Oct. 18, 1966 R. N. BATHUM, JR 3,279,760

DIELECTRIC RATCHET HOIST

Filed July 9, 1964

Fig. 1.

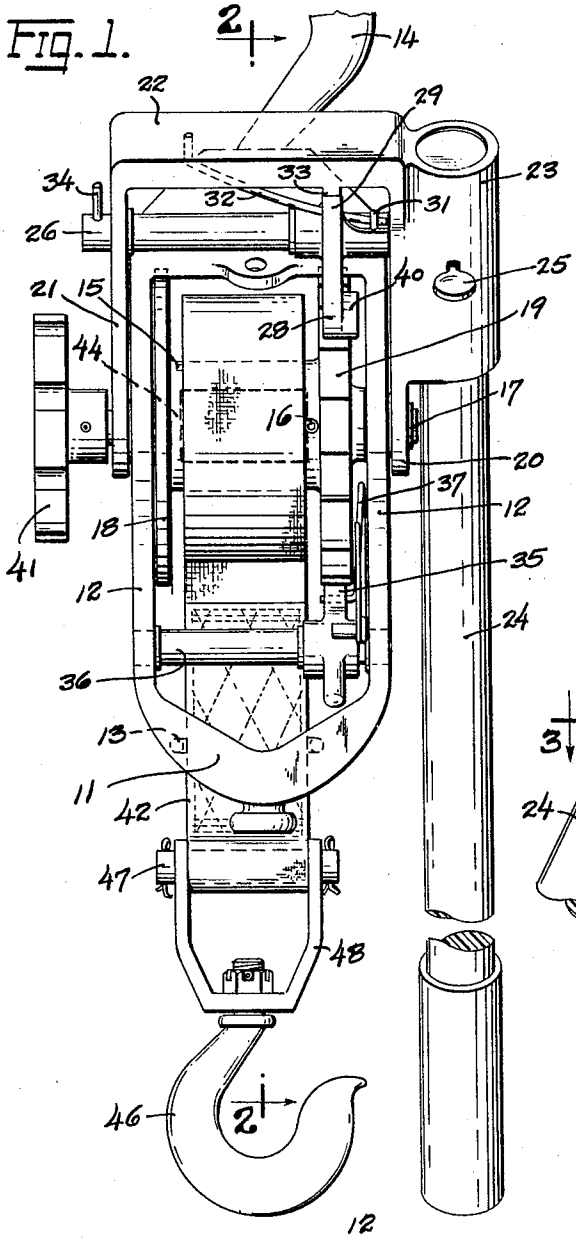
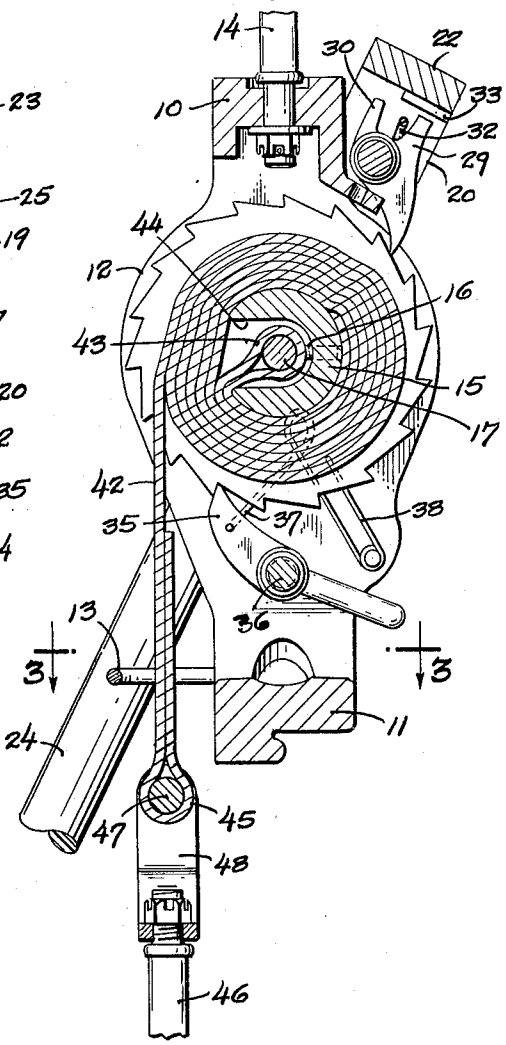


Fig. 2.



