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SLACK PULLER AND JACK

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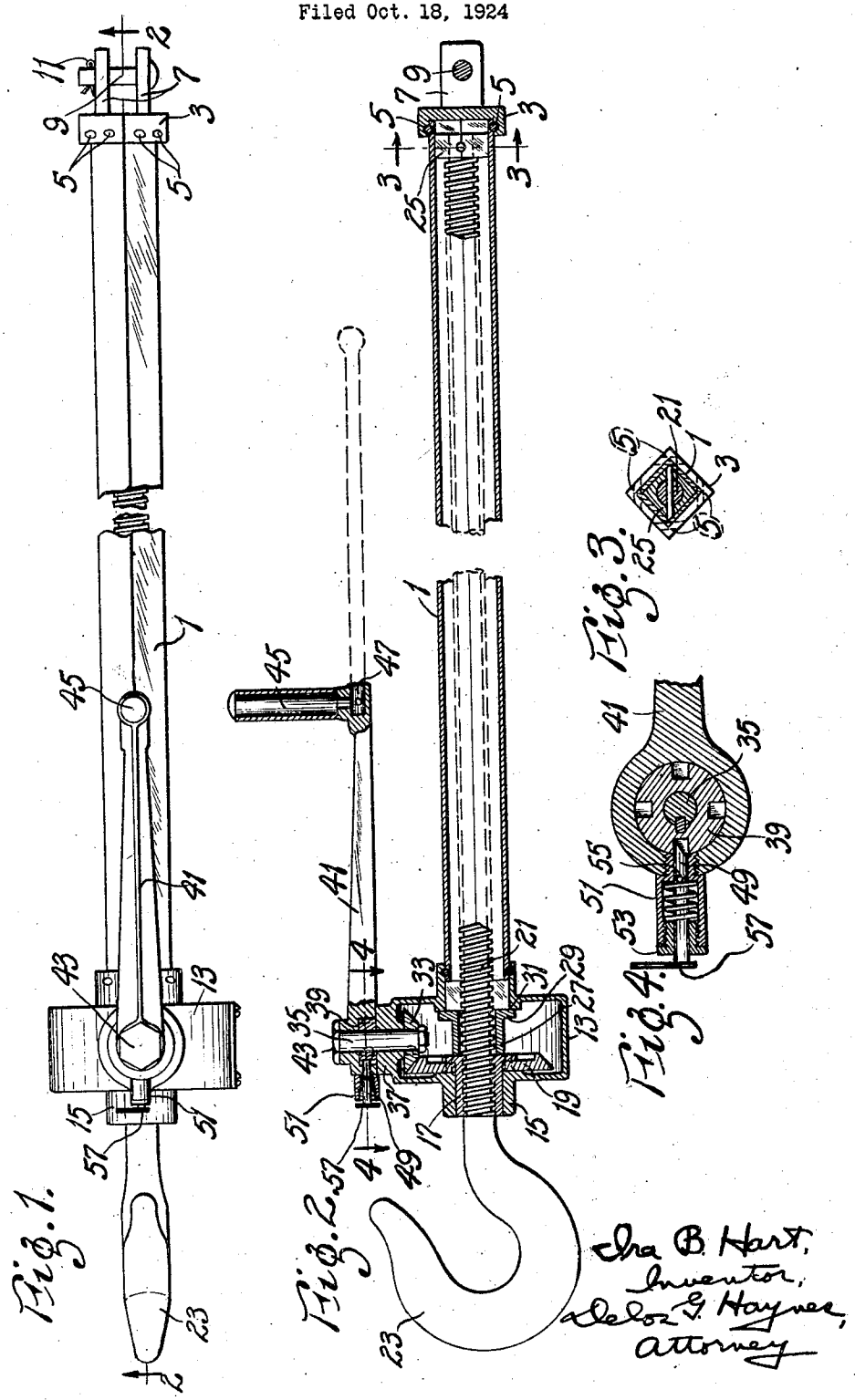


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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SLACK PULLER AND JACK.

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This invention relates to slack-pullers and with regard to certain more specific features, to slack pullers or stretchers for tightening ropes, cables and like or less heavy flexible connectors.

