July 22, 1952 T. L. GRADY 2,604,303

COMBINED HOIST AND JACK

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Fig. 1

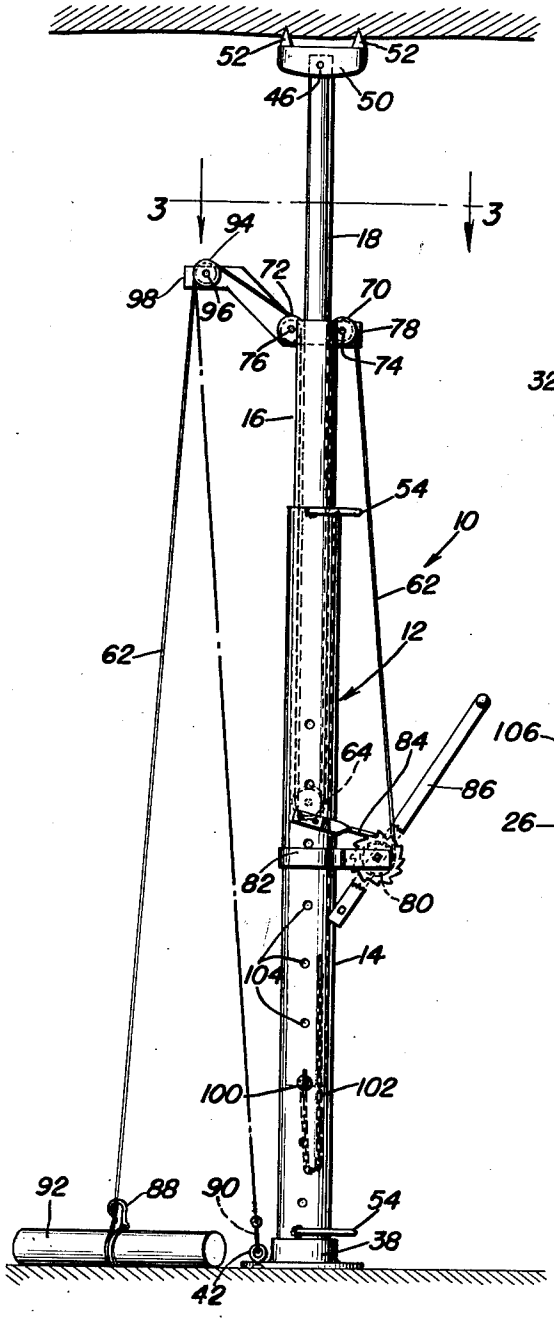



Fig. 6

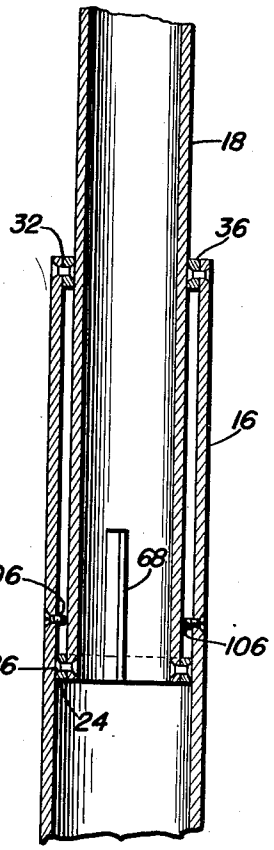
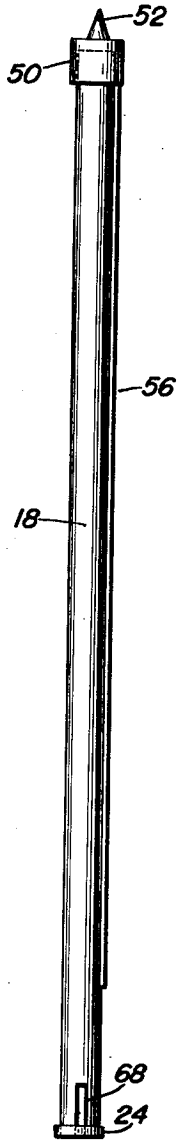



