March 12, 1957 A. REA 2,784,941

TIMBER HOIST

Filed June 14, 1954 2 Sheets-Sheet 1

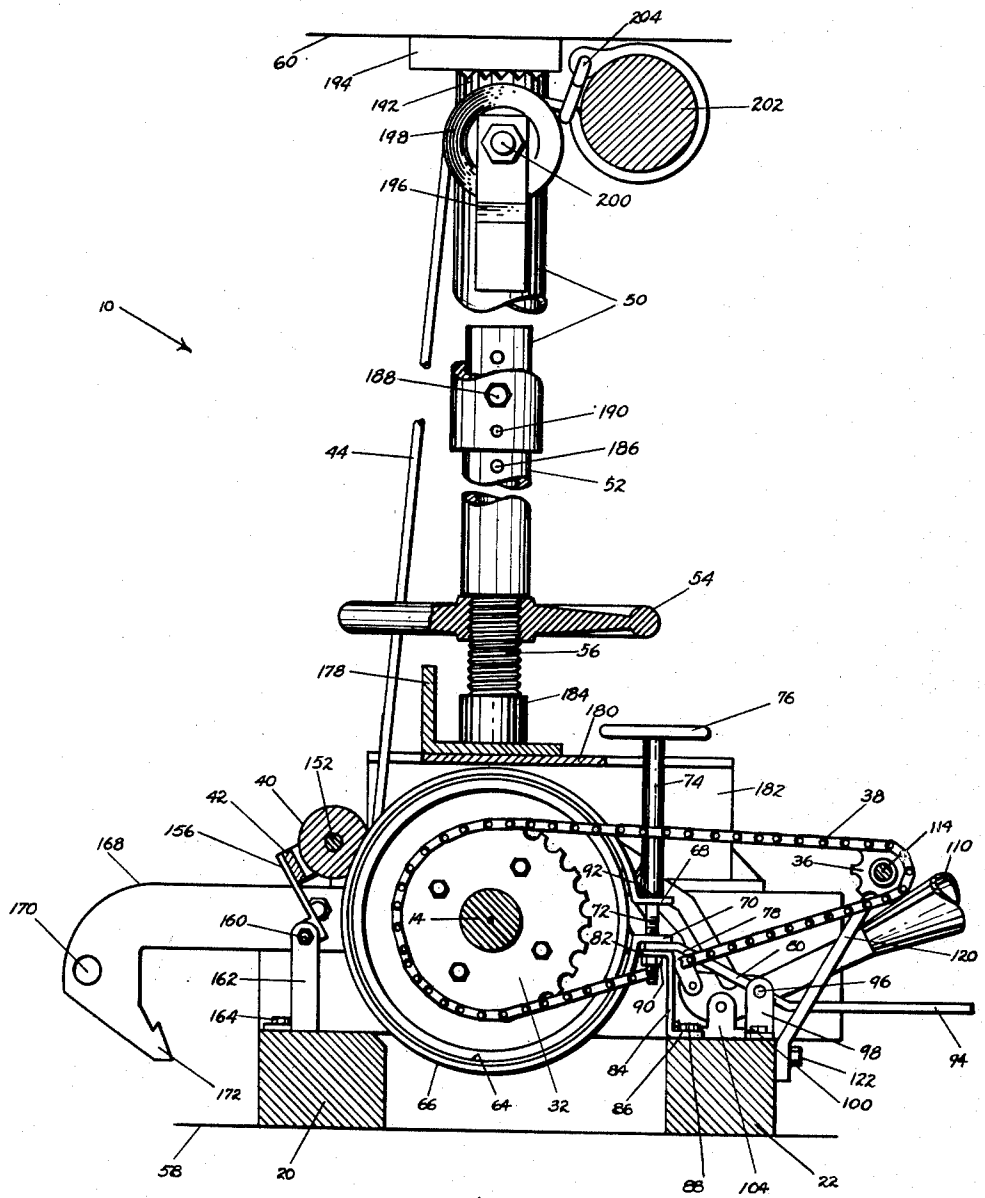


Fig. 1.

