Nov. 28, 1939. A. M. BARRETT 2,181,359

HOIST

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Fig. 1.

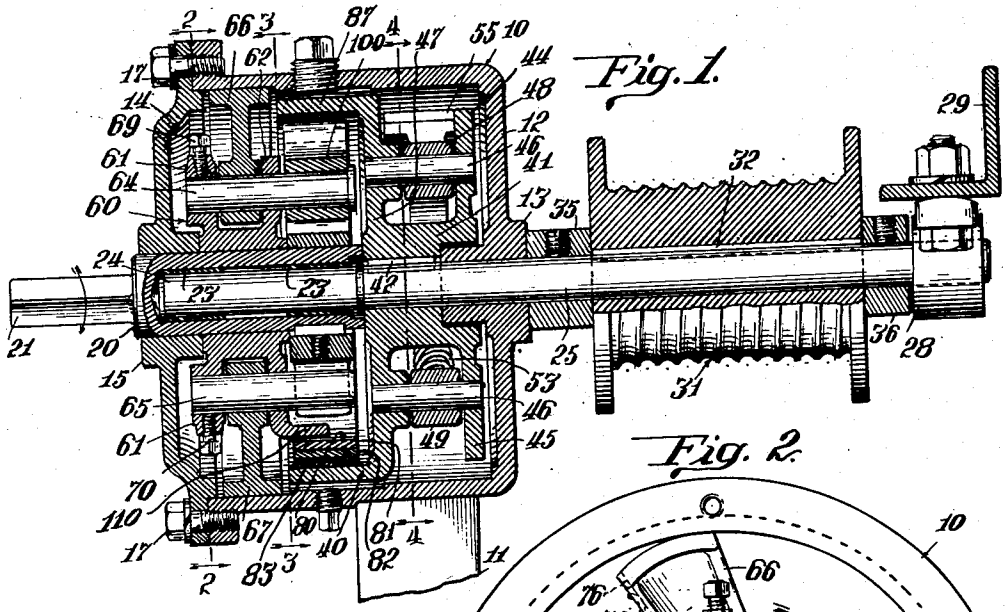


Fig. 2.

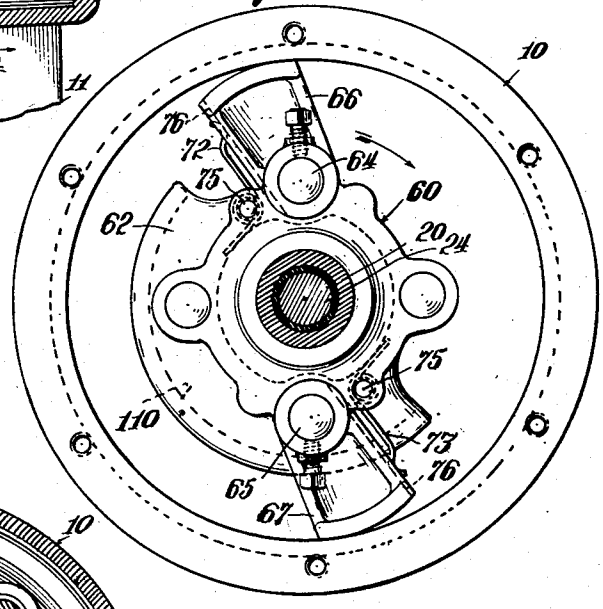
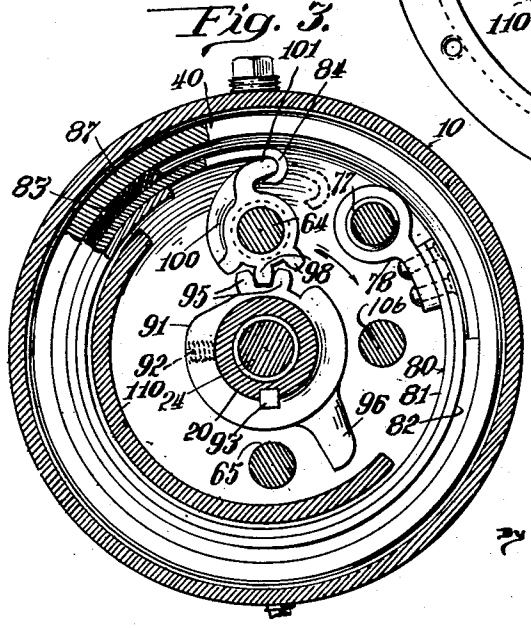


Fig. 3.



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HOIST

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Fig. 5.

