July 2, 1935. R. PAYSON 2,006,476

HOIST

Filed Nov. 16, 1933 2 Sheets-Sheet 1

Fig. 1.

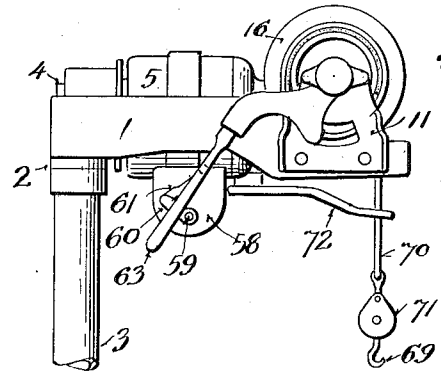


Fig. 2.

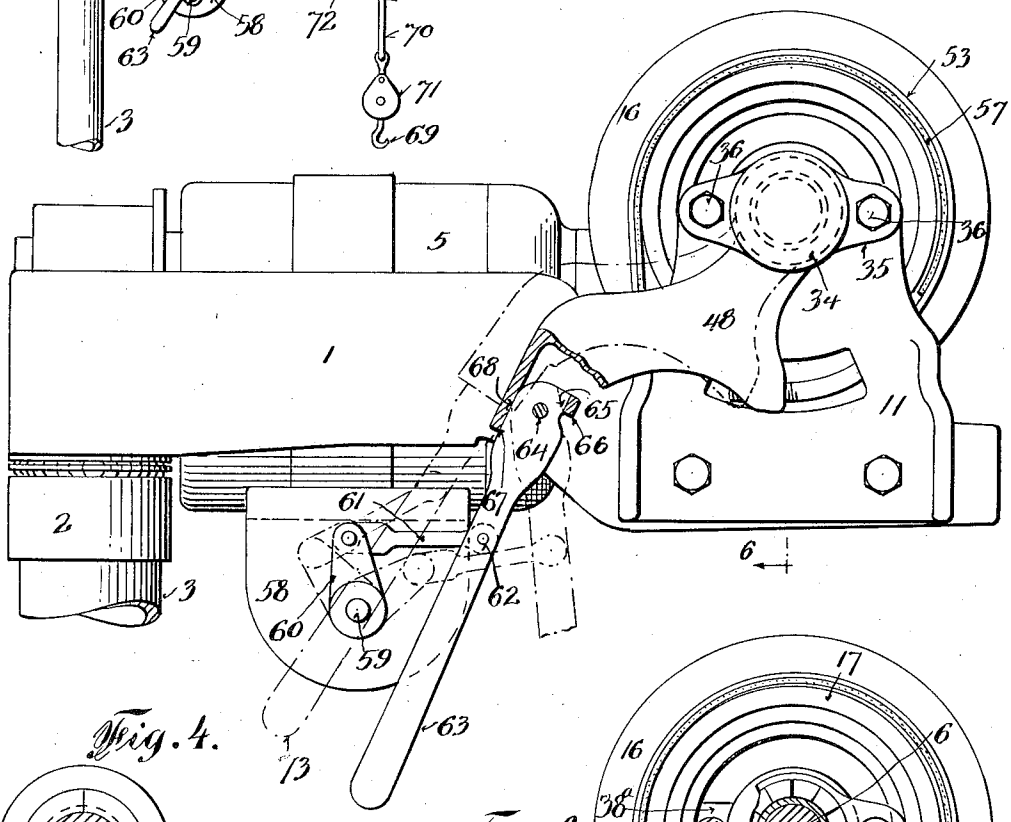


Fig. 4.

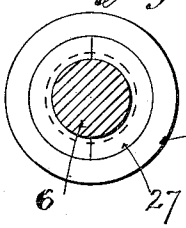


Fig. 5.