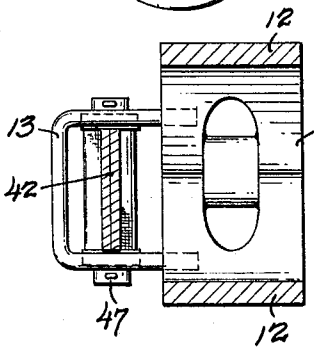


Fig. 3.

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DIELECTRIC RATCHET HOIST

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3 Claims. (Cl. 254—167)

This invention relates to a ratchet hoist, and aims to provide a sturdy yet lightweight and comparatively inexpensive hoist of a dielectric nature.

This and other more particular objects and advantages will appear and be understood in the course of the following description and claims, the invention consisting in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawing:

FIGURE 1 is a fragmentary front elevation view illustrating a hoist constructed to embody preferred teachings of the present invention.

FIG. 2 is a fragmentary transverse vertical sectional view on line 2—2 of FIG. 1; and

FIG. 3 is a horizontal sectional view on line 3—3 of FIG. 2.

The hoist of the present invention has much the same basic design as the hoist illustrated and described in U.S. Pat. No. 3,049,338, dated Aug. 4, 1962. Cast by preference from aluminum by reason of the weight factor, a cheek-frame is provided presenting upper and lower cross-arms **10** and **11** respectively, connecting the two cheeks **12**. An anchoring hook **14** has its stem journaled in the upper bar **10** for swivel movement about the longitudinal axis of the frame. For a purpose which will hereinafter appear, a U-bar **13** projects from the flank face of the lower cross-arm **11**, occupying a horizontal plane normal to the vertical plane of the frame. The legs of the U-bar are suitably anchored in holes which are drilled in the cross-arm.

The winding drum **15** of the hoist occupies a position between the two cheeks **12** more or less central to the height, being fixed by an Allen-headed pin **16** to a cross-shaft **17** journaled for rotation in the cheeks. The spooling surface of the drum lies between a flange **18** and a ratchet wheel **19**. With moderate tolerance, bosses upon the outer face of both the flange and the ratchet wheel bear upon the inner faces of the cheeks to localize the drum against endwise motion.

The two ends of the cross-shaft project beyond the cheeks **12** and have the side arms **20–21** of a frame-straddling yoke **22** pivoted thereto for reciprocal swing motion through an approximate 90° arc. Arm **20** of the yoke has an openended hollow cylinder **23** formed upon its outer face. The axis of this cylinder lies radial to the cross-shaft **17**. The cylinder serves as a socket for an operating lever **24**. The lever is introduced to the socket from either end of the latter and is held in place by a wing-headed set screw **25**. To insulate an operator, electrically, from the hoist the lever is composed of a dielectric material. A solid rod of fiberglass reinforced resin is suitable.

A shaft **26** extends between the side arms of the yoke and receives a pivotal mounting therefrom. A feed-pawl for the ratchet wheel **19** is mounted for free rocking action upon the shaft. The hub of this pawl is bossed at both ends, with one boss bearing against the yoke arm **20** and the other boss bearing against a split-ring. The pawl presents a dog **28** at one side of the hub and two circumferentially spaced horns **29–30** at the other side. The boss which bears against the yoke arm **20** is cut away at the horn side to produce an arcuate slot. A cotter pin **31**, which fits a hole drilled diametrically through the shaft **26**, has its eyed end occupying this slot. A wire spring **32** having one end pivoted in the

cross-arm of the yoke adjacent the side arm **21** extends by its free end through the space between the horns and into the eye of the cotter pin. The spring is tensioned so as to press downwardly upon the hub and its pivot axis is perpendicular to the rocker axis of the pawl on the longitudinal median line of the yoke's cross-arm. It thus has an over-center throw in both directions from center. When the shaft **26** is turned in a clockwise direction, considered from the vantage point of FIG. 2, the eye of the cotter pin snaps the spring against the horn **29** to yieldingly press the dog **28** into ratcheting engagement with the teeth of the ratchet wheel. Turned in a counter-clockwise direction, the shaft acts through the cotter pin **31** to snap the spring against the horn **30** and responsively lift the dog out of ratcheting engagement. In this latter motion the horn **29** produces a limit-stop by striking an abutment **33**. A pin **34**, projecting radially from an exposed end of the shaft **26**, permits the shaft to be easily turned at will so as to flip the spring against either horn, selectively.