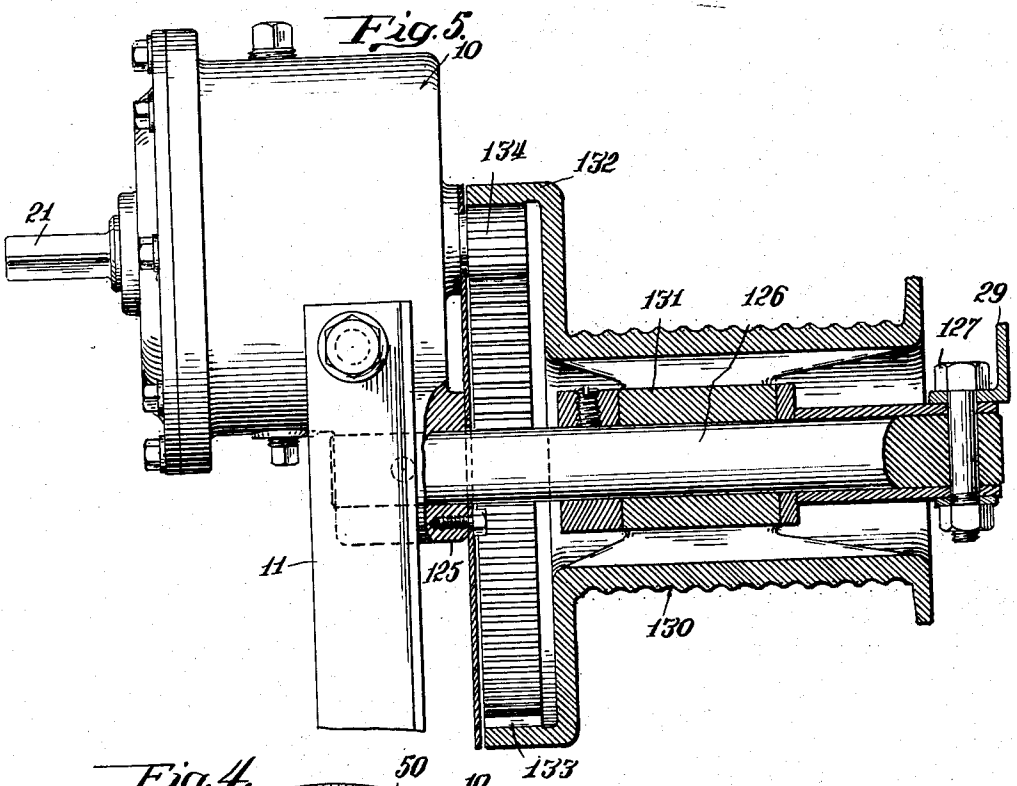
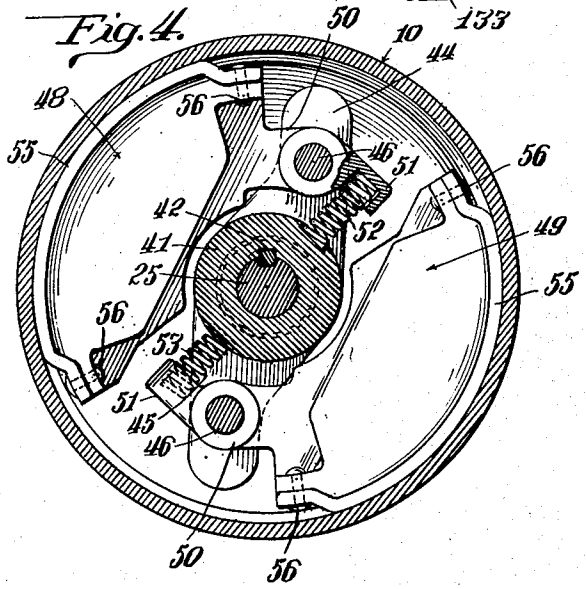


Fig. 4.



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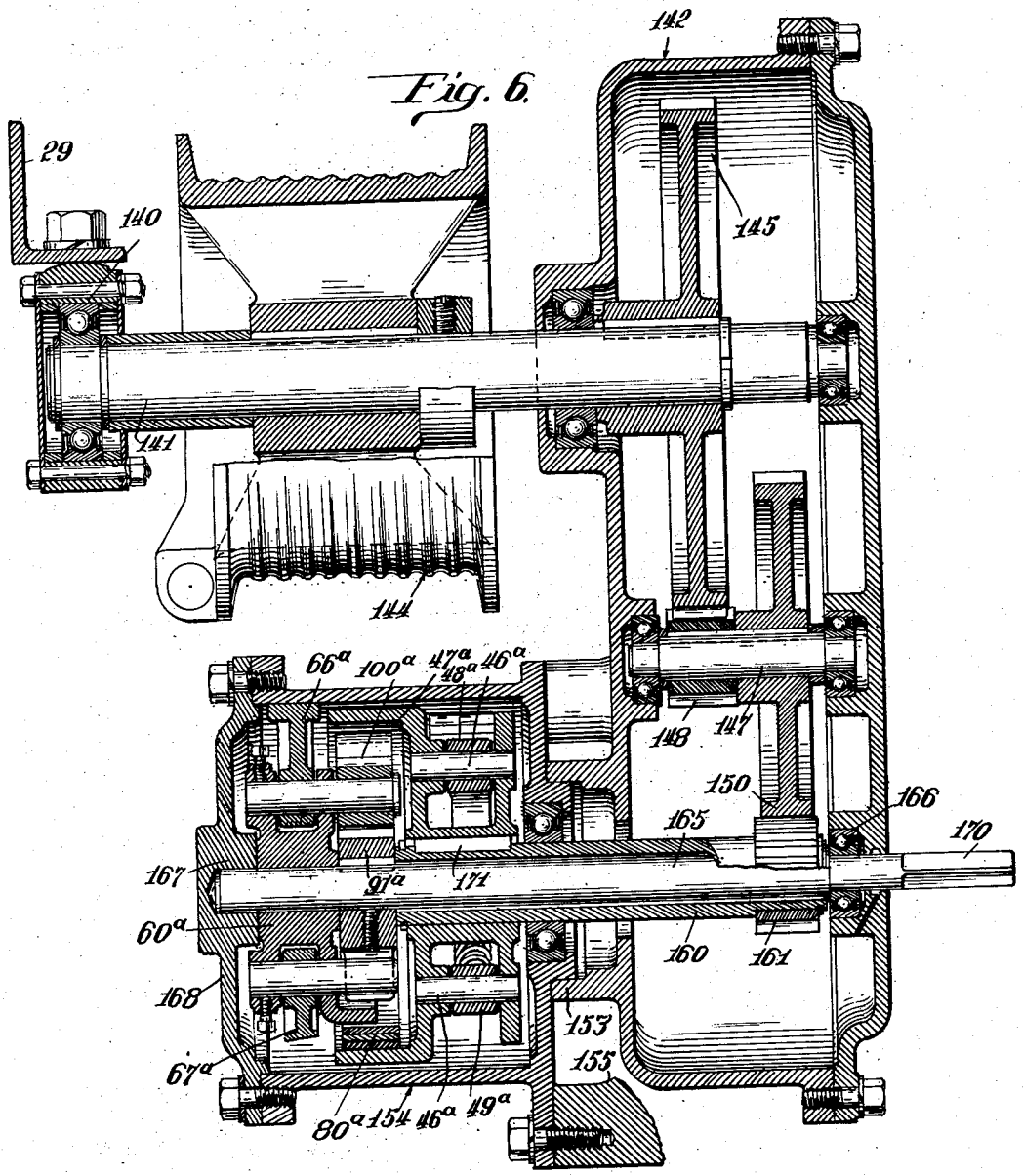
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Fig. 6.



