which prevents rotation of the tension pulley by the traction pulley. The cable is then withdrawn from the bottom of the tension pulley and over the top of the traction pulley and then down and around the bottom thereof. As the cable is withdrawn from the tension pulley the cable rotates the tension pulley and is held under tension due to the engagement of the face of the tension pulley with the now stationary clutch disk. From the foregoing it will be seen that the hoisting mechanism actually climbs up and down a single strand of suspended cable when raising and lowering a supporting means secured thereto.

As a modification of the hoisting mechanism just described, which is adapted for use with heavier loads, I provide a second tension pulley, a second friction disk clutch means, a second ratchet and pawl holding means by which the second clutch disk is held stationary when the traction pulley is rotated in a lowering direction, and a second guide pulley by which the cable is guided from the first tension pulley onto the second tension pulley. The second tension pulley, which is similar to the first tension pulley but of slightly greater diameter, is rotatably mounted on the shaft between the first tension pulley and the spring means with the second clutch means, which is similar to the first clutch means, interposed between the first and second tension pulleys. The cable is wound down under and up around the traction pulley and then over and around the first guide pulley. From the first guide pulley the cable passes under and up around the

first tension pulley. From the first tension pulley the cable passes around the second guide pulley and then over and down from the second tension pulley. The pressure means is then mounted in position to the cable in firm contact with the second tension pulley. When the traction pulley is rotated in a raising direction, it through the first clutch means rotates the first tension pulley which through the second clutch means rotates the second tension pulley; and when the traction pulley is rotated in a lowering direction the first clutch means and tension pulley are held stationary by the first ratchet and pawl means and the second clutch means and tension pulley are held stationary by the second ratchet and pawl means. The second tension pulley maintains the cable tight on the first tension pulley which in turn maintains the cable tight on the traction pulley, in the same manner as previously described, during both raising and lowering rotation of the traction pulley.

Having stated the principal objects of the invention, other and more limited objects thereof will be apparent from the following specification and the accompanying drawings forming a part thereof and in which:

Fig. 1 is a side elevation of a swing stage scaffold stirrup having my new hoisting mechanism mounted thereon;

Fig. 2 is a horizontal section, on a larger scale, taken substantially on the line 2—2 on Fig. 1;

Fig. 3 is a vertical section taken substantially on the line 3—3 on Fig. 2;

Fig. 4 is a plan view of the hoisting mechanism showing the various parts in position for applying or removing the cable;

Fig. 5 is a vertical sectional view taken on the line 5—5 on Fig. 2;

Fig. 6 is a fragmentary detail view in side elevation of the ratchet and pawl mechanism;

Fig. 7 is an enlarged detail sectional view of the clutch disk;

Fig. 8 is a diagrammatic view illustrating the manner in which the cable is applied to the hoisting mechanism;

Fig. 9 is a detail sectional view of a modified type of pressure means by which the cable is yieldingly held in firm contact with the tension pulley, the plane of the section being indicated by the line 9—9 on Fig. 10;

Fig. 10 is a vertical sectional view taken on the line 10—10 on Fig. 9;

Fig. 11 is a view similar to Fig. 2 showing a modified type of hoisting mechanism in which two tension pulleys are provided and in which another modified type of pressure means is shown;

Fig. 12 is a sectional front elevation of the modification shown in Fig. 11, as viewed from the line 12—12 on Fig. 11; and

Fig. 13 is a view similar to Fig. 8 illustrating the manner in which the cable is applied to the hoisting mechanism shown in Figs. 11 and 12.

Referring now to the drawings by reference characters, the numeral 1 indicates generally a swing stage scaffold stirrup having the hoisting mechanism of my invention applied thereto. The stirrup 1 comprises a pair of similar upwardly extending tubular side members 2 and 3 having the converging upper ends thereof welded to a cast connector plate 4, and casters 5 applied to the lower ends thereof. The side members 2 and 3 are connected together adjacent the lower ends thereof by a tubular cross member 6, and by two similar tubular members 7 and 8 which are disposed above the bottom member 6 in vertically spaced parallel relation thereto. A pair of angularly disposed tubular bracing members 9 are connected to and between the upper cross member 8 and the side members 2 and 3.