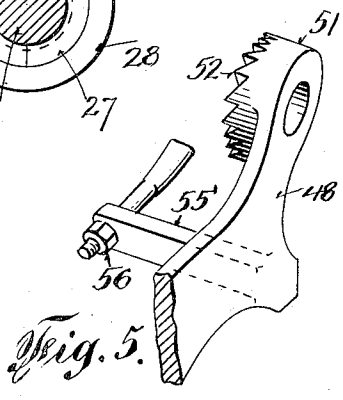
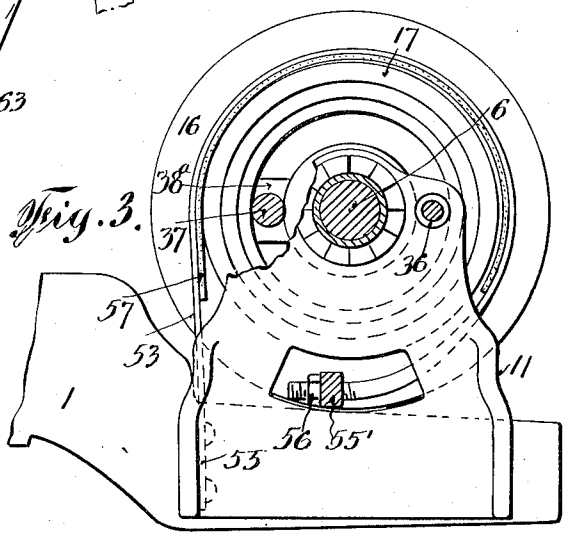


Fig. 3.



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HOIST

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Fig. 7.

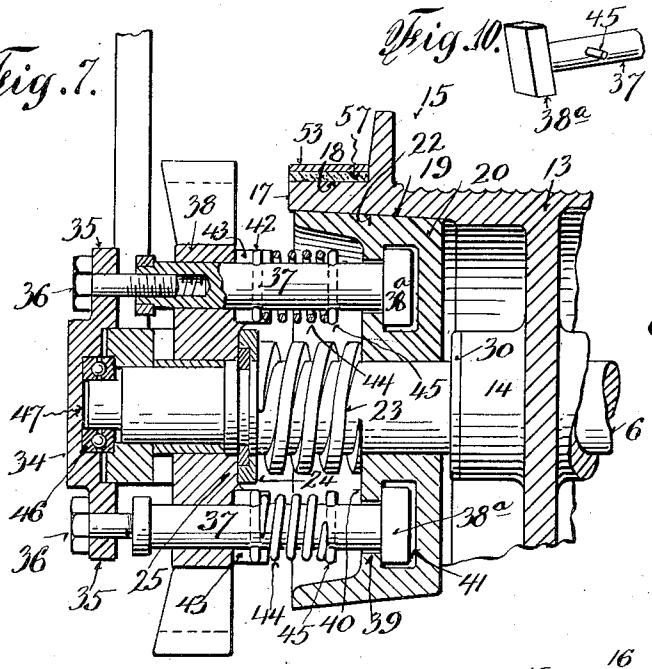


Fig. 10.

Fig. 8.

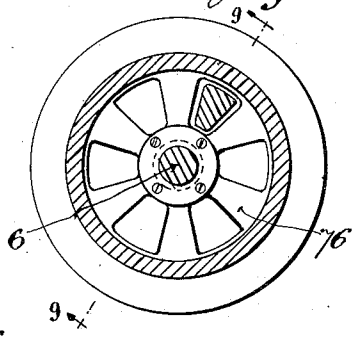


Fig. 9.

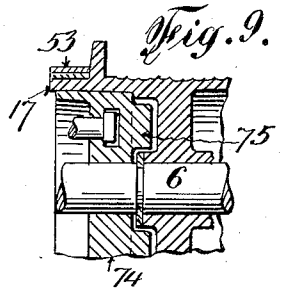
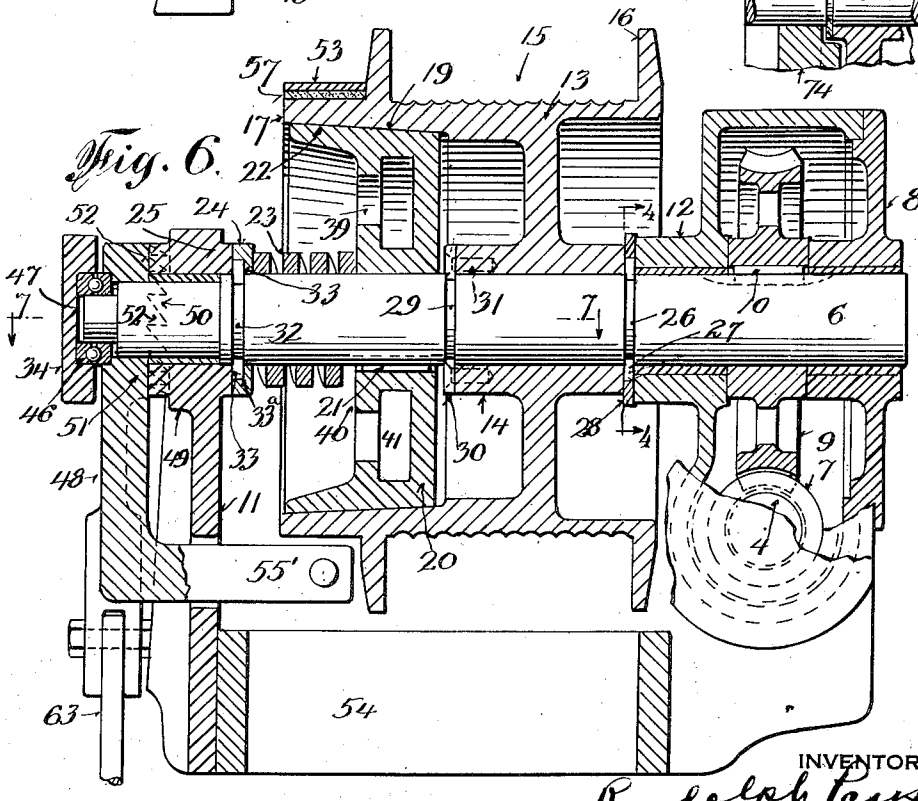