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2,181,359

UNITED STATES PATENT OFFICE

2,181,359

HOIST

Arthur M. Barrett, Winnetka, Ill., assignor to Barrett-Cravens Company, Chicago, Ill., a corporation of Illinois

Application September 23, 1935, Serial No. 41,658

25 Claims. (Cl. 254—173)

The present invention relates generally to hoists, winches, and similar apparatus. More specifically, the present invention is particularly concerned with hoist or lifting means for portable elevators and the like, either hand or motor operated.

The principal object of the present invention is the provision of a compact hoist unit which shall embody the functions of, first providing for the raising of the load through suitable means and if desired at a suitable mechanical advantage; second, holding the load in any elevated position; third, to permit lowering of the load under both automatic and manual control.

The hoist unit of the present invention is particularly useful in hand operated hoists, and it is an object of the invention to provide means whereby the aforesaid functions may all conveniently be performed by manipulation of the operating crank.

A further object of the invention is to provide a hoisting unit of simple, rugged construction.

A further object of the invention is to provide a hoisting unit of maximum efficiency and safety.

These and other objects and advantages of the present invention will be apparent to those skilled in the art after a consideration of the following detailed description of the preferred structural embodiment, taken in conjunction with the accompanying drawings illustrating the same.

In the drawings:

Figure 1 is a central section taken through one form of hoisting mechanism embodying the principles of the present invention;

Figure 2 is a view taken substantially along the line 2—2 of Figure 1 and showing the construction and operation of the pawl mechanism normally preventing the descent of the load;

Figure 3 is a section taken substantially along the line 3—3 of Figure 1 and illustrating the means which acts not only to establish a driving connection between the driving member and the winding drum but, in addition, reacts against the pawl mechanism shown in Figure 2 and makes it possible to exert a snubbing action and check the speed of the winding drum during the descent of the load;

Figure 4 is a section taken substantially along the line 4—4 of Figure 1 and illustrates the governor mechanism operating automatically to control the descent of the load;

Figure 5 is a modified form of the present invention, embodying reduction gearing in order to secure greater power and illustrating the provision of a new and improved winding drum support; and

Figure 6 is a further modified form of the present invention.

Referring now more particularly to Figures 1 to 4, inclusive, the reference numeral 10 indicates a stationary casing enclosing the principal parts of the hoist mechanism. The stationary casing 10 is supported in any suitable manner upon the frame or machine of which the hoist constitutes a part. For example, in one practical installation of the device the casing 10 is carried upon vertical angle bars 11. Obviously, of course, other supporting means may be provided for mounting the casing 10.

The rear wall 12 of the casing 10 is formed with a bearing boss 13, and a closure member 14 at the other side is provided with a similar bearing boss 15 disposed in axial alignment with the bearing boss 13. The closure member 14 is preferably secured in place by cap screws 17 or the like, and the removability of the member 14 provides for the installation of and access to the operating mechanism of the hoist. A hollow tubular drive shaft 20 is supported for rotation in the bearing boss 15 and is provided with a squared end 21 adapted to receive a driving crank or gear, depending upon whether the hoist is to be hand operated or motor operated. The hollow interior of the tubular driving shaft 20 receives suitable bearing bushings 23 in which the forward end 24 of a winding drum shaft 25 is received, the latter also being supported for rotation relative to the casing 10 in the bearing boss 13 and in suitable journal means 28 carried by a transverse angle member 29 which forms a part of the frame or machine which includes the angle bars 11. The shaft 25 carries a winding drum 31 suitably keyed or otherwise rigidly fixed thereto, as at 32, and collars 35 and 36 are preferably employed for maintaining the winding drum in proper axial position with respect to the winding drum shaft 25.

The winding drum 31 receives the cable or other means to which the load to be raised or lowered is attached, as in conventional practice, and the means for automatically controlling the descent of the load so as to prevent the same from dropping too rapidly is best indicated in Figures 1 and 4. Referring now to these figures, a drum member 40 is disposed within the stationary casing 10 and includes a hub section 41 keyed or otherwise firmly fixed, as at 42, to the winding drum shaft 25. The end of the hub section 41 adjacent the casing wall 12 is provided

with diametrically opposed extensions 44 and 45 which are apertured to receive one end of each of a pair of pivot pins 46, the other ends of the pins being received by the drum section 47 of the member 40, as indicated in Figure 1. The pins 46 serve to support a pair of governor arms 48 and 49 for limited radial movement, and each of the arms is provided with an extended lug section 50 (Figure 4) pivotally mounted on the associated pin 46 and carrying a spring receiving extension 51. Springs 52 and 53 are disposed in the sections 51 and bear against the hub section 41. The springs 52 and 53 act to swing the governor arms 48 and 49 radially inwardly out of contact with the interior surface of the stationary casing 10. The arms 48 and 49, as best shown in Figure 4, are weighted so that they tend to move radially outwardly about the pivot pins 46 under the action of centrifugal force whenever the winding drum shaft 25 tends to rotate at an excessive speed. A lining 55 of friction material is preferably secured, as by rivets 56, to the ends of each of the governor arms so as to increase the effectiveness thereof in preventing too rapid a descent of the load. As is obvious, the faster the winding drum shaft 25 tends to rotate the greater will be the outwardly directed force with which the governor arms 48 and 49 bear against the stationary casing 10.