A tubular sleeve 10 having the spaced parallel bolts 11 welded thereto, one adjacent each end thereof, is rotatably mounted upon the bottom cross member 6. The sleeve 10 is adapted to support a swing stage plank 12

which is clamped thereto by a cross-bar 13, which is slidably mounted on the bolts 11, and is yieldingly held in contact with the top of the plank 12 by the nuts 14 and interposed springs 15. A bracket 16, by which a pair of guard rails 17 are supported, is detachably secured to the stirrup 1 by a clevis 18 which engages the side member 2 and a bolt 19 by which the upper end of the bracket is bolted to a lug 20 on the connector plate 4.

The hoisting mechanism, generally indicated by the numeral 21, by which the stirrup 1 is moved up and down a suspended cable is permanently secured to and between the cross members 7 and 8. Cable guide means, generally indicated by the numeral 23, is mounted on the connector plate 4. The cable 22 extends down through the guide means 23 into operative engagement with hoisting mechanism 21 from which it hangs loosely downwardly.

The guide mechanism 23 as shown herein, comprises a grooved roller 24 which is rotatably mounted on a fixed pivot shaft, and an eccentrically mounted spring biased roller 25 which yieldingly presses the cable 22 into contact with the grooved roller 24.

The hoisting mechanism 21 comprises a casing 30 which is secured by bolts 31 to and between a pair of rearwardly extending lugs 32 and 33 which are welded to the cross members 7 and 8 respectively.

A horizontally disposed shaft 34 which is rotatably mounted in the casing 30, by roller bearings 35, and extends forwardly therefrom has a worm gear 36 keyed and pinned thereon between the bearings 35. The worm gear 36 meshes with a worm 27 which is integral with a vertically disposed shaft 38 rotatably mounted in the casing 30 by roller bearings 39. The worm gear 36, and with it the shaft 34, is adapted to be rotated in either direction by the shaft 38 through the worm 37. The worm gear 36 and the worm 37 are of the type in which the worm gear 36 can be rotated in either direction by the worm 37, but in which the worm 37 cannot be rotated by the worm gear 36.

The worm gear 36 and the worm 37 are therefore operative to hold the hoisting mechanism 21 and any supporting means secured thereto in fixed position on the cable 22 when stationary. But in the event of the failure of the worm and worm gear to so hold the mechanism I provide a safety locking means 26 which is incorporated in the cable guide means 23. This safety locking means does not constitute a part of the present invention, consequently it is not shown and described herein. But it is disclosed and claimed in my copending application Serial No. 725,562, which was filed concurrently herewith.

The shaft 38 is adapted to be selectively rotated in either direction by an electric power unit, generally indicated by the numeral 40, through a short connecting shaft 41 and a universal joint 42 interposed between the shaft 38 and the power unit 40. As shown herein the power unit 40 consists of a standard electric drill having a built-in reversible electric motor and speed reduction gearing, not shown. The power unit 40 is detachably connected to the stirrup 1 by suitable means and to the connecting shaft 41 by a chuck 43. The operation of the unit 40 is selectively controlled by a pair of built-in switches (not shown) which are adapted to be actuated by a lever 44 and a trigger 45. If desired a standard compressed air drill may be substituted for the electric drill shown.

A traction pulley 50 having a single peripheral groove 51 is keyed on the shaft 34 in fixed position adjacent the front of the casing 30. A bushing 52 having an outwardly extending annular flange 53 around the inner end thereof is slidably keyed on the shaft 34 adjacent the traction pulley 50. A tension pulley 54, having a peripheral groove 55 of slightly greater diameter than the diameter of the traction pulley groove 51, is rotatably mounted by a ball bearing 56 on the bushing 52 in slightly spaced relation to the traction pulley 50. The

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opposed parallel faces 57 and 58 of the traction pulley 50 and the tension pulley 54 respectively are ground smooth, and a friction disk clutch means 59 is interposed therebetween.

The clutch means 59 comprises a centrally apertured thin flat metal disk 60 having ratchet teeth 61 around the periphery thereof. The disk 60 is secured by rivets 63 to a hub 62 by which it is rotatably mounted on the flange 53 of the slidably mounted bushing 52. A ring 64 of friction brake material is secured to each side of the disk 60 by counter-sunk rivets 65.

