Oct. 3, 1961 J. D. RENOUD 3,002,727

CABLE HOIST

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Fig. 1

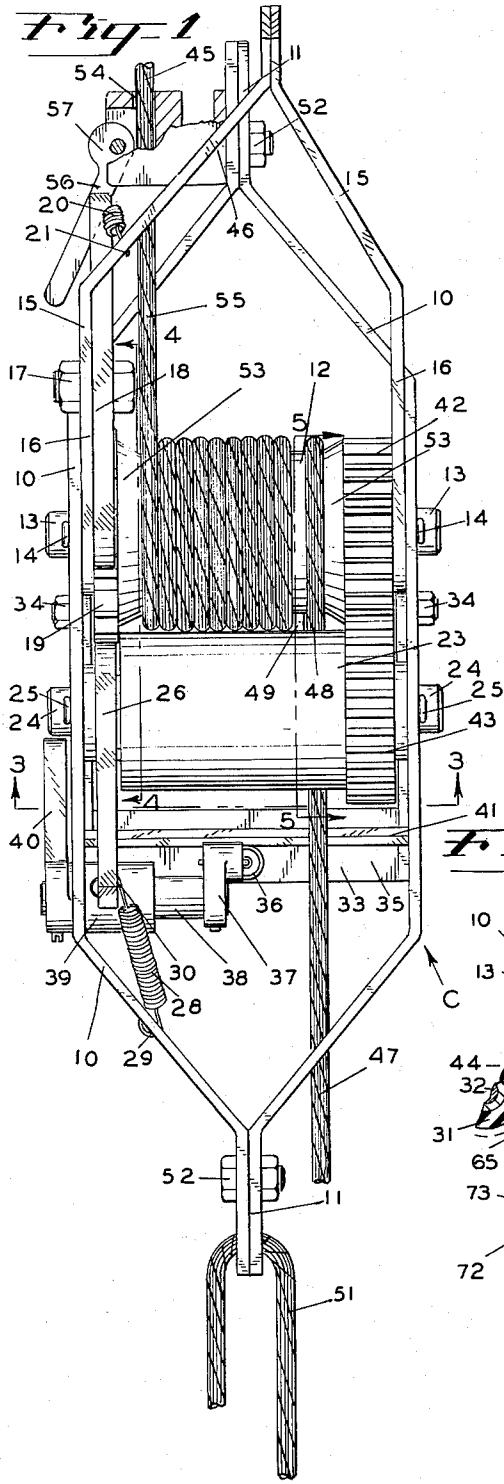


Fig. 3

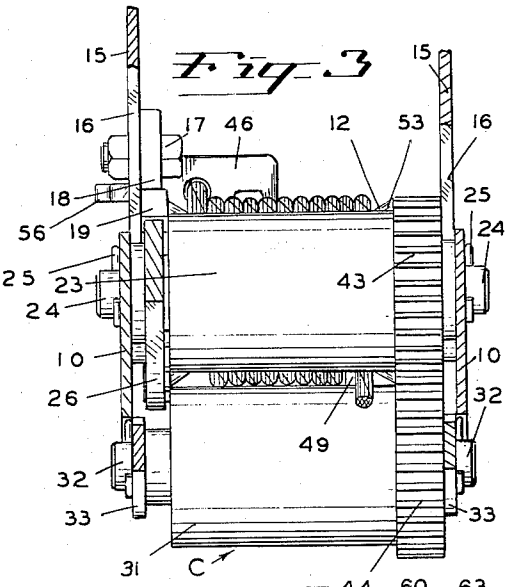


Fig. 7

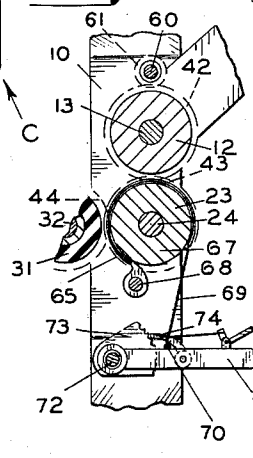
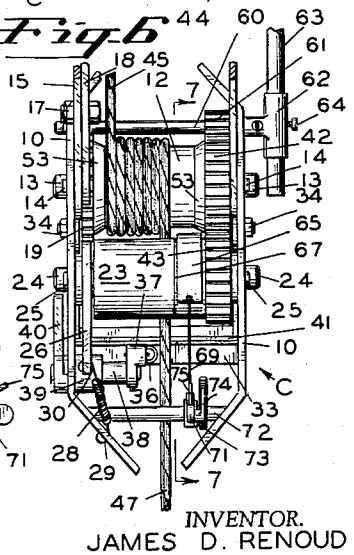


Fig. 6



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Fig-2.