Fig. 6.



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UNITED STATES PATENT OFFICE

2,006,476

HOIST

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Application November 16, 1933, Serial No. 698,240

12 Claims. (Cl. 254—187)

My invention relates to hoists and while it is not limited to a particular use I have embodied it in a hoist adapted for raising and lowering ash cans. Hoists of this character generally consist of an extensible mast mounted in a pit or in a cellar so that the mast may be extended to a position reaching above the sidewalk level and it is provided with means at the top of the mast for operating through a rope or cable to raise and lower ash cans from the pit or cellar to the sidewalk level and vice versa. The present invention is especially useful when adapted to a hoist of this character and which is driven by a motor, at least while a load is being raised.

One object of the invention is to provide a hoist of the character stated, having a winding drum on which the rope or cable is wound, and loosely mounted upon a shaft, together with a clutch member keyed to said shaft to revolve therewith and adapted to be moved into clutching engagement with said drum whenever it is desired to have the drum operated for the purpose of raising a load. The clutch member is normally engaged with the drum so that the latter is driven except when disengaged by manually controlled means. My invention also relates to a novel device for causing the clutch member to engage and disengage the drum. This clutch is independent of the gearing by means of which the power is transmitted from the motor to the drum; that is, the clutch may be operated without shifting any of the gears.

Another object of my invention is to provide a brake band acting frictionally on the winding drum and controlled by manual means so that the retrograde or lowering movement of the drum may be controlled by a friction brake independent of the clutch; that is to say, the braking action and clutching action are performed through separate devices, although controlled through a common control, permitting the load to be lowered by gravity under manual control while the clutch is disengaged from the drum.

Another object of the invention is to provide a simple and manually operated break joint lever by means of which the clutch, the brake, and a controller for controlling the motor, may all be operated from a single lever by manual control which permits the clutch and the brake to be separately actuated and with the controller automatically actuated in accordance with the operation of the clutch. Other advantages and objects will be set forth in the following detailed description of my invention.

In the drawings forming part of this application,

Figure 1 is an elevation of the hoisting apparatus mounted on the upper end of the mast, the hoisting mechanism including my invention in the preferred form,

Figure 2 is an enlarged elevation of parts of the hoisting mechanism with parts broken away,

Figure 3 is an elevation of part of the device shown in Figure 2 with parts broken away to show the interior construction,

Figure 4 is a cross sectional view of the drum shaft and showing a certain collar mounted on said shaft,

Figure 5 is a perspective view of a portion of the controlling lever which causes the disengagement of the clutch,

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

Figure 7 is a sectional view taken on the line 7—7 of Figure 6,

Figure 8 is a sectional view showing a modified form of clutch,

Figure 9 is a sectional view taken on the line 9—9 of Figure 8, and

Figure 10 is a perspective view of one of the parts of the mechanism.

There is a substantially U shaped frame 1 having a hub 2 mounted revolvably on the upper end of a mast section 3 and the working parts of the present invention are mounted on this frame in order to be swung around the mast to accommodate the device to meet various conditions in the use of the hoist.

The shaft 4, shown as extending radially of the mast, is the armature shaft of the motor 5 suitably mounted on the frame 1 and from this motor shaft the drum shaft 6 is driven as follows: There is a worm 7 carried by and fixed to the motor shaft 4 and arranged in a suitable housing 8. This worm meshes with and drives the worm gear 9 which is also arranged in the housing 8 and which is keyed on the shaft 6 by means of the key 10 so that when the worm gear revolves the shaft 6 revolves with it.