Spring pressure means 66, which is mounted on the end of the shaft 34, yieldingly maintains the opposed faces 57 and 58 of the traction and tension pulleys in firm contact with the adjacent brake rings 64 of the clutch means 59. The pressure means 66 comprises a collar 67 which is slidably mounted on shaft 34 in contact with the outer end of the bushing 52 and the inner race of the ball bearing 56. A second collar 68 is secured on the end of the shaft 34, by a snap ring 69 and nut 70, in spaced relation to the collar 67. A plurality of coiled springs 71 are interposed between the collars 67 and 68 within a cylindrical sleeve 72.

The casing 30 has a pair of spaced parallel ears 75, cast integrally therewith, which extend outwardly from one side thereof and between which are pivotally secured, by pivot pins 76, a pair of arms 77 and 78. In normal operative position the arm 77 extends forwardly from the ears 75, and the arm 78 extends forwardly in contact with one side of the arm 77 and then sidewise therefrom. The arms 77 and 78 are connected together for movement in unison by a pair of links 79 which are connected between pivot pins 80 and 81 carried by the arms 77 and 78 respectively. A guide pulley 82 is rotatably mounted by a ball bearing 83, on a hub 84 carried by the arm 78. The hub 84 and the guide pulley 82 are preferably slightly inclined as shown in Fig. 5.

A pressure roller 85 is rotatably mounted in alignment with the tension pulley 54, by a ball bearing 86, upon a bushing 87 which is eccentrically mounted on a pivot stud 88 secured to and extending outwardly from the end of the arm 77. By rotating the bushing 87 on the stud 88 the roller 85 can be adjusted toward or away from the tension pulley 54, and maintained in adjusted position by a nut 89 on the threaded end of the stud 88 by which the bushing is clamped against the end of the arm 77.

The upper ear 75 has a forwardly extending boss 90, formed integrally therewith, on the outer end of which a pawl 91 is pivotally mounted by a pivot stud 92. The free end of the pawl 91 is disposed over the clutch member 59 and is provided with teeth 93 which engage the complementary teeth 61 in the periphery of the clutch disk 60.

From the foregoing it will be apparent that when the traction pulley 50 is rotated by the shaft 34 in a clockwise direction, as viewed in Figs. 1, 2 and 6, the tension pulley 54 will be rotated in unison therewith by the traction pulley through the clutch 59; and that when the traction pulley 50 is rotated in a counter-clockwise direction by the shaft 34 the tension pulley will remain stationary due to the pawl 91 holding the clutch disk stationary so that no movement can be transmitted therethrough from the traction pulley to the tension pulley.

The hoisting mechanism is provided with a protecting cover 94 which is pivotally mounted, by ears 95 and a pivot pin 96, on a bracket 97 which extends outwardly from one side of the casing 30. The cover 94 is releasably held in closed position by a hand nut 98 which screws onto the threaded end of the pivot stud 88 on which the pressure roller 85 is mounted.

The manner in which the cable 22 is applied to the hoisting mechanism 21 is diagrammatically shown in

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Fig. 8. As shown therein the cable 22 extends down into engagement with the periphery of the traction pulley 50 between the traction pulley 50 and the guide pulley 82 and then under and up around the traction pulley.

From the top of the traction pulley the cable extends over and down around the guide pulley 82. From the bottom of the guide pulley the cable extends under and up around the tension pulley 54 and then down between the tension pulley and the pressure roller 85 from which the cable hangs loosely downwardly. When applying the cable to or removing it from the pulleys 50, 54 and 82 the cover 94 is opened up and the guide pulley 82 with the arm 78 and the pressure roller 85 with the arm 77 are moved to the positions shown in Fig. 4.