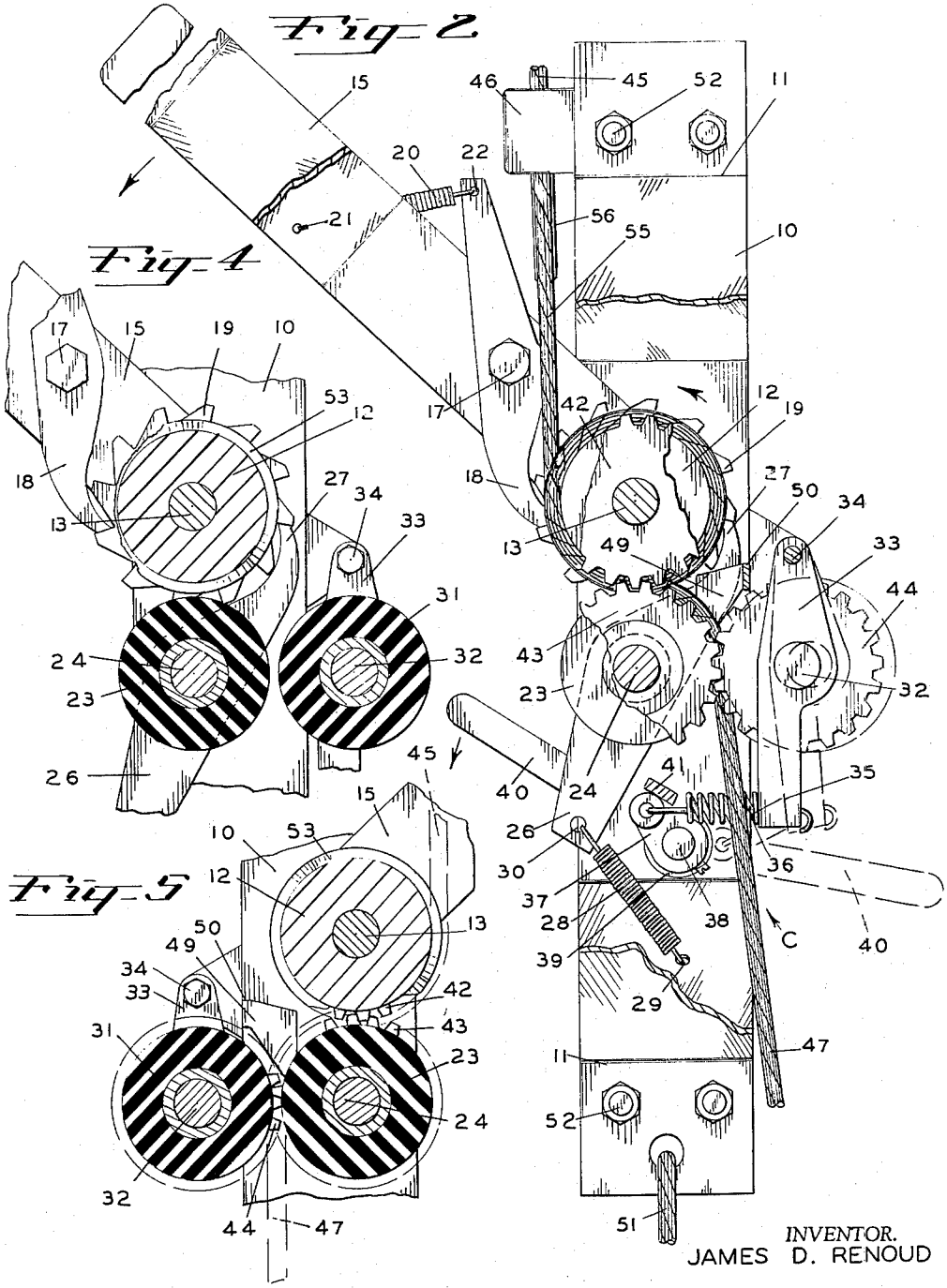


Fig-4

Fig-5

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CABLE HOIST

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1 Claim. (Cl. 254—150)

The present invention relates to cable hoists particularly adapted for use in connection with the lifting or pulling of objects.

The primary object of the invention is to provide a cable hoist in which a cable engages about drums and passes through the drums without piling up on the drums, a limited amount of turns being used, but an unlimited distance of operation can be obtained within the extent of the cable length used.

Heretofore in hoists, the cable had to be contained within the hoist regardless of the amount of cable, but with this new and improved hoist any amount of cable can be used but only a limited amount is located within the hoisting mechanism at any one time.

A further object of this invention is to provide means to pay out the cable for releasing the load without driving the hoist drums.

A still further object of the invention is to provide a cable hoist that can be operated as a permanent installation or as a portable hoist.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

FIGURE 1 is a front elevation of the invention, partially broken away for convenience of illustration.

FIGURE 2 is a side elevation looking to the left of FIGURE 1 with parts broken away and in section for convenience of illustration.

FIGURE 3 is a fragmentary horizontal section taken on the line 3—3 of FIGURE 1, looking in the direction of the arrows.

FIGURE 4 is a fragmentary sectional view, taken on the line 4—4 of FIGURE 1, looking in the direction of the arrows.

FIGURE 5 is a fragmentary sectional view, taken on the line 5—5 of FIGURE 1, looking in the direction of the arrows.

FIGURE 6 is a fragmentary front elevation of a modified form of the invention.