35 denotes a holding pawl for the ratchet wheel mounted for free pivotal motion upon a cross-shaft **36** carried by the cheeks **12** in a position below the drum. A wire spring **37**, preferably of the type illustrated and described in U.S. Patent No. 3,049,338, normally urges said holding pawl into engagement with the teeth of the ratchet wheel. Such a spring **37** also has two additional functions. These two additional functions are performed simultaneously by the act of first setting the flip-spring **32** in its pawl-lifting position and then swinging the lever **24** downwardly until an ear **40** of the feed-pawl is brought into engagement with a branch **38** of spring **37**. Counter pressures from the ear and the spring bring the feed-pawl into engagement with the ratchet wheel and coincidently lift the holding pawl out of engagement. Short-stroke reciprocal cycling of the lever at this low end of its permitted travel imparts interrupted "pay-out" motion to the winding drum, backing off one tooth of the ratchet wheel in each complete two-stroke cycle. This operation is performed only to lower a load. When the drum is free of a load, the same can be manually turned in a "pay-out" direction by means of a notched hand-wheel **41** pinned to a protruding end of the drum shaft **17**. This hand-wheel is perforce also used to take up slack before hoisting a load. The hand-wheel is or may be produced from a dielectric material.

The load line **42** for the present hoist is comprised of a web strap of electrically non-conductive nylon. Each of the two ends are turned back for a considerable distance and securely connected both by marginal and diagonal lines of stitching to produce terminal loops. The inner-end loop **43** is accommodated in a radial pocket **44** formed in the spooling portion of the drum, and is anchored by passing the shaft **17** through such loop when the hoist is assembled. The outer-end loop **45** attaches to a swivel-shanked hook **46** by means of a pin **47** traversing the arms of a clevis **48**. The strap is trained through the afore-mentioned U-bar **13** so as to be guided thereby in assuring a central spooling of the strap when the same is reeled onto the drum, the U-bar having a span between its side arms moderately wider than the strap and being located upon the frame in a position centered between planes occupied one by the inner face of the flange **18** and the other by the inner face of the ratchet wheel **19**.

It is thought that the invention will have been clearly understood from the foregoing detailed description of the now-preferred embodiment.

What is claimed is:

1. A dielectric ratchet hoist comprising a cheek-frame, a center-bored winding drum journaled for rotation between the cheeks of the frame and having a ratchet wheel

turning in unison therewith, a yoke journaled from the frame for reciprocating forward and return swing motion about an axis coinciding with the rotary axis of the drum, a shaft extending between the arms of said yoke, a feed pawl on said shaft biased into ratcheting engagement with the ratchet wheel, an electrically non-conductive lever for activating the yoke attached to the yoke to extend radially of the swing axis thereof in a position laterally removed beyond one of the cheeks of the frame, and a load line for the hoist comprising a strap of electrically non-conductive woven webbing anchored by one end to the spooling drum and having a load-handling fitting at the other end, the strap having a width somewhat less than the length of the drum and being centered relative to said length, the hoist having a drum-shaft received through said center-bore of the drum with its ends protruding and fitting in registering bores which are provided in the cheeks of the frame to give the drum its journal mounting, dis-connectible means being provided normally fixing the drum-shaft to the drum, the spooling portion of the drum providing a radial cavity corresponding in its length to the width of the strap and completely exposing the drum-shaft, the inner end of the strap being

turned back and stitched upon itself to form a terminal loop arranged to be received in said cavity and through which the drum shaft is passed when the hoist is being assembled to produce the anchor connection for the strap.

2. A dielectric ratchet hoist according to claim **1**, the strap being nylon.

3. A dielectric ratchet hoist according to claim **1**, the lever being comprised of a solid rod of fiberglass-reinforced resin.

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