This shaft 6, which I prefer to call the drum shaft, is shown disposed at right angles to the motor shaft from which it is driven and it is mounted in suitable bearings in a bracket 11 bolted or otherwise secured to the U shaped frame 1 and also in the hub portion 12 of the housing 8.

The winding drum 13 is provided with a hub 14 mounted to revolve freely on the shaft 6 except when gripped by the clutch member. This winding drum has a peripheral pocket 15 to per-

mit the winding cable to be wound therein between the side flanges 16.

The drum has a flange-like extension 17 having a friction surface 18 with which the braking device co-operates, as will be hereinafter set forth. The winding drum has on its perimeter a tapering or frusto-conical clutch surface 19 with which the cone clutch is adapted to engage.

The cone clutch including a circular body 20 is also mounted on the shaft 6 in a manner to permit it to be moved slightly lengthwise of the shaft, but it is keyed to the latter by means of a key 21 so that the clutch member is compelled to revolve with the shaft. This clutch member has a tapered or frusto conical surface 22 which is parallel to and adapted to engage the corresponding clutch surface 19 of the drum so that when the clutch member is pressed to the right in Figure 6 or in Figure 7, its tapered surface will engage the tapered surface of the drum and cause the latter to be locked with the clutch, whereupon the winding drum will be revolved with the shaft 6 through the action of the cone clutch. There is a coiled spring 23 surrounding the shaft 6 with one end pressing against the left face of the clutch member and with its opposite end pressing against a washer 24 which itself presses against one face of the hub 25 of the bracket 11. The tendency of this spring is at all times to press the clutch into engagement with the friction surface of the drum and it may be said that the normal condition is that in which the clutch grips the drum.

I have provided novel means for holding the winding drum in proper position upon the shaft 6 and for holding the shaft against axial movement. In Figure 6 I have shown a circumferential groove 26 in the shaft 6 and a washer 27 consisting of two half circular and annular members which are adapted to be assembled so that they extend into the groove 26 of the shaft and project laterally beyond the outer diameter thereof.

There is another washer 28 consisting of a complete annular ring or, in other words made in one piece, which fits over the two half washers 27 for the purpose of retaining the latter in assembled condition upon the shaft. The two-piece and one-piece washers both rest against one end of the hub 12 of the housing and one end of the hub 14 of the winding drum rests against the opposite faces of these two washers. It will be seen that the split or two-piece washer may be assembled to extend into the grooves 26 of the shaft and then the one-piece washer 28 may be applied to the periphery of the separable washer, so that the latter is held in assembled position upon the shaft and the washers themselves will be retained in place by the members which they hold separated. These washers prevent the drum from moving to the right on the shaft 6 beyond the point where the end of the hub 14 of the drum engages the washers. The winding drum being held against longitudinal movement in one direction permits the clutch to be forced against the friction surface of the drum.

There is a second annular groove 29 formed in the shaft 6 adjacent the left hand end of the hub 14 of the winding drum. There is a washer 30 consisting of two half circular members which, together, form an annular ring assembled around the shaft so that the two halves of the washer extend into the groove 29. This washer forms an abutment for the left hand end of the hub 14 of the winding drum so that the drum cannot shift to the left in Figure 6. The drum is, therefore, free to revolve on the shaft but is prevented from moving lengthwise thereof by the several washers which I have just described. Preferably, the two halves of the washer 30 are secured after being assembled in the groove 29 to the left hand end of the hub 14 of the drum by means of screws 31 which pass through apertures in the halves of the washer 30 and are threaded into the ends of the hub 14.

As stated above, the clutch member is movable lengthwise of the shaft in relation to the drum and is keyed to the shaft so that it always revolves with it and the drum revolves only when the clutch members are engaged with each other.

I have provided a third peripheral groove 32 in the shaft 6 and there are assembled in this groove two halves of an annular washer 33, each forming a semi-circle so that they may be assembled laterally upon the shaft with the inner portions of the washer extending into the groove 32. There is a washer 24 of L-shaped cross section, the inner periphery of which fits the outer periphery of the shaft 6. The L-shaped space 33a in this washer engages both the side face and the periphery of the two sections of the washer 33 and one face of the washer 24 engages against one end of the hub 25. The washer 24 therefore holds the two-part washer 33 assembled on the shaft. One end of the coiled spring 23 which forces the clutch member towards the winding drum, presses against the washer 24 so that the action of the spring is to press the washers 24, 33 and therefore the shaft 6 in one direction and to press in the opposite direction against the clutch member 20. The shaft cannot move axially because of the washers 27, 28 so that the action of the spring causes the clutch member to be moved towards the winding drums.