FIGURE 7 is a sectional view, taken on the line 7—7 of FIGURE 6, looking in the direction of the arrows.

Referring now to the drawings in detail wherein like reference numerals indicate like parts throughout the several figures, the reference character C indicates generally a cable hoist constructed in accordance with the invention.

The cable hoist C consists of a frame 10, preferably rectangular in shape, converging and joined at 11 at each end thereof. The frame 10 is preferably demountable so that the same can be taken apart for inserting or removing the hoist mechanism.

Journalled in the frame is a cable drum 12 carried by a transverse shaft 13. The shaft 13 is held in position by cotter keys 14, referring particularly to FIGURE 1. An operating handle 15 is pivotally mounted to the shaft 13 at its end 16.

Pivotally journalled to the handle 15 by a pivot bolt 17 is a pawl 18. The pawl 18 cooperates with ratchet teeth 19 fixedly secured to the drum 12 or integrally formed therewith. The pawl 18 is held into engagement with the ratchet teeth 19 by action of a spring 20, which has one of its ends fixedly secured at 21 to the handle 15, and the opposite end secured at 22 to the pawl 18. When the lever 15 is pulled down by the operator it will rotate the drum 12 in the direction of the arrow.

A cable take up drum 23 is rotatably mounted on a transverse shaft 24 fixedly secured to the frame 10 by keys 25. Also pivotally mounted to the shaft 24 is a lever 26 having a pawl 27 formed on one of its ends to engage ratchet teeth 19 of the drum 12. The pawl 27 prevents the drum 12 from rotating backward when moved by the handle 15.

The pawl 27 is held in contact with the teeth 19 by action of a spring 28 fixedly secured at one end 29 to the frame 10, and at its opposite end pivotally connected at 30 to the lever 26, referring particularly to FIGURES 1 and 2.