The winding drum shaft 25 is driven to raise the load carried by the drum 31 by actuation of the drive shaft 20, either by a hand crank on the squared end 21 or by suitable power connection therewith, and the means whereby the load is prevented from dropping during the raising operation will now be described.

A sleeve member 60 is disposed within the casing 10 and is preferably mounted for relative rotation upon the tubular portion of the drive shaft 20, as best indicated in Figure 1. The sleeve member 60 includes axially spaced flanged sections 61 and 62 which are suitably apertured to receive a pair of pivot pins 64 and 65 upon which holding pawl members 66 and 67 are rockably mounted, as best indicated in Figures 1 and 2. The pivot pins 64 and 65, which extend laterally inwardly of the innermost flanged section 62 for a purpose which will be referred to later, are held in position by set screws 69 and 70. Spring means 72 and 73 are mounted on pins 75 and bear at one end against the hub of the sleeve member 60 and at the other end against the pawls 66 and 67 so as to urge them to swing outwardly into engagement with the interior surface of the stationary casing 10. The outer end of each of the springs is rounded and rides in a slot 76 formed in each of the pawls 66 and 67, as indicated in Figure 2. The pawls 66 and 67 are so arranged that they permit the sleeve member 60 to rotate relative to the stationary casing 10 in the direction of the arrow shown in Figure 2, but the pawls prevent the rotation of the member 60 relative to the casing 10 in the other direction. Thus, by virtue of this means, the member 60 is connected with the casing 10 by means establishing a one-way connection permitting the member 60 to rotate in one direction but preventing its rotation in the other direction.

A third pin 77 passes through both of the flanged sections 61 and 62 and, as best shown in Figure 3, receives the anchoring lug 78 of a strap member 80 which, preferably comprises two or more resilient or spring strap sections 81 and 82 of generally circular formation, the latter having friction material 83 secured thereto and a hook-like end 84 formed at the extremity opposite the anchoring lug 78. The member 80 cooperates with the drum portion 87 both in establishing a driving connection between the driving shaft 20 and the winding drum shaft 25 and in reacting against the pawls 66 and 67 and associated parts in snubbing or checking the speed of rotation of the shaft 25 and associated drum 87.

The inner end of the driving shaft 20 carries a collar 91 secured thereto by a set screw 92 and a key 93, or either of them, and the collar member 91 is provided with two gear teeth 95 and a stop extension 96, best shown in Figure 3. The gear teeth 95 of the collar member 91 mesh with teeth 98 carried by or formed on a pivoted retractor member 100 which is formed with a finger extension 101 that is engaged by the hook end 84 of the strap or band member 80. The latter member is of spring material and is so constructed as to be biased for outward movement into frictional engagement with the drum section 87. The force or bias of the member 80 causes the retractor member 100 to rotate in a counterclockwise direction, permitting the stop member 96 to approach the inner end of the pivot pin 65. If the driving shaft 20 is rotated relative to the sleeve member 60 in a counterclockwise direction as viewed in Figure 3, the rectractor member 100 is rocked on the end of the pivot pin 64 in a clockwise direction and serves to withdraw the strap member 80 out of contact with the drum section 87. A pin 106 is carried by the member 60 and cooperates with the stop extension 96 for limiting the relative movement of the driving shaft 20 with respect to the member 60 in this direction. The peripheral portion of the flange section 62 of the member 60 is formed with a lateral extension 110 of generally semi-circular formation and is disposed adjacent the inner strap member 81 so as to cooperate therewith in limiting the retraction of the member 80, thereby also serving to limit the relative movement between the driving shaft 20 and the member 60.

The operation of the hoist mechanism described above is substantially as follows: When the hand crank or motor mechanism associated with the driving shaft 20 rotates the latter in the direction of the arrows shown in Figures 2 and 3, the retractor 100 is shifted in a counterclockwise direction, thereby permitting the member 80 to firmly engage the drum section 87 of the member 40. When the stop 96 engages the pin 65, no further relative movement of the shaft 20 with respect to the member 60 is then possible, and the latter is then rotated in the direction of the arrows shown in Figure 2. Since the strap member 80, anchored to the member 60 at 77, is in firm engagement with the drum section 87 at this time and the latter securely fixed to the winding drum shaft 25, rotation of the driving shaft 20 in the direction of the arrow shown in Figure 1 serves to rotate the winding drum 31 in the same direction. This rotation of the drum 31 is normally utilized for raising a load or otherwise performing service, and the rotation of the member 60 in the direction of the arrow is permitted by the angularity of the pawls 66 and 67, but backward movement of the member 60 is prevented since the springs 72 and 73 continually urge the pawls 66 and 67 into engagement with the interior surface of the stationary casing 10 so that the moment the member 60 tends to rotate backwardly, or counterclockwise as viewed in Figure 2, the pawls 66 and 67 firmly grip the

stationary casing and effectively prevent such movement. By this means, therefore, the accidental dropping of the load raised by the above mentioned rotation of the winding drum 31 is prevented. Ordinarily, the raising speed of the shafts 20 and 25 is not sufficient to cause the governor arms 48 and 49 to move outwardly against the tension of the bar springs 52 and 53. Hence the governor mechanism is normally inoperative during the raising of the load.