The device for withdrawing the clutch member 20 to discontinue the drive of the winding drum consists of the following: There is a plate 34 having opposite extensions 35 to receive therethrough the bolts 36 which are threaded into bores of the rods 37. These rods are mounted to move axially in the bearings parallel with the shaft 6, two such rods being shown disposed 180° apart in Figure 7. Each of the rods 37 has a block or head 38a on its right hand end in Figure 7, and these heads are adapted to be passed through the annular aperture 39 in the wall 40 formed as part of the clutch member.

The heads 38a are adapted to be passed through the slot 39 when so turned as to present the major axis of the heads lengthwise of the slot 39 until the heads enter the annular pocket 41 formed within the clutch member. After these heads have been passed into the pocket 41 the rods 37 are turned so that the heads 38a have their major dimensions extending across the opening 39 so that the ends of the heads engage the right hand side of the wall 40 and permit the rods 37 to move the clutch member to the left in Figures 6 and 7. As the opening 39 is of annular shape, as is also the pocket 41 it will be obvious that the clutch member which is keyed to the shaft 6 can revolve in relation to the rods 37 while the rods are always capable of moving the clutch member to the left to release the drive action on the winding drum. I have provided a pin 42 extending through each rod 37 with the ends of the pin projecting beyond the rods and extending into grooves or slots 43 in the bearings 38 of the frame, so that when the heads 38a have been properly assembled in the pockets 41 the rods 37 cannot turn because the pins 42 engage in the slots 43 to hold the rods from turning and there-

by prevent the heads 38a from accidentally turning and being withdrawn through the opening 39.

I have shown a coiled spring 44 disposed around each rod 37 with one end abutting against the member 38 of the frame and the other end abutting against the pin 45 which extends through each rod 37 and projects laterally beyond the same, as shown in Figure 7. These springs have a tendency to move the rods 37 to the right as far as will be permitted by the heads of the bolts 36 and they prevent the bolts from moving to the left except when the plate 34 is so moved in the manner hereinafter described. The springs 44 also tend to move the heads 38a slightly from the wall 40 of the clutch.

I prefer to provide a ball bearing 46 partly seated in the recess 47 of the plate member 34 and disposed around the reduced end of the shaft 6. This bearing lies between the plate 34 and the lever arm.

It has been stated that the clutch member is forced to the right, as shown in Figures 6 and 7 by the spring 23. The means for forcing the clutch member to the left to release the drive of the drum is as follows: On the left hand end of the hub 49 which forms a part of the bracket 11 there are formed teeth 50 around the hub, which teeth have straight sides and slanting sides. The lever arm 48 pivoted on the left hand end of the shaft 6 has the hub 51 one end of which has a set of teeth 52 facing the teeth 50 and adapted to mesh therewith. When these teeth are in mesh the position of the hub 49 of the lever 48 will be such as to permit the clutch member to be engaged with the drum; but as will be described hereinafter, the lever may be turned so that the teeth 52 rise on the teeth 50 and thus force the plate 34 to the left in Figures 6 and 7.

The brake device is as follows: There is a flexible brake band 53 which is shown as having one end secured to the wall 54 by means of rivets 55 and this band extends upwardly and around the brake surface 18 of the drum, the major portion of its circumference, and the opposite or free end of the brake band is connected with a cross member 55' or lateral arm of the lever 48 by means of a nut 56 which is threaded onto the circular end of the brake band, as shown more fully in Figure 3. This brake band is lined with a lining 57 of leather or other suitable material, which is attached to the band and forms a lining which is in direct engagement with the friction surface 18 of the winding drum. It will be apparent that this brake band may be tightened or loosened upon the surface 18 by the movement of the lever 48 in the manner hereinafter described.