Among the several objects of the invention may be noted the provision of a device of the kind described which may be used, not only as a tension member, but as a compression member also, one adapted to do work which is to be done within narrow limits of space, and a device which will withstand rough usage, yet be simple and inexpensive to manufacture. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the features of construction, combinations of elements and arrangements of parts, which are exemplified in the description hereinafter in connection with the accompanying drawings, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which are illustrated two of various possible embodiments of the invention,

Fig. 1 is a front elevation of the slack puller;

Fig. 2 is a central longitudinal section taken from front to rear, on line 2—2 of Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 2; and

Fig. 4 is a section taken on line 4—4 of Fig. 2.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Figs. 1 and 2 of the accompanying drawings there is illustrated at numeral 1 a polygonal tube (composed preferably of drawn steel and preferably of square section) to which is pinned at its upper end a clevis cap 3. This cap 3 comprises a square base in the present embodiment, which fits the tube snugly, and is pinned thereto by the four diagonal pins 5 (Fig. 3). These pins do not pierce to the inside of the tube 1 but do use the full sectional area of the corners thereof for holding purposes. Formed integrally with the square base portion of this upper cap 3 are the tines 7 of a clevis fork through which extends a bolt 9 for the purpose of holding fast to a cable, a rope or the like. This bolt 9 is held in position by the cotter key 11.

The tube or extension 1 extends downwardly a distance substantially equal to the maximum slack distance which the device is designed to eliminate i. e., 40 inches. On its lower end is pinned, in the above described manner, a gear housing or supporting means 13.

The housing or supporting portion 13 is provided on its lower end with a neck 15 in which is rotatably borne a flanged nut 17. This nut is riveted to a bevel gear 19 rotatable horizontally within the housing. The riveted connection between gear 19 and nut 17 is designed to shear at a predetermined overload or overstress in order to prevent injury to more vital or expensive parts of the device when it is put under extreme service conditions. By this means the tension in a stretched wire may also be limited and kept at a proper value. The rivets are easily reached for replacement.

Threaded through the nut 17 is the screw 21, provided at its lower end with a grab-hook 23 or any other suitable means for hooking or clutching a connector.

The screw 21 passes through the nut 17, housing 13 and through the tube 1. At its extreme upper end it is pinned to a polygonal or square block 25. This block is free to ride longitudinally of the tube 1 as it has a loose fit therein. By means of the block 25 the screw is kept from turning but it is free to move axially.

Above the nut 17 is placed a thrust collar 27 loosely fitting the outside of the screw 21 and rotatably mounted therewith. An upper flange 29 on the collar 27 abuts a flange 31 or reenforcing portion of the housing 13 for a purpose to be hereinafter described. The reenforcing portion provides means for pinning on the tube 1. It carries both tensile and compressive stresses.

Meshing with the bevel gear 19 is the bevel pinion 33, keyed to a horizontal journal 35. This journal passes through a bearing 37 on the forward end of housing 13.

Outside of the housing on journal 35 is keyed a ratchet collar 39 slotted at several points. Loosely fitting over the ratchet collar 39 and loosely born on the journal 35

is a crank 41. This crank 41 is kept from sliding forwardly by the head 43 provided on the journal and cannot go rearwardly because of a shoulder on the bearing 37. The crank is provided with a crank handle 45 and means in the form of hole 47 for increasing the leverage on said crank. The dotted lines show how an extension may be pinned into the hole 47 and used as a lever.

Returning to the ratchet collar, it may be seen that a pointed pawl 49 cooperates therewith. This pawl extends through that part of the crank surrounding the ratchet, enters a box 51 and passes through a cap 53 thereof. A spring within box 51, reacting on pin 55 placed at right angles through the pawl to drop into one of the four slots of the ratchet collar whenever alignment occurs. It is self evident however, that if the crank is turned counter-clockwise (Figs. 1 and 4), the pawl is forced out of the ratchet grooves by the wedge action, thereby, causing no turning effect on the journal 35, while if the crank is turned clockwise such wedge action does not occur (the pawl being pointed from one side only) and the crank is then, to all intent and purposes, integral with the journal 35, driving the same and consequently the gear train within housing 13.