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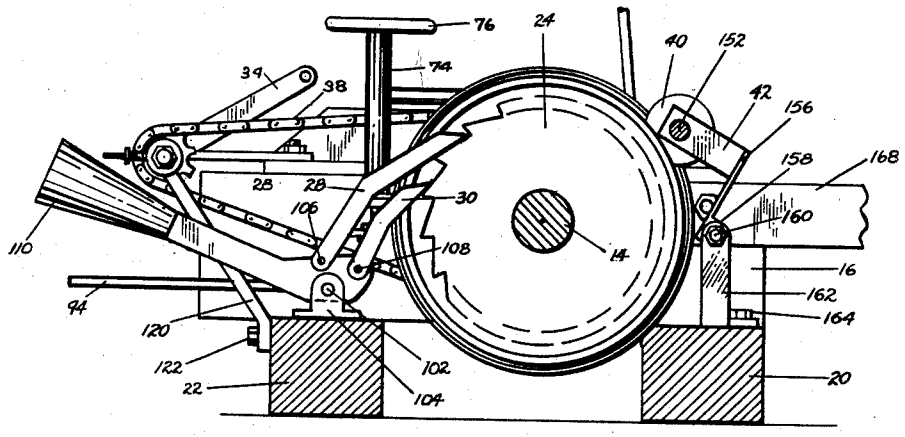


Fig. 3.

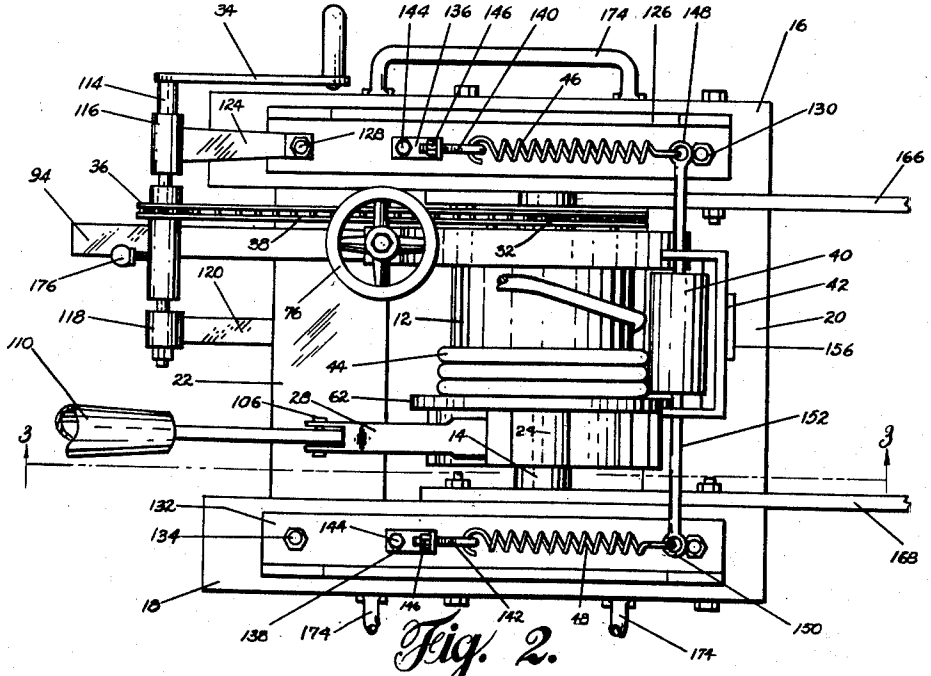


Fig. 2.

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TIMBER HOIST

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Application June 14, 1954, Serial No. 436,448

1 Claim. (Cl. 254—145)

This invention relates to mine equipment and operating devices such as used for elevating timber for mine shaft reinforcing or for pulling heavy loads through a mine shaft, and in particular a hoist having a manually actuated winch with an extensible mast adapted to be extended for clamping the hoist in a stationary position between the floor and ceiling of a mine shaft, and also gripping jaws for clamping the hoist to a rail of a track in the mine shaft.

The purpose of this invention is to provide a hoist or winch that is a self-contained unit and wherein a drum with a hoisting cable extended therefrom may be clamped in operative positions in a mine shaft.