A second take up drum 31 is rotatably mounted on the shaft 32. The shaft 32 is fixedly secured within the pivotally mounted double frame 33. The frame 33 is pivotally mounted to the main frame 10 at 34 at its one end, and the opposite end 35 is pulled towards the frame 10 by a spring 36. One end of the spring 36 is connected to the end 35 of the frame 33, the opposite end of the spring 36 being connected to the crank 37. The crank 37 is fixedly secured to the stub shaft 38, which is journalled within the boss 39, forming part of the side member of the frame 10.

A lever 40 is also fixedly secured to the shaft 38, to be operated manually. In the position shown in FIGURE 2, the take up drum 31 is brought towards the take up drum 23 by the spring 36. It will be noted that the spring 36 extends past the center of the shaft 38, causing the crank 37 to rest against a stop 41. This position will be maintained until the operator pulls the lever 40 in the direction of the arrow, where it will take the broken line position, completely releasing the tension on the spring 36 and permitting the take up drum 31 to move away from the take up drum 23. The drums 23 and 31 are preferably made from a resilient material, such as rubber, so that considerable driving friction is obtained in the operation thereof against the cable.

Forming part of the drum 12 is a spur gear 42, and also forming part of the take up drum 23 is another spur gear 43 to maintain the drum 12 and the take up drum 23 in timed relation. The gear 42 of the drum 12 rotates the drum 23 through its gear 43 when the lever 15 is operated. The take up drum 31 may also be geared by way of the integral spur gear 44 to the gear 43 of the take up drum 23. The drum 31 in some cases may not have to be driven from the drum 23, as this drum could be an idler.

The lifting cable 45 is wound in several turns around the drum 12, as best illustrated in FIGURES 1 and 2 with one turn adjacent one of the conical ends of the drum 12. This cable 45 is held in line to the drum 12 by the guide 46, and is wound around the drum 12 the desired number of turns. The free end 47 of the cable 45 passes down at 48 and between the take up drums 23 and 31, referring particularly to FIGURE 2.

A finger 49 is interposed between the one turn adjacent the conical end of the drum and the adjacent turn and frictionally engages the one turn. The finger 49 maintains the free end of the cable 45 in the position shown, particularly in FIGURE 1, so that the same will not move transversely of the hoist in its operation. This finger 49 forms part of the frame 10, as indicated at 50. Any suitable form of lifting cable 51 or hook may be secured to the lower end of the frame 10 for supporting the load being either lifted or pulled.

In order to assemble or disassemble the mechanism of the hoist, the bolts 52 are removed, permitting the frame 10 to be separated.

The ends of the drum 12 are cone shaped as indicated at 53. The purpose of this is to maintain the cable 45 in a predetermined location on the drum 12 while in operation. The cable 45 passes through the guide 46 as

indicated at 54. When the hoist C is being operated, the cable 45 is free to move through guide 46, but when the load is slacked off to prevent the cable 45 from slacking on the drum 12 at the point 55, it is desirable to lock the cable 45 within the guide 46. This is accomplished by raising the lever 56, which revolves the cam 57, tightening the same against the side of the cable 45, pushing the cable 45 against the side of the opening 54, preventing the cable 45 from moving through the guide 46 until the lever 56 is again lowered in the operation of the hoist C.

The take up drums 23 and 31 maintain a taut condition of the cable 45 between the drum 12 and the free end 47 for raising the load. When it is desired to lower the load or release the same, the take up drums 23, 31 are separated allowing the turns of the cable about the drum 12 to rotate about the drum 12 for releasing or lowering the load.

The mode of operation of the cable hoist C will now be described. The lever 40 is moved to the broken line position as viewed in FIGURE 2 to separate the take up drum 31 from the take up drum 23. The free end 47 of the cable 45 is wound around the drum 12 a number of turns, as best illustrated in FIGURE 1, the last turn of the free end of the cable 45 will be placed to the right of the guide finger 49, and then inserted between the take up drums 23 and 31, after which the lever 40 will be moved to the full line position as seen in FIGURE 2, bringing the take up drums 23, 31 together for gripping the cable 45 therebetween. The finger 49 will prevent the free end of the cable 45 from travelling to the left as seen in FIGURE 1, between the take up drums 23, 31 in the operation of the hoist C.