I have shown simply the exterior or shell of any well known controller box 58 by means of which the motor 5 is controlled; that is to say, there is a shaft 59 extending from this box and it will be understood that a suitable switch within the box controls the supply of current to the motor, so that by oscillating the shaft 59 the motor may be turned on or off. There is a crank arm 60 fixed to the shaft 59 and it is pivotally connected with a link 61 which latter is also pivotally connected at 62 with a hand lever 63. This latter lever is pivotally connected at 64 with the lever arm 48 by novel means which permits the arm 63 to be moved in one direction without moving the lever arm 48, but which serves to move the latter in one direction, starting from a normal or intermediate position of the arm 63. For this purpose I have shown an abutment surface 65 on the operating arm 63 which is adapted, when the parts are in the position shown in Figure 2, to rest against a portion 66 of the lever 48 but when the arm 63 is moved counterclockwise, the abutment 65 moves away from the member 66. Similarly there is a flat abutment surface 67 on the arm 63 which also rests against the portion 68 of the lever 48 when the parts are in the position shown in Figure 2, but this engagement does not prevent the arm 63 from being moved counterclockwise in relation to the lever arm 48.

Operation

As has been stated, the cone clutch is normally engaged with the clutch member of the winding drum and let it be assumed that the operator desires to raise a load from the lower to the higher level by means of the apparatus shown and described herein. Let us assume that the hook 69 is at the lower level and that sufficient of the cable 70 has been paid off from the drum to allow the hook to be in the lower position. The ash can or whatever other body is to be raised may be hung on the hook 69 while it is in its lower position.

To raise the load the operator moves the lever arm 63 from the full line position of Figure 2 to the right hand dotted line position. In this movement of the lever arm 63 it pivots on the pin 64 but it does not change the position of the lever arm 48 to which it is attached. The movement of the lever arm 63 in the operation just described effects, through the link 61 and the lever arm 60 the rocking of the shaft 59 in the direction necessary to close the switch in the controller box, and thus set the motor into operation. The motor will operate through the worm 7 to revolve the worm gear 9 and as the latter is keyed to the shaft 6 it will operate this shaft. As the clutch member is normally engaged with the clutch portion of the winding drum and as the clutch member is keyed to the shaft 6 the winding drum will be operated in the direction necessary to reel up the cable 70 and to lift the load. The operator may, at any time, release the lever arm 63 whereupon it will be drawn back from the right hand dotted line position to the full line position in Figure 2 by the spring (not shown) in the controller box. Generally the lever arm 63 will be released when the load has been raised to the desired level. If, however, the operator should fail to release this lever arm by the time the load reaches the highest position, the block 71 which carries the hook 69 will engage the lever arm 72 and swing it upwardly. This lever arm actuates a switch (not shown) to disconnect the current from the motor, so that the latter will be stopped when the load is in its higher position, even though the operator should neglect to release the lever arm 63.

The ash can may be lifted off the hook 69 and the contents discharged. Whenever it is desired to lower the empty can, it is hung on the hook 69 and the lowering is effected by gravity in the following manner:

The lever arm 63 is swung to the left in Figure 2, towards the dotted line position 73 and in this movement the lever arm 48 is carried or swung with the arm 63 because the abutments 65 and 67 engage the portions 66 and 68 of the lever 48 and as a result the lever arm 48 is swung simultaneously to the left with the lever arm 63. As soon as this motion of the lever arm takes place, the teeth 52 on the hub of the lever arm 48 rise on the inclinations of the teeth 50 of the hub 49 so

that the lever arm 48 is forced to the left in Figure 6 by the action of the slanting teeth; and this moves the plate 34 to the left in Figures 6 and 7. As the rods 37 are attached to the plate 34 they are also moved to the left in Figure 7 and the heads 38 move the clutch member to the left in Figures 6 and 7 so that this clutch member is disengaged from the clutch portion of the winding drum. This releases the winding drum from driving connection with the shaft 6 and permits the winding drum to turn in reverse direction to that which it turned when the load was being raised. If the lever arms 63, 48, are moved further to the left, or to the position shown in dotted lines 73 in Figure 2, the arm 55' which is connected to the free end of the brake band will also be moved to the left and this will tighten the brake band around the friction surface 18 of the brake drum and apply the necessary braking action to prevent the sudden dropping of the load. By regulating the braking action through the lever arms 63, 48 the speed of lowering of the load may be controlled as desired. While the lever arms 63, 48 are in the left hand position in Figure 2, current is cut off from the motor in the controller box 58 and in fact, the only time that the motor is supplied with current is when the lever arm 63 is in the dotted right hand position in Figure 2. After the load has been lowered into the desired position the lever arm 63 may be released and it will be returned to the full line position in Figure 2 by the action of the co-operating teeth 52, 53 and by the spring 23.

When the lever arms 63, 48 return to the full line position of Figure 2, the spring 23 will press the clutch member 20 into clutching engagement with the clutch portion of the winding drum, whereupon the latter will be restored to the condition necessary for the raising of the next load.