Since the pawls 66 and 67 serve at all times to prevent the counterclockwise movement of the member 60 with respect to the stationary casing 10, in order to permit the load to lower the connection between the members 60 and 40 must be released. According to the principles of the present invention, this is accomplished by a slight backward rotation of the shaft 20 in a counterclockwise direction as viewed in Figure 3. Referring to this figure, it will be observed that if the member 20 is rotated in a direction opposite to the arrow shown in this figure, the retractor 100 will be caused to move the hook end 84 of the strap member 80 to the right and inwardly, thereby withdrawing the same out of contact with the drum section 87 of the member 40 which is fixed to the winding drum 25. As soon as the disengagement of the member 80 with the drum section is effected, the winding drum 31 and the shaft 25 are free to rotate to permit the load to descend. However, such descent is under the control of the governor arms 48 and 49, for if the load causes the shaft 25 to rotate at an excessive speed, the governor arms are thrown outwardly under the action of such centrifugal force and, bearing with greater or less force against the interior surface of the casing 10, retard the speed of the winding drum 31.

According to the present invention, it is also possible to retard the descent of the load by rotating the shaft 20 in the forward direction, or clockwise as viewed in Figures 2 and 3. It will be remembered that movement of the driving shaft 20 in this direction permits the friction member 80 to expand outwardly into contact with the drum section 87, thereby reestablishing a connection between the members 60 and 40, and as soon as this connection is established the pawls 66 and 67 connect with the member 60 and serve to hold the load against further descent. This provides a very convenient manner in which the descent of the load can be easily controlled in addition to the automatic lowering control effected by the governor mechanism 48—49, for controlling the firmness with which the resilient member 80 is permitted to engage the drum section 87, the descent of the load can be conveniently and nicely snubbed so as to permit the load to descend at exactly the rate desired. When the member 80 is in firm engagement with the drum member 87, the load is effectively locked against further descent by the member 60 reacting through the pawls 66 and 67 against the stationary casting 10.

In Figure 1 I have disclosed what might be termed a gearless hoist, that is, one in which the winding drum rotates at a one to one ratio with respect to the driving shaft. A gear reduction may, however, be readily interposed between the winding drum and the hoist mechanism proper, and in Figure 5 I have shown how the principles of the present invention may be embodied in such a hoist. The casing 10 in this modification can be provided with a lower extension 125 which is apertured and receives one end of the fixed shaft 126, the other end of which is bolted, as at 127, to the cross angle bar 29. The winding drum 130 shown in Figure 5 embodies an integral central bearing section 131 and an integral gear member 132 having internal teeth 133 which are in mesh with a pinion 134 fixed to the end of the shaft 25, the latter being shorter in the construction shown in Figure 5 as compared with the construction shown in Figure 1 in which the winding drum is fixed directly to the shaft 25. The operation of the hoist shown in Figure 5 is substantially the same as that described above and hence further explanation is not believed to be necessary.

Where a further reduction is desired, the construction shown in Figure 6 is preferably adopted. In this case, the angle bar 29 carries a journal 140 in which is received one end of the shaft 141, the opposite end of which is journaled in a vertically elongated casing 142. A winding drum 144 is fixedly mounted on the shaft 141 to rotate therewith, and within the casing 142 a gear 145 is fixed to the end of the shaft 141 opposite the journal 140. The casing 142 also carries a short shaft 147 supported by suitable bearing means within the casing 142 and carrying a pinion 148 which meshes with and serves to drive the gear 145. A second gear member 150 is fixed, as by a key or the like, to the shaft 147, the same key being used for fixing both the pinion 148 and the gear 150 onto the shaft 147, if desired. The lower end of the casing 142 is supported, as at 153, on a portion of the stationary casing 154. The casing 154 is attached in any suitable manner to any convenient portion of the apparatus or machine, indicated at 155, to which the hoist is connected.

The hoist mechanism enclosed within the casing 154 is substantially identical for all practical purposes with the mechanism shown in Figures 1 to 4, the principal difference being the driven shaft is tubular and the driving shaft is solid and that both of the shafts extend from the same end of the casing 154. The driven shaft shown in Figure 6 is indicated by the reference numeral 160 and is the full equivalent of the winding drum shaft 25 shown in Figure 1, for the driven shaft 160 carries a pinion 161 which drives the shaft 141 on which the winding drum 144 is carried through the double gear reduction disposed within the casing 142 and comprising the pinions 161 and 148 and the gears 150 and 145. The driving shaft, which is solid as mentioned above, is indicated by the reference numeral 165 and is supported by bearing means 166 in one wall of the casing 142 and extends within the tubular driven shaft 160 and at the other end is supported in a bearing boss 167 formed in the closure member 168 of the hoist casing 154. The end 170 of the driving shaft 165 is squared so as to receive either a crank or other operating means, and the opposite end of the shaft 165, adjacent the casing closure plate 168, carries a member 60a which is the same in function and operation as the member 60 described above in connection with Figure 1. Pawls 66a and 67a are pivotally carried by the member 60a, which is rotatable with respect to the shaft 165, the pawls 66a and 67a serving to prevent rotation of the member 60a in one direction with respect to the stationary casing 154 and to permit its rotation in the other direction. The member 60a has anchored to it one end of a strap member 80a, the other end of which is

formed as shown in Figure 3 and controlled by a retractor 100a that is operated by a toothed collar member 91a fixed, as by a set screw and key, to the driving shaft 165. The band member 80a cooperates with a drum 47a suitably keyed, as at 171, to the inner end of the tubular driven shaft 160, the hub of the drum member 47a being formed with radial extensions serving as a support for pins 46a upon which governor arms 48a and 49a are mounted.