When desired, the take up drum 31 is driven by engagement of the gear 44 with the spur gear 43, but as above stated it may not be necessary to drive the take up drum 31. It is assumed that the upper end of the cable 45 is suspended from some object and that the load being carried by cable 51 is lifted by the frame 10 of the hoist C, the whole assembly being moved upwardly towards the object supporting the cable 45.

In the operation of hoist C, the operator pulls the handle 15 in the direction of the arrow to cause the pawl 18 to revolve the drum 12 in the direction of the arrow, and due to the fact that the take up drums 23 and 31 are driven by the drum 12 the free end 47 of the cable 45 is held taut, so that a tight frictional engagement will be maintained between the turns of the cable 45 about the drum 12, thereby winding the cable 45 therearound and taking the free end 47 of the cable 45 on through the hoist C. This principle provides that there will be only a limited amount of cable 45 contained within the hoist C, but still permits the use of an unlimited amount of cable 45 in its operation of the same.

When it is desired to release or lower the load being supported by the cable 51, the lever 40 is moved in the direction of the arrow releasing the take up drums 23, 31, while the operator holds the free end 47 of the cable 45, then he pays out the free end 47 of the cable 45 and the slackness transmitted to the turns on the drum 12 permits the cable 45 to revolve about the stationary drum 12.

Referring to FIGURES 6 and 7, a modified form of the invention is illustrated including an alternate form of reeling in the cable when the hoist is lifting a load, also an alternate form of braking the release of the cable on lowering the load. A shaft 60 is journalled within the frame 10 parallel to and spaced above the shaft 13 and has a spur gear 61 keyed thereto in mesh with the gear 42 on the drum 12.

Fixedly secured to one end of the shaft 60 is a hollow T 62, in which a crank 63 is locked in the desired position by a set screw 64. After the load has been raised by the crank 63, the same is removed from the T 62, permitting the shaft 60 and gear 61 to revolve freely on releasing the load or when the operating handle 15 is used as described in the preferred form of the invention. In the revolving of the drum 12 by the crank 63, a high rate of speed can be obtained in operating the hoist.

In the alternate form shown in FIGURES 6 and 7, a brake band 65 is arranged to surround a metallic portion 67 of the dum 23. One end of the band 65 is anchored to a cross shaft 68 fixedly secured within the frame 10. Its opposite end terminating in a connecting link 69 pivotally secured at 70 to the lever 71. The lever 71 is pivotally mounted on a cross shaft 72 and is locked in the desired adjusted position by a quadrant 73 fixedly mounted to the shaft 72 and a dog 74 mounted on the lever 71 for engagement with the quadrant 73 and released by a hand lever 75, in the usual manner.

The object of the brake band 65 is to retard rotation of the drum 23, which retards the rotation of drums 12 and 31, allowing the hoist to lower its load at the desired controlled rate of speed.

Having thus described the preferred embodiments of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claim.

What is claimed is:

In a hoist including a frame, a rotatable drum mounted in said frame, at least one end of said drum being cone shaped, a cable having one end secured to an overhead support and having an intermediate portion wound in a plurality of turns about said drum with one turn adjacent the cone shaped end of said drum, a guide finger attached to said frame positioned rearwardly and substantially parallel to the lower portion interposed between and frictionally engaging the last of said turns and the adjacent plurality of turns on said drum and operable to restrain movement of said last turn toward the other end of said drum, a second drum journalled for rotation in said frame, spur gears operatively related to each of said drums with said spur gears arranged in meshing contact, a third drum positioned within a second frame for holding the free end of said cable taut, a snub shaft positioned within said first-mentioned frame having an arm on the outer end thereof, a biasing spring connected to said second frame and said arm for swinging said second frame toward said first-mentioned frame, and a spur gear related to said third drum and arranged for meshing contact with the spur gear on said second drum when said third drum is swung to a position adjacent said second drum, means fixedly secured to said snub shaft whereby movement thereof in one direction will cause the spur gear on said third drum to move toward and mesh with the spur gear on said second drum and movement of said means in the opposite direction will cause said third drum to move away from said second drum.

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