The operation of the mechanism, which in effect climbs up and down the suspended cable 22 during raising and lowering, will now be described in connection with the drawing. When the traction pulley 50 is rotated in a raising direction, clockwise as viewed in Figs. 1, 2 and 6, the cable 22 is wound onto the traction pulley from the bottom thereof and is withdrawn from the top of the traction pulley under tension by the tension pulley 54 at the same rate that the cable is being wound onto the traction pulley which always maintains the cable in firm contact with the traction pulley; and the cable is maintained in firm contact with the tension pulley by the pressure roller 85. This is due to the diameter of the tension pulley being greater than the diameter of the traction pulley. The tension pulley is therefore rotated at the same peripheral speed as the traction pulley but at a slightly lesser r.p.m., there being a slight slippage between the tension pulley and the clutch disk and/or between the traction pulley and the clutch disk. The tension applied to the cable is dependent upon the adjustment of the spring means 66 by which the opposed faces of the traction and tension pulleys are held in yielding contact with faces of the clutch disk.

When the traction pulley 50 is rotated in a lowering direction, counter-clockwise as viewed in Figs. 1, 2 and 6, the clutch disk 60 is held stationary by the pawl 91 which prevents rotation of the tension pulley by the traction pulley. The cable is withdrawn by the traction pulley from the bottom of the tension pulley 54 and over the top of the traction pulley and then down and around the bottom thereof. As the cable is withdrawn by the traction pulley the cable rotates the tension pulley and is held under tension and in firm contact with the traction pulley due to the engagement of the face of the tension pulley with the now stationary clutch disk. It will therefore be seen that the cable is always maintained in firm contact with the traction and tension pulleys during both raising and lowering so that there is no slippage between the cable and either the traction or tension pulley.

In Figs. 9 and 10 I have shown a slightly modified type of pressure means by which the cable is held in contact with the tension pulley. In this type I provide the outer end of the eccentric bushing 87 with a disk 100 by which the bushing may be manually rotated on the stud 88 to adjust the position of the pressure means with respect to the tension pulley, and I substitute a standard sealed type roller bearing 101 for the roller 85. The roller bearing 101 comprises the outer race 102, the inner race 103, the interposed balls 104 and the seals 105. The roller bearing 101 is mounted upon the bushing 87 with a ring of pliable rubber 106, which holds the inner race 103 against rotation, interposed between the inner race 103 and the bushing 87. A disk 107 which is mounted upon the bushing 87 between the roller bearing 101 and the end of the supporting arm 77 is provided to confine the pliable rubber ring 106 within the inner race 103. The pliable rubber 106 will yieldingly maintain the outer race 102 in contact with the cable 22 during operation even though different sections of the cable may vary slightly in diameter.

In Fig. 11 I have shown a slightly modified form of

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hoisting mechanism in which a second tension pulley 54^a, a second clutch means 59^a, and a second guide pulley 82^a are provided. Also in Fig. 11 I have shown still another type of cable pressure means, generally indicated by the numeral 110, and a different manner of mounting the pressure means and the guide pulleys. Otherwise the form of the invention shown in Fig. 11 is the same as that shown in Figs. 1 to 7 and the same reference numerals have been applied to like parts.

The second tension pulley 54^a, which is similar to the tension pulley 54, is provided with a peripheral groove 55^a of slightly greater diameter than the diameter of the groove 55 in the tension pulley 54. The second tension pulley 54^a is rotatably mounted upon a bushing 52^a, similar to the bushing 52, which is slidably keyed on the shaft 34 adjacent the bushing 52, and is provided with an annular flange 53^a. The clutch means 59^a, which is identical with the clutch means 59, is interposed between the tension pulleys 54 and 54^a and is rotatably mounted on the flange 53^a on the bushing 52^a. The traction pulley 50, the tension pulleys 54 and 54^a, and the clutch means 59 and 59^a are all yieldingly maintained in firm contact with each other by the spring pressure means 66 on the end of the shaft 34 adjacent the tension pulley 54^a. A pawl 91^a is pivotally mounted on a boss 90^a, carried by the casing 30, in position for the teeth 93^a thereof to engage the ratchet teeth 61^a in the periphery of the disk 60^a of the clutch means 59^a.

The second guide pulley 82^a is rotatably mounted, adjacent the guide pulley 82, on an arm 111 secured to and extending out from one side of the casing 30; and the cable pressure means 110 is mounted in alignment with the tension pulley 54^a on a boss 112 integral with and extending forwardly from the arm 111. The guide pulleys 82 and 82^a are preferably slightly inclined as shown in Fig. 5.

