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POWER OPERATED BOOM FOR HOISTS OR THE LIKE

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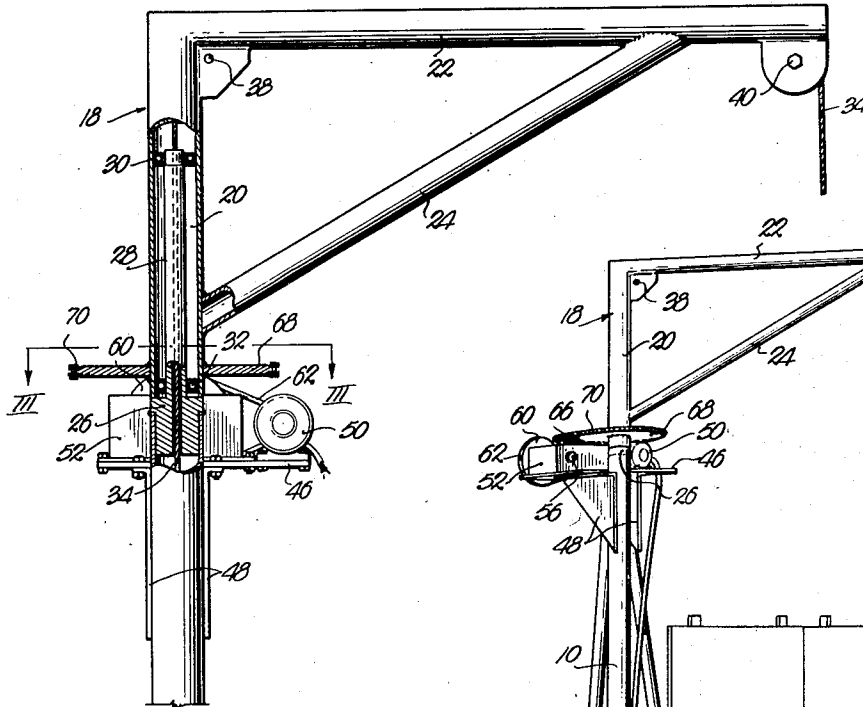


Fig. 2.

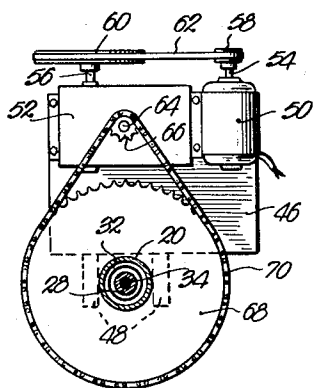


Fig. 3.

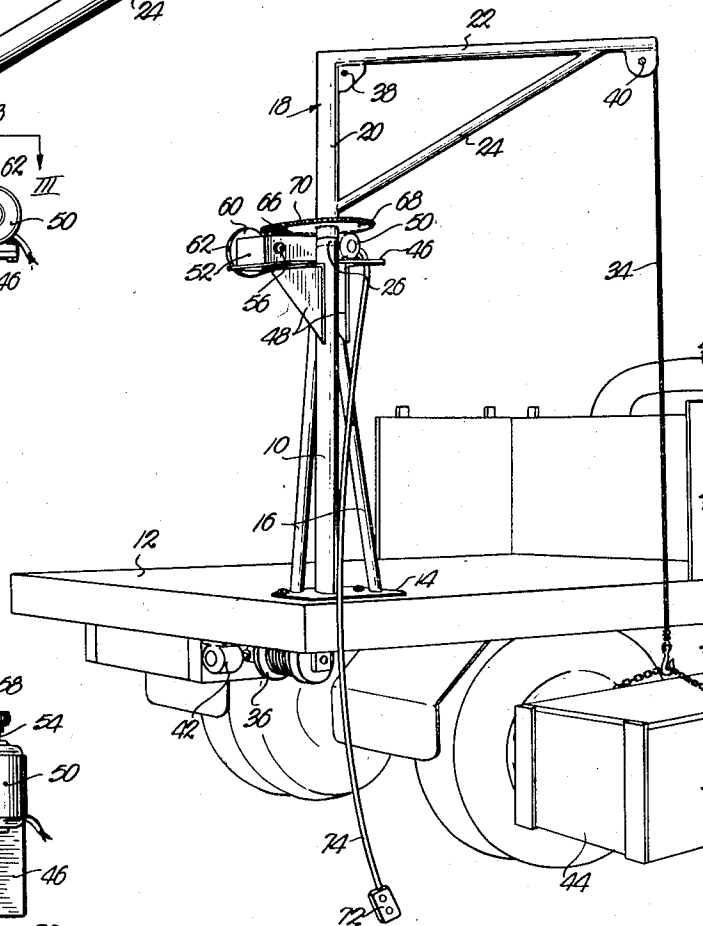


Fig. 1.

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POWER OPERATED BOOM FOR HOISTS OR THE LIKE

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1 Claim. (Cl. 212—65)

This invention relates to improvements in hoists and particularly to that class of lifting apparatus that includes a swingable boom pivotally mounted upon the normally uppermost end of an upright standard, the primary object being to provide novel structure for swinging the boom relative to the standard.

It is the most important object of the present invention to include in a hoist that is equipped with a boom having an upright post, structure to rotate the post and, therefore, swing the boom, and which structure includes power means carried by the aforementioned standard and operably coupled with the post through the medium of a gear or the like secured rigidly to the post.