From the above it will be apparent that I have provided a simple and effective device for raising and lowering bodies in connection with a hoist. There is no necessity of shifting any of the gears to control the clutch action and the clutch is operated independently of the gears. By having the clutch normally engaged with the drum, the latter cannot unwind or race after the load has been lowered. The device for drawing the clutch out of engagement with the winding drum is both simple and effective. The spring 23 which moves the clutch into engagement with the drum reacts upon the shaft 6 and this not only simplifies the construction but it makes it unnecessary to apply the thrust of this spring against other parts of the device. The common operating lever controls in a novel manner the throwing out of the clutch, the throwing in of the brake, and it also controls the starting and stopping of the motor.

While I am not the first to use a single control for throwing out the clutch and for controlling the motor, I believe I am the first to have this common means also control the brake, and the mechanism through which the common lever or control operates is, I believe, entirely new.

In Figures 8 and 9 I have shown how a different form of clutch may be used instead of the cone clutch described above. Herein the clutch member 74 is operated in the same manner as the clutch member 20 in the previously described form, but instead of this member having a frusto conical surface to lock against a corresponding surface of the winding drum, I have provided projections 75 extending from the right hand face of the member 74 and being disposed radially around the same.

These projections are adapted to move in between interlocking members 76 projecting from the vertical wall of the winding drum. This forms a positive or jaw clutch engagement. When the clutch member 74 is in its right hand position in Figure 9, the projections 75 interlock with the projections 76 and the winding drum is then positively driven by the clutch member 74. When the clutch member 74 is moved to the left sufficiently to disengage the projections 75 from the cooperating projections 76 the winding drum will cease to be operated through the clutch. In other respects this device operates the same as in the form of the invention first described.

Having described my invention, what I claim is:

1. A hoisting apparatus including a drum shaft, a winding drum mounted to revolve upon said shaft, said shaft having a peripheral groove, a washer composed of separable sections adapted, when assembled around said shaft, to extend into said groove and to abut the end of the hub of the winding drum, and another washer forming a complete annular ring, adapted to be assembled around said separable washer to lock the same in assembled position around said shaft.

2. In a hoisting apparatus a drum shaft, a winding drum mounted to revolve upon said shaft, a motor, gears through which said motor operates said drum shaft, a clutch member independent of said gears and mounted to slide axially on said drum shaft and having means for causing said clutch member to revolve with the shaft, a spring around said drum shaft acting on said clutch member to force it into clutching engagement with said drum, said drum shaft having a peripheral groove, a washer composed of separable segments adapted to be assembled to form a ring around said drum shaft and to project partly into said peripheral groove, a one-piece washer engaging one face and the periphery of said first washer to hold said first mentioned washer in assembled position, one end of said spring acting against said second mentioned washer, and manual means for moving said clutch to disengage it from said winding drum.

3. A hoisting apparatus including a frame, a drum shaft mounted in said frame, a winding drum mounted to revolve on said shaft a clutch member having means causing the clutch member to revolve with the shaft, a spring surrounding said shaft for normally pressing said clutch member into clutching engagement with said drum, and means for moving said clutch member in opposition to said spring to disengage it from said winding drum, including teeth on said frame, a manually operated lever having teeth co-operating with said first teeth whereby said lever, when turned, is caused to move axially, a plate co-operating with said lever so that it is moved axially therewith, rods connected with said plate and having elongated heads, said clutch member having an annular pocket and having an annular opening communicating with said pocket, said rods extending through said annular openings and with said heads engaging in said pockets to cause lateral movement of said clutch member when actuated by said lever.

4. A hoisting apparatus including a drum shaft, a winding drum mounted to revolve on said shaft, a clutch member mounted on said shaft and having means for causing the clutch member to revolve with said shaft, a spring tending to move the clutch member into clutching engagement with the drum, and manually operated means for disengaging the clutch from the

drum, including teeth on said frame, a manually operated lever having teeth co-operating with said first teeth whereby when said lever is turned said teeth will cause axial movement of said lever, a plate adapted to be moved by the axial movement of said lever, rods mounted to slide axially in said frame, and connected with said plate, enlarged heads on said rods, said clutch member having an annular pocket to receive said heads, and having an annular opening through which said rods project.