Fig. 4




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Fig. 2

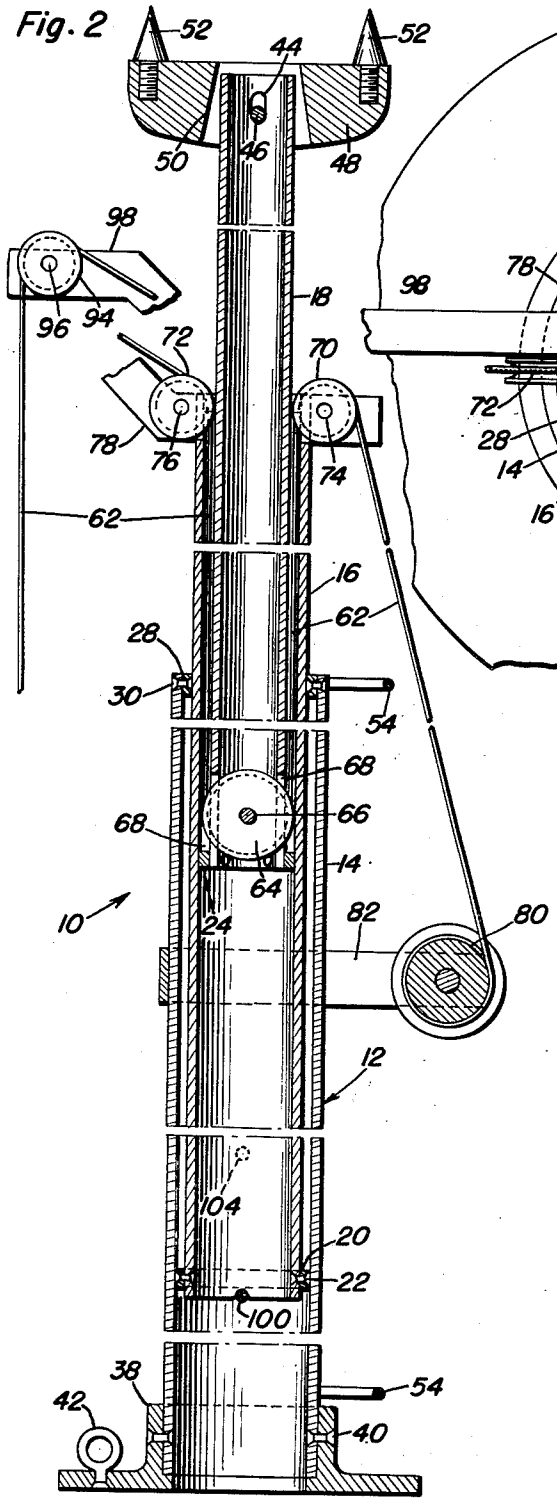



Fig. 3

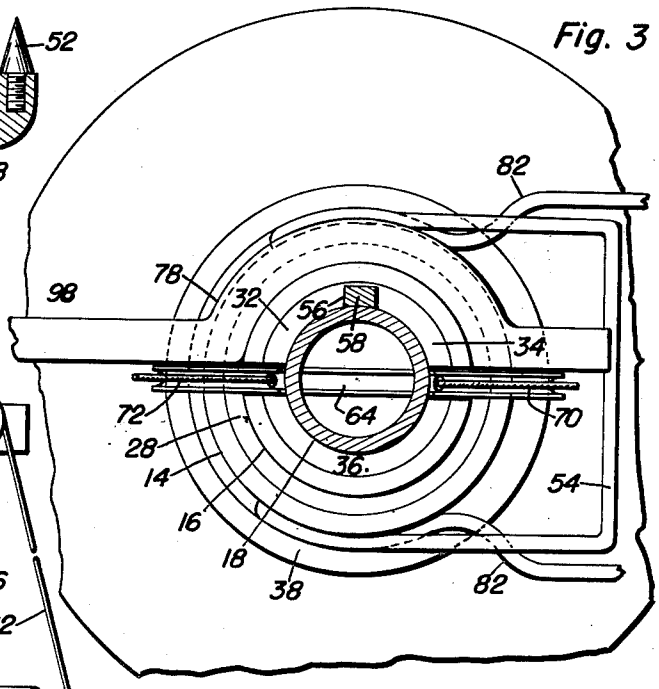
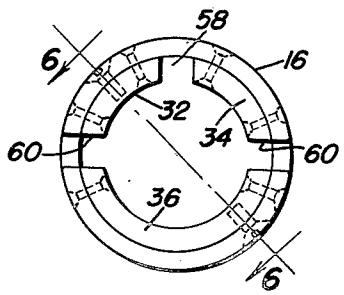