The manner in which the cable 22 is applied to the hoisting mechanism in this form of the invention is diagrammatically shown in Fig. 13. As shown therein the cable 22 extends down and around the traction pulley 50 and then over and around the guide pulley 82. From the guide pulley 82 the cable extends under and up around the tension pulley 54, and then over and down around the guide pulley 82^a. From the guide pulley 82^a the cable extends under and up around the tension pulley 54^a and then down between the tension pulley 54^a and the cable pressure means 85.

In this form of the invention, when the traction pulley 50 is rotated clockwise, as viewed in Figs. 11 and 12, the tension pulley 54 will be rotated by the traction pulley 50 through the clutch 59, and the tension pulley 54^a will be rotated by the tension pulley 54 through the clutch 59^a; and when the traction pulley 50 is rotated counter-clockwise the tension pulleys 54 and 54^a will remain stationary due to the pawls 91 and 91^a holding the clutch disks 60 and 60^a stationary so that no movement can be transmitted therethrough from the traction pulley to the tension pulleys.

During operation of this form of the invention the cable 22 is withdrawn from the top of the traction pulley 50 under tension by the tension pulley 54, and from the top of the tension pulley 54 under tension by the tension pulley 54^a at the same rate that the cable is being wound onto the traction pulley. The tension pulley 54 maintains the cable in firm contact with the traction pulley 50; the tension pulley 54^a maintains the cable in firm contact with the tension pulley 54, and the cable pressure means maintains the cable in firm contact with the tension pulley 54^a. There is therefore no slippage between the cable and the traction and tension pulleys which is due to the tension pulley 54^a having a slightly greater diameter than the tension pulley 54. The traction pulley 50 and the tension pulleys 54 and 54^a are therefore all rotated at the same peripheral speed, but the tension pulley 54^a is rotated at a slightly lesser r.p.m. than the traction

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pulley 54, there being a slight slippage between the pulleys and the interposed clutch disks.

When the traction pulley 50 is rotated counter-clockwise the clutch disks 60 and 60^a are held stationary by the pawls 91 and 91^a which prevents rotation of the tension pulleys by the traction pulley. As the cable is withdrawn from the tension pulleys by the traction pulley it rotates the tension pulleys 54 and 54^a and is held in firm contact with the pulleys due to the engagement of the pulleys with the now stationary clutch disks.

The cable pressure means 110 shown in Figs. 11 and 12 comprises a plurality of small rollers 115 which are mounted in equally spaced relation in an endless sprocket chain 116. The chain of rollers is mounted on a flanged track 117, about the periphery of a member 118 for travel therearound. The track 117 is provided with a concave section 119 and a convex section 120 which are connected by the short arcuate sections 121. The member 118 is provided with a medial longitudinal rectangular recess 122 in which a metal block 123 is slidably mounted, with a block 124 of resilient pliable rubber interposed between the end of the recess 122 and the adjacent side of the block 123. The block 123 is provided with a transverse bore 125 by which the pressure means 110 is rotatably mounted, in alignment with the tension roller 54^a, upon a crank pin 126 which is eccentrically secured to a crank disk 127 carried by a crankshaft 128 which is rotatably mounted in the boss 112. The rollers 115 are adapted to engage and press the cable 22 into contact with an extended section of the periphery of the tension pulley 54^a, to which end the concave section 119 of the track 117 is made concentric with the tension pulley 54^a. During rotation of the tension pulley the cable rotates the rollers 115 which causes the chain of rollers to travel around the track 117. The position of the pressure means 110 with respect to the tension pulley 54^a can be adjusted by rotating the crankshaft 128 which is adapted to be clamped in adjusted position by a nut 129 on the threaded end thereof. The resilient rubber block 124 is provided to yieldingly maintain the rollers 115 in contact with the cable and thereby compensate for variations in the diameter of the cable and wear of the tension pulleys.

The various types of cable pressure means are interchangeable and can be used with either of the two forms of hoisting mechanism shown.