As in the case of the hoist operating mechanism shown in Figure 1, rotation of the shaft 165 in one direction serves to drive the driven shaft 160 in the same direction through the interengagement of the friction member 80a with the drum section 47a. The shafts 160 and 165 are thus rotated at a one to one ratio, but the winding drum 144 rotates at an appreciably lower rate due to the interposed reduction gearing. When the shaft 165 is rotated slightly in the other direction, the friction member 80a is released from the drum section 47a, whereupon the winding drum 144 and associated gearing permits the load to descend. However, such descent is under the automatic control of the governor arms 48a and 49a and associated parts. When the load is descending, the rate of descent may be checked or the descent entirely stopped by the forward rotation of the shaft 165 to a degree sufficiently to cause the band 80a to engage the drum section 47a with sufficient firmness to secure the desired snubbing.

While I have shown and described above the preferred form of my invention, it will be apparent to those skilled in the art that the present invention is not to be limited to the particular details shown and described above, but that, in fact, widely different means may be employed in the practice of the broader aspects of my invention.

What I claim, therefore, and desire to secure by Letters Patent is:

1. A hoist comprising a stationary casing, a winding drum rotatably mounted with respect to said casing, governor means connected with said winding drum and engageable with said stationary casing to prevent too rapid a rotation of the winding drum in one direction, a driving member rotatably disposed in said stationary casing and having means serving as pawls to prevent rotation thereof in one direction, and means associated with said driving member for releasably connecting the same with said winding drum, said pawl means taking the reaction of said winding drum when said driving member is connected therewith and the winding drum tends to rotate in said one direction, said governor means controlling the rotation of said winding drum when the latter is disconnected from said rotatable member.

2. A hoist comprising a stationary casing, a winding drum shaft and a driving shaft coaxially mounted in said casing for relative rotation, centrifugal members pivotally mounted on said winding drum shaft for movement radially outwardly thereof into contact with said stationary casing so as to prevent excessive rotation of said winding drum shaft in one direction, a driving sleeve member mounted for rotation on said driving shaft, pawl means carried by said sleeve member and cooperating with said casing to prevent rotation of said winding shaft in said one direction, means normally connecting said driving sleeve with said winding drum shaft so that rotation of said driving shaft occasions a rotation of said winding drum shaft, and means providing for the release of said sleeve member from said winding drum shaft to provide for the rotation of said winding drum shaft under the control of said centrifugal governor means.

3. A hoist comprising a stationary member, a winding drum shaft journaled for rotation within said casing and having a drum member secured thereto within the casing, a driving shaft journaled coaxially of said winding drum shaft, a sleeve member mounted on said driving shaft for rotation with respect thereto, pivoted pawl members carried thereby and engageable with the interior of said casing to prevent movement of the sleeve in one direction, pivoted governor arms also engageable with the stationary casing and carried by said drum member in fixed relation with respect to said shaft so as to prevent rotation of the latter in said one direction at an excessive speed, a biased friction member carried by said sleeve and normally engaging said drum member to hold the same in fixed relation with respect to the sleeve member whereby the pawl means of the latter prevents rotation of the winding drum shaft in said one direction, and means associated with said driving shaft for releasing said friction member when the driving shaft is moved in one direction, thereby permitting the winding drum shaft to rotate free with respect to said driving shaft and the sleeve member carried thereby.

4. A hoist comprising a stationary casing, axially aligned shafts mounted for rotation in said casing, a winding drum secured to one of said shafts, the other shaft constituting a driving shaft for the hoist, a drum member disposed within said casing and keyed to the winding drum shaft so as to rotate therewith, governor arms pivotally connected with said drum member in such a position as to move radially outwardly of the winding drum shaft and into contact with the interior surface of the stationary casing so as to prevent the winding drum shaft from rotating too rapidly, a sleeve member rotatably mounted within said casing on said driving shaft and carrying means serving as two pair of apertured ears, a pair of pawls pivotally mounted between said ears and adapted to engage the interior surface of the stationary casing to prevent rotation of said sleeve member with respect to the casing in one direction, spring means normally urging said pawls radially outwardly of the driving shaft into engagement with said casing, an expansible friction member anchored at one end to said sleeve and movably mounted at its other end, said friction member being biased for movement into engagement with said drum member so as to fixedly connect the winding drum shaft with said sleeve member whereby the pawls of the latter act to hold the winding drum shaft against movement in one direction, means connected with said driving shaft and said sleeve member for causing the driving shaft to rotate said sleeve member and said winding drum shaft when the driving shaft is rotated in the other direction, and means connected with the driving shaft and said movable end of the friction member for withdrawing the latter out of engagement with said drum member, thereby releasing the winding drum shaft from its connection with said pawls.

5. In a hoist, a stationary casing, a winding drum shaft journaled for rotation in said casing, a drum member disposed within the stationary casing and fixedly secured to said winding drum shaft, a rotatable member carried within said

casing and provided with pawl means cooperating therewith to prevent the rotatable member from turning in one direction, a releasable friction member connected with said rotatable member and adapted to engage said drum member so as to connect the latter with said pawl means to prevent rotation of said winding drum shaft in one direction, and means for controlling said releasable friction member.

6. In a hoist, a stationary casing, a pair of shafts journaled for relative rotation therein, a drum member carried within the casing on one of said shafts and the other shaft constituting a driving shaft for the hoist, a rotatable member mounted within said casing for movement about the axis of said driving shaft, pawl means carried by said rotatable member and cooperating with the casing to prevent rotation thereof in one direction, a spring strap member anchored at one end to said rotatable member and biased for movement outwardly into engagement with the drum carried by said winding drum shaft so as to normally connect the latter with said rotatable member, and means actuated by relative movement between said driving shaft and said rotatable member for withdrawing said strap member out of contact with said drum to permit free rotation of said winding drum shaft.