In numerous instances it is desirable to use mechanical means for elevating timbers and the like for reinforcing and shoring in mine shafts, and it is also desirable to provide means for drawing heavy objects through the shafts, and owing to the comparatively light structures or framing in mine shafts it is difficult to find suitable support for a conventional chain hoist or other mechanical device adapted for this use.

With this thought in mind this invention contemplates a cable winding drum rotatably mounted in a framework with a hand lever for actuating ratchet elements for operating the drum and with clamping means for securing the device to a rail of a track in a mine shaft or for holding the device between the floor and ceiling of the shaft.

The object of this invention is, therefore, to provide a manually actuated winch that is adapted to be clamped in operative positions in a mine shaft or the like in which means is provided for elevating objects, or for drawing objects through the shaft.

Another object of the invention is to provide a combination of pawls attached to a hand lever on both sides of a pivotal mounting of the lever whereby a winch may be operated to elevate mine timbers and the like in a shaft with limited headroom.

Another important object of the invention is to provide a winch for use in a mine shaft that is adapted to be clamped in operative positions in the shaft without providing a foundation therefor.

A further object of the invention is to provide a winch adapted to be clamped in operative positions in a mine shaft in which a mast for clamping the winch between the floor and ceiling of a mine shaft provides supporting means for a hoisting cable whereby timbers for reinforcement of the shaft may be elevated.

A still further object of the invention is to provide a winch adapted to be clamped in operative positions in a mine shaft in which a cable winding drum of the winch is manually actuated, and in which the winch is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a cable winding drum rotatably mounted in a framework of transverse and longitudinally disposed beams, a crank rotatably mounted on the framework and operatively connected to the drum with a chain trained over sprockets, a lever pivotally mounted on the framework and having pawls positioned to coact with a ratchet wheel on the drum for rotating the drum, a roller for frictionally urging the cable against the drum, and an adjustable mast mounted on the framework and having a pulley on the upper end over which a cable from the drum is trained whereby timbers are adapted to be drawn to the upper end of the mast.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a longitudinal section through the winch with parts shown in elevation and other parts broken away, and illustrating the device with a timber elevated to the ceiling of a mine shaft with the mast clamped between the floor and ceiling of the shaft.

Figure 2 is a plan view of the winch with the mast and mounting elements thereof omitted.

Figure 3 is a longitudinal section through the winch similar to that shown in Figure 1, looking toward the opposite side of the winch, with the mast omitted, and taken on line 3—3 of Figure 2.

While one embodiment of the invention is illustrated in the above referred to drawings, it is to be understood that they are merely for the purpose of illustration and that various changes in construction may be resorted to in the course of manufacture in order that the invention may be utilized to the best advantage according to circumstances which may arise, without in any way departing from the spirit and intention of the device, which is to be limited only in accordance with the appended claims. And while there is stated the primary field of utility of the invention, it remains obvious that it may be employed in any other capacity wherein it may be found applicable.

In the accompanying drawings, and in the following specification, the same reference characters are used to designate the same parts and elements throughout, and in which the numeral **10** refers to the invention in its entirety, numeral **12** indicating a drum mounted on a shaft **14** rotatably mounted in side beams **16** and **18** carried by end beams **20** and **22**, numeral **24** a ratchet wheel positioned on one end of the drum and actuated by a lever **26** through pawls **28** and **30**, numeral **32** a sprocket positioned on the opposite end of the drum and adapted to be actuated by a hand crank **34** through a sprocket **36** and a chain **38**, numeral **40** a friction roller mounted in a yoke **42** and resiliently urged against cable **44** on the drum **12** by springs **46** and **48**, and numerals **50** and **52** telescoping sections of a mast adapted to be actuated by a hand wheel **54** on a threaded shank **56** of the lower section **52** of the mast to clamp the winch between a floor **58** and a ceiling **60** of a mine shaft.

One end of the drum is provided with a flange **62**, and the opposite end with a cylindrical-shaped rim **64** on which a brake band **66** is positioned and the ends of the band **66** are provided with flanges **68** and **70** through which a threaded stud **72** extends, as shown in Figure 1. The stud **72** extends from a stem **74** having a hand wheel **76** at the upper end, and the lower end of the stud extends through a flange **78** of a lever **80**, and also through a flange **82** of a mounting bracket **84**. The lower end of the bracket **84** is provided with a flange **86** by which the bracket is secured to the beam **22** with lag screws or bolts, as indicated by the numeral **88**. The lower end of the stud **72** is threaded through a nut **90** that is welded or otherwise secured to the bracket **84**, and with the flange **70** resting upon the flanges **78** and **82**, and the flange **68** held by a shoulder **92** at the lower end of the stem **74** the brake band is adapted to be drawn into gripping relation with the rim **64** by turning the hand wheel **76**.