Fig. 5




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# UNITED STATES PATENT OFFICE

2,604,303

## COMBINED HOIST AND JACK

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Application February 20, 1950, Serial No. 145,235

3 Claims. (Cl. 254—143)

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This invention relates to new and useful improvements and structural refinements in hoisting and jacking equipment, and the principal object of the invention is to facilitate convenient and expeditious handling of bracing timber, props, legs, collars, etc., such as are used in tunnels, mine shafts, or the like.

In particular, the invention concerns itself with the provision of what may be referred to as a combined hoist and jack, the invention being so arranged that it automatically braces itself against the floor and ceiling or roof of the tunnel for dependable jacking or hoisting purposes, without requiring the preparation of a secure base or footing thereunder.

Some of the advantages of the invention reside in its simplicity of construction, in its efficient, safe and dependable operation, in its sturdiness, and in its adaptability to economical manufacture.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially in the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view of the invention in use;

Figure 2 is a vertical sectional view thereof;

Figure 3 is a horizontal sectional view, taken substantially in the plane of the line 3—3 in Figure 1;

Figure 4 is a side elevational view of the inner standard section and head;

Figure 5 is a top plan view of the intermediate standard section; and

Figure 6 is a transverse sectional view, taken substantially in the plane of the line 6—6 in Figure 5, but illustrating the inner standard section within the intermediate section.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention consists of a combined hoist and jack which is designated generally by the reference character 10 and embodies in its construction a vertically extensible standard 12 consisting of a tubular outer section 14, a tubular intermediate section 16 and a tubular inner section 18.

These several sections are slidably telescoped together in spaced relation, there being provided an annular spacer 20 which is secured, as at 22,

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to the lower end of the intermediate section 16 and slidably engages the inner surface of the outer section 14, while a similar spacer 24 is secured, as at 26, to the lower end of the inner section 18 and slidably engages the inner surface of the intermediate section 16.

Similarly, an annular spacer 28 is secured, as at 30, in the upper end of the outer section 14 and slidably engages the outer surface of the intermediate section 16, while a plurality of spaced segments 32, 34, 36 are secured in spaced relation in the upper end of the intermediate section 16 and slidably engage the outer surface of the inner section 18, the arrangement of the segments being best illustrated in the accompanying Figure 5 and being hereinafter more fully described.

A flanged base 38 is secured, as at 40, to the lower end of the outer section 14 and is provided with an anchoring element in the form of an eye piece 42.

The upper end portion of the inner section 18 is provided with a pair of diametrically opposite, longitudinally extending slots 44 which accommodate a transverse fulcrum pin 46 carrying a head 48, the latter being recessed, as at 50, so as to movably receive the upper end portion of the inner section 18, by which arrangement the head 48 is free to adjust itself, both longitudinally and transversely, to a given, approximately horizontal plane, while the standard 12 remains vertical.

It may be explained at this point that the base 38 of the standard is intended to rest upon the floor or bottom of a mine, while the head 48 abuts the roof or ceiling of a mine, to which end the head may be provided with upwardly projecting, pointed prongs 52 so as to prevent slipping.

Suitable handles 54 may be provided at the upper and lower ends of the standard section 14 so that the entire device may be conveniently carried, it being understood that the invention is preferably constructed from light material, such as aluminum, or the like, so that it is readily portable.

The space between the spacer segments 32, 34 in the upper end of the standard section means defines a channel for the slidable reception of a key 56 which is secured longitudinally to the inner section 18 and is slidable in the space or channel 58 between the segments 32, 34, whereby relative rotation of the standard sections 16, 18 is prevented. Moreover, the spaces between the segments 32, 34 and the segment 36 define a pair of channels 60 (see Figure 5), so that a

cable 62 may pass through the space between the inner section 18 and the intermediate section 16 to a pulley 64 which is rotatably mounted in the lower end portion of the section 18, as will be presently explained.