7. In a hoist, a stationary casing, a pair of shafts journaled for relative rotation therein, a drum member carried within the casing on one of said shafts and the other constituting a driving shaft for the hoist, a rotatable member mounted within said casing for movement about the axis of said driving shaft, pawl means carried by said rotatable member and cooperating with the casing to prevent rotation thereof in one direction, a spring strap member anchored at one end to said rotatable member and biased for movement outwardly into engagement with the drum carried by said winding drum shaft so as to normally connect the latter with said rotatable member, a retractor carried by said rotatable member and having a portion engaging the opposite end of said strap member for moving the same out of engagement with the drum carried by said winding drum shaft, there being gear teeth formed on said retractor, and a gear member secured to said driving shaft adjacent said rotatable member and having gear teeth meshing with said retractor, whereby relative rotation between said driving member and the pawl carrying rotatable member causes the retractor to withdraw the strap member out of engagement with said drum to disconnect the winding drum shaft from said holding pawls.

8. In a hoist, a stationary casing, a winding drum shaft carried by the casing and provided with a drum element fixed thereto and disposed within the casing, a second shaft mounted for rotation within said casing, a rotatable member carried within said casing and movable about the axis of said second shaft, pawl means carried by said rotatable member and engaging the interior of the casing to prevent rotation of said member in one direction with respect to the casing, a flexible friction member anchored at one end to said rotatable member, the other end of said flexible member being movable to provide for positioning the flexible member in contact with the drum carried by said winding drum shaft, and means controlled by the relative movement between said second shaft and said rotatable member to provide for the movement of said friction member into contact with said drum so as to impose thereon a retarding force reacting through said pawl means against said stationary casing.

9. In a hoist, a stationary casing, a winding drum shaft journaled for rotation therein, a drum member having a hub mounted on said shaft, means fixing said drum member to said shaft, a pair of radial extensions carried by the hub in spaced relation with respect to the drum portion of said member, pivot means supported by said extensions and the adjacent sections of said drum portion, weighted governor arms pivoted, respectively, on said pivot means and each having a spring receiving arm, spring means disposed between each of said arms and said hub and biasing the governor arms for movement radially inwardly toward said shaft, said governor arms tending to move radially outwardly against the bias of said springs upon the occurrence of an excessive rate of rotation of said shaft so as to engage said stationary casing to reduce the speed of said shaft, and a friction driving member adapted to be engaged with the drum portion of said member for rotating said winding drum shaft.

10. In a hoist, a stationary casing, a winding drum shaft journaled for rotation therein, a drum member having a hub portion fixedly secured to said shaft to rotate therewith, weighted governor arms carried by said member and engageable with said stationary casing to prevent excessive speed of rotation of said shaft, a friction member carried within said stationary casing and adapted to be moved into and out of frictional contact with the drum portion of said member, and means having a one-way connection with said casing and carrying said friction member so that the latter is adapted to react against said stationary casing and retard the rotation of said shaft when the friction member is moved into engagement with said drum member.

11. In a hoist, a stationary casing, a driving shaft, a flanged member rotatable mounted in said casing about said shaft, a pair of diametrically disposed pivot pins carried by said flanged member, a pair of pawls pivotally mounted on said pins and cooperating with said stationary casing to prevent rotation of said flanged member in one direction, a winding drum shaft rotatably mounted in said casing in coaxial relation with respect to said driving shaft and carrying a drum member in fixed relation, a friction member in the form of a spring strap anchored at one end to said flanged member and disposed in cooperative relation with respect to the drum carried by said winding drum shaft, a retractor mounted on one of said pivot pins and engaging the other end of said strap member, and means carried by the inner end of the driving shaft engaging the other pivot pin in one position and in the other position swinging said retractor to withdraw the friction member out of engagement with said drum.

12. In a hoist, a winding drum shaft, a driving shaft, a stationary casing in which said shafts are mounted, means disposed within said casing and rotatable relative to said driving shaft, pawl mechanism operatively connecting said means with said casing to prevent rotation of said means in one direction and to permit rotation relative to said casing in the other direction, biased means establishing a releasable connection between said first means and said winding drum shaft to provide for rotating the latter by turning the driving shaft in said other direction, and means op-

eratively connecting said driving shaft and said biased means and operative upon rotation of said driving shaft in said one direction to release said biased means from the winding drum shaft.

13. A hoist comprising, in combination, a stationary casing, a winding drum shaft rotatable with respect thereto, a driving shaft, a member movably carried upon said driving shaft and having pawl means cooperating with said casing to prevent rotation of said member in one direction and to provide for rotation thereof in the other direction, means serving to establish a driving connection between said member and said winding drum shaft when said driving shaft is rotated in said other direction with respect to said member, and means associated with said driving shaft and said member for releasing said last named means when said driving shaft is rotated in said one direction with respect to said member.

14. A hoist comprising, in combination, a winding drum shaft, a brake drum carried thereby, a stationary casing enclosing a portion of said shaft and said brake drum, a driving shaft journaled for rotation in said casing, pawl mechanism engageable with said casing and movable with respect to said driving shaft, means operated by the relative movement between said driving shaft and said pawl mechanism in one direction for establishing a connection with said winding drum shaft so as to actuate the latter from the driving shaft, and brake means movable into engagement with the brake drum carried by said winding drum shaft and reacting against said stationary casing through said pawl mechanism upon the occurrence of relative movement between said driving shaft and said pawl mechanism in the other direction.

15. A hoist comprising, in combination, a stationary casing, a driven shaft rotatable with respect thereto, a driving shaft, a member movably carried upon said driving shaft and having pawl means cooperating with said casing to prevent rotation of said member in one direction and to provide for rotation thereof in the other direction, means serving to establish a driving connection between said member and said winding drum shaft when said driving shaft is rotated in said other direction with respect to said member, means associated with said driving shaft and said member for releasing said last named means when said driving shaft is rotated in said one direction with respect to said member, a winding drum, shaft means to which said drum is fixed, and gear reduction means connecting said shaft means with said driven shaft.