Other objects include the way in which a gear reduction unit and a prime mover such as an electric motor are both mounted rigidly upon the nonrotatable supporting standard of the hoist and operably coupled with the post; the way in which a continuous chain drive is used to interconnect the sprocket on the post and a second sprocket mounted on the output shaft of the gear reduction unit; the way in which the post sprocket is mounted for rotation therewith on its vertical axis; the manner of providing an input and an output shaft on the gear reduction unit, the latter of which is disposed in parallelism with the axis of rotation of the post; and many other important details of construction all of which will be made clear as the following specification progresses.

In the drawing:

Figure 1 is a perspective view of a power-operated boom for hoists or the like made pursuant to my present invention, the entire hoist being shown operably supported by the bed of a truck.

Fig. 2 is an enlarged, fragmentary, elevational view, parts being broken away to reveal details of construction; and

Fig. 3 is a cross-sectional view taken on line III—III of Fig. 2.

The hoist that is equipped with structure for swinging the boom thereof according to the improvements of the present invention, includes an upright, tubular standard 10 that may be suitably mounted on any support such as bed 12 of a truck as shown in Fig. 1, through employment of a base plate 14 and suitable bracing 16.

The standard 10 carries a swingable boom, broadly designated by the numeral 18, and which is substantially L-shaped, presenting a vertical, tubular post 20 and a horizontal, tubular arm 22. The arm 22 is reinforced or supported, by a cross-base 24 interconnecting the post 20 and the arm 22.

A perforated plug 26 in the uppermost end of the standard 10 is rigidly secured to the latter in supporting relationship to the post 20 and is provided with a tubular extension 28 carrying bearings 30 and 32 that rotatably receive the post 20.

The hoisting mechanism includes a cable 34 coiled on a winch 36 carried by the truck bed 12 therebelow, cable 34 extending upwardly through the bed 12, the tubular

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standard 10, the plug 26, its extension 28, and thence through the arm 22. Cable 34 is trained over a pair of pulleys (not shown), one of which registers with the post 20 and the arm 22 and is rotatable on a horizontal axis 38. The said other pulley registers with the arm 22 at the outermost free end thereof and rotates on an axis 40.

It is clear that upon energization of a reversible electric motor 42, or other prime mover, the winch 36 may be rotated through suitable gear reduction mechanism (not shown), all carried by the bed 12 therebelow. Motor 42 may be operated from the battery of the truck and various loads such as at 44, coupled with the cable 34, may be raised or lowered and swung relative to the bed 12 by virtue of the swinging movement of boom 18 relative to the standard 10.

It has been found most difficult to swing the boom 18 when relatively heavy loads are carried by the cable 34 and, therefore, in accordance with the principles of the present invention, there is provided power-operated structure operably interconnecting the standard 10 and the post 20 to rotate the latter and thereby swing the boom 18. Such structure includes a platform 46 attached to brackets 48 rigid to the standard 10, and which platform 46 carries a prime mover 50 preferably in the nature of a reversible electric motor together with a gear reduction unit 52 of a worm-gear type. The motor 50 has a horizontal drive shaft 54 in spaced parallelism to an input shaft 56 forming a part of the unit 52. Pulleys 58 and 60 on shafts 54 and 56 respectively, are interconnected by an endless belt 62.

The gear reduction unit 52 is provided with a vertical output shaft 64 in spaced parallelism to the axis of rotation of the post 20 relative to the standard 10 and upon which shaft 64 is mounted a small sprocket 66.

The post 20 is provided with a large sprocket 68 in surrounding relationship thereto and rigidly mounted thereon for rotation with the post 20 on its vertical axis. As shown in Fig. 2 of the drawing, the sprocket 68 is disposed above the platform 46 within the plane of the sprocket 66 and is operably connected with the latter through the medium of an endless chain 70. The motor 50 may likewise be driven from the battery of the truck shown in Fig. 1 and be controlled by use of a switch 72 operably coupled therewith through use of an extension cable 74.

It is clear from the foregoing that, upon energization of the motor 50, the boom 18 may be rotated throughout a full arc of 360° since, as the boom 18 and the sprocket 68 thereon rotate together as a unit, they completely clear the sprocket 66 and the chain 70, together with the unit 52, motor 50 and pulley 60 therebelow.

When de-energization of the motor 50 takes place, the swinging movement by the boom 22 will be arrested by virtue of the locking action of the worm-type gear reducing unit 52. In other words, the tendency on the part of the load and associated parts to continue rotation when the motor is stopped, will be overcome within the gear reducing unit 52 without attention of the operator or the use of braking or other movement-retarding mechanism.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

In a hoist, the combination of a vertical, tubular standard; a perforated plug fixed in the standard at the uppermost end of the latter, said plug having a tubular, upstanding extension; bearings on the extension; a swingable boom including a vertical post resting on the plug and surrounding the bearings for rotation on a vertical axis, and a laterally extending, tubular arm on the uppermost end of the post; hoisting mechanism including a

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cable threaded through the standard, the plug, the extension, the post and the arm; and structure for swinging the boom comprising a horizontal platform rigid to the standard, a reversible electric motor mounted on the platform and having a horizontal drive shaft, a gear reduction unit mounted on the platform and having an input shaft parallel with said drive shaft and an output shaft parallel with said axis, pulleys on the drive shaft and the input shaft, an endless belt joining the pulleys, a sprocket surrounding the post and rigidly secured to

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the post above the platform for rotation therewith on said axis, a sprocket mounted on the uppermost end of the output shaft, and an endless chain joining the sprockets.

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