5. A hoisting apparatus, including a drum shaft, a winding drum mounted to revolve on said shaft, a clutch member mounted on said shaft and having means for causing the clutch member to revolve with said shaft, a spring tending to move the clutch member into clutching engagement with the drum, and manually operated means for disengaging the clutch from the drum, including teeth on said frame, a manually operated lever having teeth co-operating with said first teeth whereby when said lever is turned said teeth will cause axial movement of said lever, a plate adapted to be moved by the axial movement of said lever, rods mounted to slide axially in said frame, and connected with said plate, enlarged heads on said rods, said clutch member having an annular pocket to receive said heads, and having an annular opening through which said rods project and pins in said rods engaging in grooves in said frame to prevent said rods from turning after said heads have been inserted into said pocket of the clutch member.

6. A hoisting apparatus, including a drum shaft, a winding drum mounted to revolve on said shaft, a clutch member mounted on said shaft and having means for causing the clutch member to revolve with said shaft, a spring tending to move the clutch member into clutching engagement with the drum, and manually operated means for disengaging the clutch from the drum, including teeth on said frame, a manually operated lever having teeth co-operating with said first teeth whereby when said lever is turned said teeth will cause axial movement of said lever, a plate adapted to be moved by the axial movement of said lever, rods mounted to slide axially in said frame, and connected with said plate, enlarged heads on said rods, said clutch member having an annular pocket to receive said heads, and having an annular opening through which said rods project, and a spring surrounding each of said rods and pressing said rods towards said clutch member.

7. In a hoisting apparatus a drum shaft, a winding drum mounted to revolve on said shaft, means for operating said drum shaft, a clutch member revolvable with said shaft and adapted to be moved axially to engage and disengage said drum, a spring for moving said clutch into engagement with said drum, and means for moving said clutch to disengage it from said drum, including a lever, a manually operated lever pivotally connected with said first lever by a break-joint whereby said second lever may be moved pivotally in one direction in relation to said first lever, and whereby movement of the second lever in the opposite direction will cause said first lever to be operated, a controller for said motor and means connected with said second mentioned lever for operating said controller.

8. A hoisting apparatus including a drum shaft, a drum revolvable thereon, a motor for operating the same, a clutch member revolving with said shaft and adapted to be moved axially thereof into and out of clutching engagement with said drum, a spring for moving the clutch member into engagement with the drum, a manually operated lever for disengaging the clutch from said drum, a second lever pivotally connected with said first lever by a break-joint, a controller for said motor and means connected with said second lever for operating the controller, said second lever being adapted to be moved in one direction to start the motor without moving said first lever and adapted to be moved in the opposite direction to operate the controller to stop the motor and to move said first lever and thereby disengage the clutch from the drum.

9. A hoisting apparatus including a drum shaft, a drum revolvable thereon, a motor for operating the same, a clutch member revolving with said shaft and adapted to be moved axially thereof into and out of clutching engagement with said drum, a spring for moving the clutch member into engagement with the drum, a manually operated lever for disengaging the clutch from said drum, a second lever pivotally connected with said first lever by a break-joint, a controller for said motor and means for connecting the same with the second lever, a brake band co-operating with said drum and means whereby said first lever will apply the braking action on said drum, said second lever being adapted to be moved pivotally in relation to said first lever in one direction to start the motor and when moved in an opposite direction from the normal position to operate said first lever and to thereby disengage said clutch and tighten said brake band on said drum.

10. In a hoisting apparatus a drum shaft, a winding drum mounted to revolve on said shaft, a motor for driving said shaft, a clutch member revolvable with said shaft and adapted to be moved axially to engage and disengage said drum, and means for shifting said clutch, including a lever, a manually operated lever connected with said first lever by a break-joint whereby said second lever may be moved pivotally in one direction in relation to said first lever and whereby movement of the second lever in the opposite direction will cause said first lever to be operated to shift said clutch, a controller for said motor and means connected with said second mentioned lever for operating said controller.

11. A hoisting apparatus including a drum shaft, a drum revolvable thereon, a motor for operating the shaft, a brake for controlling the operation of said drum, a controller for said motor, a lever controlling the actuation of said brake, a second lever connected with said first lever by a break-joint whereby said second lever may be actuated in one direction without operating said first lever and whereby the operation of said second lever in another direction will actuate said first lever to control the brake, and means connecting said controller with said second lever whereby the latter will control the operation of the motor.

12. The combination of a shaft, a winding drum mounted to revolve upon said shaft, said shaft having peripheral grooves, washers composed of separable segments adapted to be assembled to form a ring projecting partly into said grooves of the shaft and adapted to abut the hub of the winding drum to prevent axial movement of the winding drum on said shaft, and means for securing said segments in assembled position on said shaft.

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