16. A hoist comprising, in combination, a stationary casing, a tubular winding drum shaft rotatable with respect thereto, a driving shaft mounted within said tubular shaft, a member movably carried upon said driving shaft adjacent the inner end of said tubular shaft and having pawl means cooperating with said casing to prevent rotation of said member in one direction and to provide for rotation thereof in the other direction, means serving to establish a driving connection between said member and the inner end of said winding drum shaft when said driving shaft is rotated in said other direction with respect to said member, a winding drum driven from the outer end of said tubular winding drum shaft, and means associated with said driving shaft and said member for releasing said last named means when said driving shaft is rotated in said one direction with respect to said member.

17. In a hoist, a stationary casing, a driving shaft journaled for rotation therein, a winding drum shaft also journaled for rotation in said casing, a drum member disposed within the stationary casing and fixedly secured to said winding drum shaft, a rotatable member carried within said casing and provided with pawl means cooperating therewith to prevent the rotatable member from turning in one direction, a releasable friction member anchored to said rotatable member and adapted to engage said drum member so as to prevent rotation of said winding drum shaft in one direction, and means for controlling said friction member from said driving shaft.

18. A hoist comprising a stationary casing, a winding drum rotatably mounted with respect to said casing, means including a spring biased member adapted to connect said winding drum with said stationary casing to prevent rotation of the winding drum in one direction, means having a lost motion connection with said winding drum for rotating the latter in said one direction, and mechanism connected with said spring biased member and actuated by the initial movement of said last mentioned means to overcome the bias of said member and disconnect said winding drum from said rotation preventing means.

19. A hoist comprising a stationary member, a winding drum shaft journaled for rotation within said casing and having a drum member secured thereto within the casing, a driving shaft journaled coaxially of said winding drum shaft, a sleeve member mounted on said driving shaft for rotation with respect thereto, pawl means carried by said sleeve member and engageable with the interior of said casing to prevent movement of the sleeve in one direction, a biased friction member carried by said sleeve and normally engaging said drum member to hold the same in fixed relation with respect to the sleeve member whereby the pawl means of the latter prevents rotation of the winding drum shaft in said one direction, and means associated with said driving shaft for releasing said friction member when the driving shaft is moved in one directon, thereby permitting the winding drum shaft to rotate free with respect to said driving shaft and the sleeve member carried thereby.

20. In a hoist, a stationary member, a driven member rotatably mounted with respect thereto, mechanism serving to prevent rotation of said driven member in one direction, comprising means reacting against said stationary member and biased means releasably connecting said driven member to the means that reacts against said stationary member, and means rotatable in the other direction for driving said driven member in that direction, said rotatable means also being rotatable coaxially with respect to said driven member for shifting said biased means to disconnect the driven member from the means that reacts against the stationary member, thereby providing for rotation of the driven member in said one direction.

21. In a hoist, a stationary member, a driven member rotatably mounted with respect thereto, mechanism serving to prevent rotation of said driven member in one direction, comprising means reacting against said stationary member and means biased at all times to connect said driven member to the means that reacts against said stationary member, means movable relative to said driven member for shifting said biased means to disconnect the driven member from

the means that reacts against the stationary member, thereby providing for rotation of the driven member in said one direction, and means on the driven member for limiting the movement of said movable means relative thereto, whereby operation of said movable means drives said driven member.

22. A hoist comprising a stationary member, a winding member rotatably mounted with respect thereto, governor means connected with one of said members and acting against the other member for preventing the winding member from rotating too rapidly in one direction, means releasably connected with said winding member for rotating the same in the other direction, mechanism to prevent rotation of said winding member in said one direction, and means acting through said releasable means for disabling said rotation preventing mechanism to provide for rotation of the winding member in said one direction under the control of said governor means.

23. A hoist comprising the combination of a stationary casing, a load sustaining member rotatably mounted with respect to said casing, driving means releasably associated with said load sustaining member and including mechanism rockable in one direction to engage and drive said load member, said driving means being disengaged from said load member when said mechanism is rocked in the other direction, and governor means connected with said load sustaining member and adapted to react against said stationary casing to prevent too rapid a rotation of the load member in the other direction when said mechanism has been rocked to release said driving means from the load sustaining member.

24. A hoist comprising a stationary casing, a winding member rotatably mounted therein, governor means connected with said winding member and disposed within and reacting against said casing for preventing the winding member from rotating too rapidly in one direction, a part mounted in said casing for rotation relative thereto in one direction, means to prevent rotation of said part in the other direction, clutch means carried by said part and biased to engage said winding member and prevent the latter from rotating in said other direction, a second part mounted for movement relative to said first part, stop means limiting the amount of relative movement between said parts, whereby rotation of said second part in said one direction acts through said stop means to rotate said first part in said one direction, rotation of said first part acting through said biased clutch means to rotate said winding member in said one direction, and means actuated by rotation of said second part in the other direction for releasing said biased clutch means, thereby releasing the connection between said first part and said winding member.

25. A hoist comprising a stationary casing, a winding drum rotatably mounted with respect to said casing, governor means connected with said winding drum and adapted to react against said stationary casing to prevent too rapid a rotation of the winding drum in one direction, driving means comprising a part having a one way connection with said casing, a second part movable relative to said first part, releasable driving means between said first part and said winding drum, and limit means for limiting the relative movement between said parts, means operated by the initial movement of said second part between said limit means relative to said first part for actuating said releasable driving means, whereby said second part acts through said limit means and said releasable driving means for driving said winding drum in the other direction, initial movement of said second part in said one direction between said limit means acting through said releasable driving means for releasing said winding drum from said first part.

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