The pulley 64 is rotatable on a transverse shaft 66 with which the lower end portion of the inner section 18 is provided, it being noted that the lower end portion of the section 18 is also formed with a pair of vertically elongated, diametrically opposed recesses 68 to accommodate peripheral portions of the pulley 64, whereby the cable 62 may pass around the pulley 64 without coming in contact with the standard sections 16, 18, as is best shown in Figure 2.

The two upward stretches of the cable 62 from the pulley 64 pass around a pair of additional pulleys 70, 72 which are rotatably mounted on suitable stud shafts 74, 76, respectively, on a bracket 78 which is affixed to the upper end portion of the standard section 16.

The stretch of the cable 62 passing over the pulley 70 is windable upon a winch 80, supported by a bracket 82 on the standard section 14 and equipped with a conventional ratchet mechanism 84 and with a removable, actuating crank 86.

The stretch of the cable 62 which passes over the pulley 72 has its free end provided with a fastening element in the form of a hook 88 which may either be anchored to the eye piece 42 on the base 38 as shown by the dotted line 90 in Figure 1, or which may be fastened to the cable after the latter is wrapped around a log 92 which is to be hoisted, as shown by the full lines in the same figure.

In any event, it is to be noted that the stretch of the cable 62 passing over the pulley 72 also passes over an additional pulley 94 which is rotatably mounted on a pin 96 on an upwardly offset extension 98 of the bracket 78, as is best illustrated in Figures 1 and 2.

The standard section 16 may be locked against downward sliding movement in the standard section 14 by a transversely extending locking pin 100 which is anchored by a suitable flexible fastening element 102 to the section 14 and is receivable selectively in rows of vertically spaced apertures 104 with which the standard section 14 is provided.

Finally, it is to be noted that the upward sliding movement of the inner section 18 in the intermediate section 16 is limited by a pair of inwardly projecting screws or pins 106 which are provided in the section 16 for abutment by the spacer 24 on the section 18, as illustrated in Figure 6.

When the invention is placed in use, the standard section 16 is adjusted vertically relative to the standard section 14 so as to provide an overall height to suit the height of the roof or ceiling of the tunnel above the floor, and by winding the free end portion of the cable 62 around a piece of bracing timber 92 and thereafter actuating the winch 80 by the crank handle 86 so as to wind the cable 62 on the winch, the timber 92, being heavier than the standard section 18, will result in the standard section 18 being slid upwardly until the prongs 52 on the head 50 embed themselves into the roof or ceiling of the tunnel. In this manner, the device will



be rigidly sustained in an erect position, and continued winding of the winch 80 will then cause the load 92 to be hoisted in readiness for subsequent installation.

On the other hand, when there is no load to be hoisted, and it is merely desired to use the device as a jack, the fastening hook 88 of the cable 62 may be anchored to the eye piece 42, so that as soon as the winch 80 is actuated to wind the cable 62 thereon, the inner section 18 of the standard will be slid upwardly to effect the jacking operation.

Needless to say, by virtue of the adjustability of the intermediate section 16 in the outer section 14, the span or range of vertical expansion or extension of the entire standard is substantially increased, so that the invention may effectively be used under various different working conditions.

It is believed that the advantages and use of the invention will be clearly understood from the foregoing disclosure, and accordingly, further description thereof at this point is deemed unnecessary.

Having described the invention, what is claimed as new is:

1. In a combined hoist and jack, a vertically extensible standard comprising an outer section provided at its lower end with a base to engage a floor, an intermediate section slidably telescoped in said outer section, means for locking the intermediate section in a predetermined position against downward sliding in the outer section, an inner section slidably telescoped in the intermediate section and provided at its upper end with a head to abut a ceiling, a winch mounted on said outer section and having a cable provided at its free end with a fastening element, a pair of upper pulleys provided at the upper end of the intermediate section, and a lower pulley provided at the lower end of the inner section, said cable passing around said pulleys, whereby said standard may be extended when said element is fastened to said base and whereby said element may be hoisted when the inner and intermediate sections are relatively stationary.

2. The device as defined in claim 1 wherein said inner section is spaced from said intermediate section and is provided in its lower end portion with a pair of diametrically opposite recesses to receive peripheral portions of said lower pulley, stretches of said cable extending from the upper pulleys to the lower pulley through the space between the intermediate and inner sections.

3. The device as defined in claim 1 together with means for preventing relative rotation of the intermediate and inner sections.

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