The brake is also adapted to be applied by a foot

treadle 94 of the lever 80 which is pivotally mounted with a pin 96 in a support 98 which is secured to the beam 22 with bolts 100. Pressing downwardly on the treadle 94 forces the flange 70 upwardly toward the flange 68, thereby drawing the brake band into gripping relation with the rim 64.

The lever 26 for actuating the drum 12 through the ratchet wheel 24 is also pivotally mounted on the beam 22, being pivoted by a pin 102 in a bearing 104, and, as shown in Figure 3, the pawl 28 is secured by a pin 106 to the lever on one side of the pivot pin 102 and the pawl 30 by a pin 108 on the opposite side. By this means a handle in the socket 110 is moved upwardly to actuate the pawl 28 to move the wheel 24 in a clockwise direction and upon downward movement of the handle the pawl 30, engaging the same ratchet teeth 112, continues the rotation of the wheel and drum in a clockwise direction, the pawl 28 dropping downwardly with the downward movement of the handle. With this arrangement of the lever and pawls the cable winding drum is adapted to be operated with comparatively little movement of the handle in the handle receiving socket 110 so that the winch may be operated with very little headroom. Furthermore, one of the pawls is always in engagement with the teeth of the ratchet wheel, thereby preventing accidental reverse movement of the ratchet wheel and drum.

The sprocket 36 and the crank 34 are mounted on a crank shaft 114 that is rotatably mounted on the framework with bearings 116 and 118, the bearing 118 being carried by a bracket 120 which is secured by a bolt 122 to the beam 22, and the bearing 116 being secured by an arm 124 to an angle bar 126 on the side beam 16, to which the arm is secured by a bolt 128. By this means the drum is adapted to be rotated by hand with the crank 34 with the sprocket 36 turning the sprocket 32 through the chain 38.

The angle bar 126 is secured to the beam 16 with bolts 130 and a similar angle bar 132 is held to the beam 18 with similar bolts, as indicated by the numeral 134, and, as shown in Figure 2, the angle bars 126 and 132 provide mounting means for clip angles 136 and 138 in which eye bolts 140 and 142, to which the fixed ends of the springs 46 and 48 are positioned. The clip angles 136 and 138 are secured to the angle bars 126 and 132 with bolts 144, respectively, and the eye bolts 140 and 142 are provided with nuts 146 with which the tension of the springs 46 and 48 is adjusted.

The opposite ends of the springs 46 and 48 are secured in eyes 148 and 150 in the ends of a rod 152 upon which the roller 40 and arms of the yoke 42 are mounted, and the yoke is provided with a strut 156 from which ears 158 extend, and the yoke is pivotally mounted by a pin 160 in the upper ends of arms of a bracket 162 which is secured to the beam 20 by bolts 164. By this means the friction or guide roller 40 is urged upwardly against the turns of the cable 44 on the drum 10 whereby slack in the coils or turns of the cable is eliminated and the cable is nested snugly against the surface of the drum.

A pair of hook-like grapple arms 166 and 168 having openings 170 therethrough and barbed prongs 172 depending therefrom are secured to the inner surfaces of the beams 16 and 18. With the arms 166 and 168 positioned over a rail of a track in a mine shaft the winch is adapted to pull from one side of the track or shaft, or in a direction perpendicular to the shaft, and particularly from a shaft extended laterally from the shaft in which the winch is positioned. The openings 170 provide means for bolting the winch in a convenient position for a permanent installation.

The side beams 16 and 18 are provided with handles 174 to facilitate carrying the winch from one position to another, and the handles may be secured to the beams by suitable means.

The drum is adapted to be actuated by either the ratchet or crank, and when the crank 34 is used the small sprocket 36 is secured to the shaft 114 by a set screw 176 which is threaded in the hub of the sprocket.