The pawl 49 is provided with a direction indicating head 57 which indicates the direction in which the crank may be turned in order to have the pawl lock the handle and gear train together. This is of value in that the pawl may be pulled downwardly by hand, twisted through 180 degrees, and permitted to drop back into place under action of the spring whereupon the ratchet action is reversed from that above described. Both the fact that a reversal of ratchet action is obtained in this device, and the fact that the direction of action is indicated makes for a very flexible control. The ratchet permits use of the device where a 360 degree swing of the crank is not practicable.

The advantage of being able to reverse the action will appear presently. Assume, first that the crank is turned clockwise and that the ratchet and pawl are so set as to lock the crank and journal together (Fig. 2.) Upon rotating the crank the gear train will be set into motion, and as gear 19 rotates the screw 21 will be drawn into the tube 1 and the device is thus adapted for use as a tension element or slack puller. The longitudinal reaction comes between gear 19 and the upper part of neck 15.

Upon reversing the action of the ratchet, counter-clockwise rotation of the crank causes the gear train to move and the action is reversed. In this case the gear 19, by means of nut 17, forces the screw 21 outwardly from the tube 1 thus making the device useful as a jack or compression member. This is a very useful action of the device in many circumstances encountered in field work of linemen and others.

The mechanical advantage obtained by using the device either as a tension or compression member may be made as great as desired by choosing proper gear ratios and pitch of thread.

It should be noted that when used as a compression member, the longitudinal reaction comes between the flange 29 of the collar 27 and flange 31 or reenforcing portion of the housing 13, inasmuch as the gear 19 reacts on the collar 27 in forcing the screw outwardly. The tube 1 is adapted to withstand both tensile and compressive stresses but it has been found advantageous to relieve housings such as 13 from compressive stresses as has been done here. Its polygonal shape provides strength and at the same time provides a guide for permitting sliding action of the block 25 without rotation thereof.

It will be noted that the moving parts of this device are almost entirely closed in and protected from dirt and grit.

From the above it will be seen that the several objects of the invention are attained and other advantageous results achieved.

As many modifications of the embodiments above illustrated might be made without departing from the spirit or scope of the present invention, it is intended that the above description and accompanying drawings and claims shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a slack puller, the combination of a screw, a housing adapted to completely enclose a reducing gear train, a nut in said housing driven to rotate by said train located in said housing, said nut engaging said screw, the screw having slidable movement through said housing, a polygonal tube attached at one end to said housing and at the other to an enclosing fastener, the tube being adapted to receive and completely enclose the movable screw, and a polygonal block slidably cooperating with the inside of the tube fastened to the screw.

2. In a slack puller, the combination of a screw, a housing adapted to enclose a reducing gear train and having a reenforcing portion adapted to transmit tensile and compression stresses, a nut in said housing driven to rotate by said train located in housing, said nut reacting through the housing when the device is used in tension and means whereby it reacts only through said reenforcing portion when the device is used in compression, the screw having slidable movement through the housing, a polygonal tube attached to said housing at said reenforcing portion and at the other end to a fastener, the tube being adapted to receive

the slidable screw and a non-rotatable block slidably cooperating with the tube and fastened to the screw, said tube being adapted to transmit tensile and compressive stresses.

3. In a slack puller, the combination of a screw, means for supporting a reducing gear train having a reenforcing portion adapted to transmit tensile and compression stresses, a nut in said supporting means adapted to be driven to rotate from said train located in the supporting portion, said nut reacting through the complete supporting portion when the device is used in tension and means whereby it reacts only through said reenforcing portion when the device is used in compression, the screw having slidable movement with respect to the supporting means, extension means attached to said supporting means at the reenforcing portion and at the other end to a fastener and a non-rotatable member slidably engaging the extension means and fastened to the screw, said extension means being adapted to transmit tensile and compressive stresses.

In testimony whereof, I have signed my name to this specification this 16th day of October, 1924.

IRA B. HART.