From the foregoing it will be apparent to those skilled in this art that I have provided a relatively simple and very efficient mechanism for accomplishing the objects of the invention.

It is to be understood that I am not limited to the specific constructions shown and described herein, as various modifications may be made therein within the spirit of the invention and the scope of the appended claims.

I claim:

1. A hoisting mechanism of the character described comprising a suspended cable, a frame adapted to have a supporting means detachably secured thereto, guide means through which said cable passes secured to said frame adjacent the upper end thereof, a shaft rotatably mounted in said frame in spaced relation below said guide means, power means carried by said frame by which said shaft is selectively rotated in either direction, a traction pulley about which said cable is wound secured on said shaft for rotation therewith, a tension pulley of larger diameter than the diameter of said traction pulley about which said cable is wound after it leaves said traction pulley, said tension pulley being rotatably mounted on said shaft adjacent said traction pulley, clutch means interposed between said traction pulley and said tension pulley through which said tension pulley is rotated in one direction by said traction pulley, said tension pulley being operative to withdraw said cable from said traction pulley under tension and thereby maintain said cable taut upon

said traction pulley as said traction pulley is rotated in said one direction.

2. A hoisting mechanism of the character described comprising a suspended cable, a frame adapted to have a supporting means detachably secured thereto, guide means through which said cable passes secured to said frame adjacent the upper end thereof, a shaft rotatably mounted in said frame in spaced relation below said guide means, power means carried by said frame by which said shaft is selectively rotated in either direction, a traction pulley about which said cable is wound secured on said shaft for rotation therewith, a tension pulley of larger diameter than the diameter of said traction pulley about which said cable is wound after it leaves said traction pulley, said tension pulley being rotatably mounted on said shaft adjacent said traction pulley, clutch means interposed between said traction pulley and said tension pulley through which said tension pulley is rotated in one direction by said traction pulley, a second tension pulley of larger diameter than the diameter of said tension pulley about which said cable is wound after it leaves said tension pulley, said second tension pulley being rotatably mounted upon said shaft adjacent said tension pulley, a second clutch means interposed between said tension pulley and said second tension pulley through which said second tension pulley is rotated by said tension pulley, said tension pulley being operative to withdraw said cable from said traction pulley under tension and thereby maintain said cable taut upon said tension pulley as said traction pulley is rotated in said one direction.

3. A hoisting mechanism as defined in claim 1 in which means is provided which is operative to prevent rotation of said tension pulley by said traction pulley when said traction pulley is rotated in a direction opposite to said one direction.

4. A hoisting mechanism as defined in claim 1 in which pressure means is provided by which said cable is maintained in firm contact with said tension pulley during operation.

5. A hoisting mechanism as defined in claim 1 in which a guide pulley is provided around which said cable passes between said traction pulley and said tension pulley.

6. A hoisting mechanism as defined in claim 5 in

which pressure means is provided by which said cable is maintained in firm contact with said tension pulley.

7. A hoisting mechanism as defined in claim 6 in which said pressure means is mounted upon a pivoted arm by which said pressure means is moved into and out of operative position.

8. A hoisting mechanism as defined in claim 6 in which said guide pulley and said pressure means are mounted upon pivoted arm means by which said pressure means and said guide pulley are moved into and out of operative position.

9. A hoisting mechanism as defined in claim 2 in which means are provided which are operative to prevent rotation of said tension pulley by said traction pulley and rotation of said second tension pulley by said tension pulley when said traction pulley is rotated in a direction opposite to said one direction.

10. A hoisting mechanism as defined in claim 2 in which pressure means is provided by which said cable is maintained in firm contact with said second tension pulley during operation.

11. A hoisting mechanism as defined in claim 2 in which a first guide pulley is provided around which said cable passes between said traction pulley and said tension pulley and in which a second guide pulley is provided around which said cable passes between said tension pulley and said second tension pulley.

12. A hoisting mechanism as defined in claim 11 in which pressure means is provided by which said cable is maintained in firm contact with said second tension pulley during operation.

13. A hoisting mechanism as defined in claim 2 in which guide means is provided by which said cable is guided from said traction pulley onto said tension pulley and from said tension pulley onto said second tension pulley.

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