The mast is mounted upon a transversely disposed L-shaped beam 178, supported by a frame 180 having flanges 182 at the ends, which are mounted on the beams 16 and 18, and the lower end of the shank or stud 56 of the lower tubular section 52 is secured to the beam 178 with a socket 184. The lower section 52 is raised and lowered by the hand wheel 54, and the upper part of the section 52 is provided with spaced openings 186 through which a bolt 188 in openings 190 of the upper telescoping section 50 may be extended to retain the sections in adjusted positions, whereby the section 50 may be moved upwardly until teeth 192 in the upper end engage the ceiling or roof, such as the beam 194 of the shaft lining, and with the parts held in these positions the hand wheel 54 is rotated to rigidly clamp the parts against the floor and ceiling of the mine shaft.

The upper telescoping section of the mast is provided with an arm 196, the upper end of which extends outwardly from the section, and a pulley 198 that is rotatably mounted on a bolt 200 extended from the section 50 through the arm 196 provides means for retaining the cable 44 at the upper end of the mast so that timbers, as indicated by the numeral 202, and secured in the end of the cable by a hook 204, may be elevated to a position for use, or whereby they are adapted to be used for reinforcing, shoring, or the like.

The cable is adapted to extend down or through a mine shaft, or into a laterally disposed branch thereof, directly from the drum 10, or, as illustrated in Figure 1, the cable may be trained over the pulley 198, as shown.

While the invention has been described with a primary purpose of mine use and particularly in conjunction with the mast assembly it is obvious that the hoist or winch will adequately fulfill many other uses and is especially adapted for universal use by reason of its portability and compact design.

From the foregoing specification, it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed, and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish, and that it will find an important place in the art to which it appertains when once placed on the market.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Changes in shape, size, and rearrangement of details and parts, such as come within the purview of the invention claimed may be resorted to, in actual practice, if desired.

Having now described the invention that which is claimed to be new and desired to be procured by Letters Patent, is:

In a mine shaft timber hoist, the combination which comprises spaced parallel end beams adapted to be positioned on a mine floor, spaced parallel side beams mounted on said end beams and positioned perpendicular thereto, a shaft rotatably mounted in said side beams, a cable winding drum mounted on said shaft and positioned between said side beams, said drum having a flange on one end and a cylindrical-shaped rim on the opposite end, a brake band having flanged ends extended around the rim, a stem having a threaded end extended through the flanges of the brake band, a bracket mounted on one of the end beams and in which the lower end of the stem is secured, said stem having a shoulder thereon

and said shoulder being positioned to engage one of the flanges of the brake band, a hand wheel on the upper end of the stem for turning the stem to actuate the brake band to grip the cylindrical-shaped rim to prevent rotation of the drum, a sprocket mounted on the outer surface of the rim, a crankshaft, the axis of which is parallel to the axis of the drum, brackets rotatably mounting the crankshaft on the beams, a sprocket on the crankshaft, a chain trained over the sprockets of the drum and crankshaft, a hand crank mounted on one end of the crankshaft for rotating the drum through the chain and sprockets to take up slack in a cable extended around the drum, a ratchet wheel mounted on the end of the drum on which the flange is positioned, a handle receiving socket pivotally mounted on the beams, pawls pivotally mounted on the handle receiving socket and positioned to coact with said ratchet wheel for actuating the drum to wind the cable thereon under load whereby the chain and sprocket are first actuated to take up slack in the cable and then the pawls and ratchet wheel are manually operated to haul a log up the mine shaft, a friction roller positioned against cable on said drum, a rod on which the friction roller is mounted, a yoke pivotally mounted on one of said beams and having arms in which the rod of the friction roller is mounted, springs connected to ends of the rod and also to the beams for urging the roller against a cable on the drum, a frame mounted on the side beams and extended over the drum, a mast having a threaded section telescoping in the lower end mounted on said frame, the upper end of the mast having gripping teeth thereon, a hand wheel having an internally threaded hub positioned on the threaded section of the mast, means for locking the telescoping sections of the mast in adjusted positions, a pulley rotatably mounted on the upper end of the mast, and a cable wrapped around the drum and trained over the pulley for drawing timber to the upper end of the mast.

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