Sept. 20, 1949. J. J. RAVERS, JR 2,482,367

TRENCH JACK

Filed May 12, 1948

FIG 1

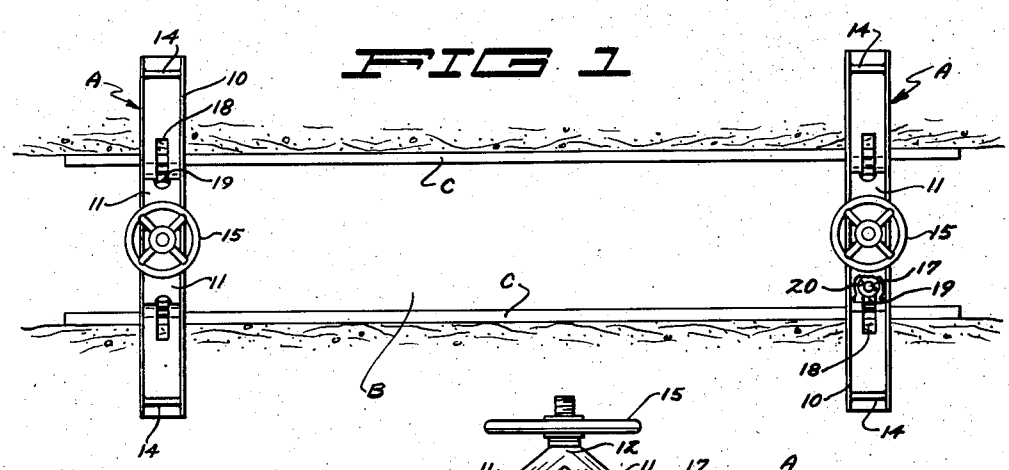


FIG 2

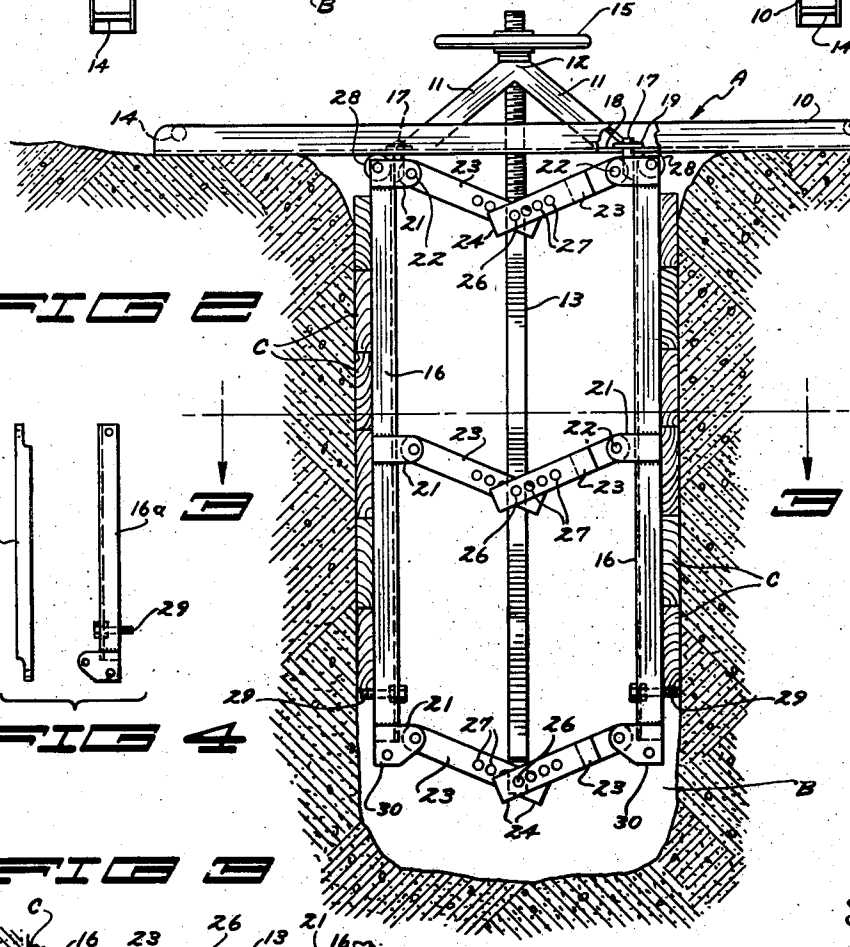
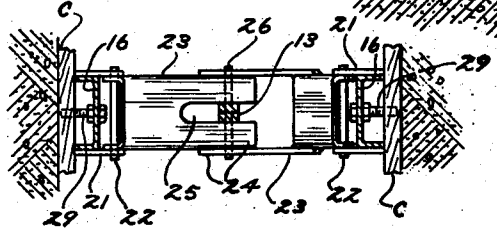


FIG 4

FIG 3



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Patented Sept. 20, 1949 2,482,367

UNITED STATES PATENT OFFICE

2,482,367

TRENCH JACK

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Application May 12, 1948, Serial No. 26,551

13 Claims. (Cl. 254—126)

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This invention relates to improvements in jacks for use in trenches, ditches and similar excavations, for cribbing up the walls and preventing crumbling and collapse thereof.

The primary object of the invention is to provide a comparatively simple and light but very strong device which may be collapsed for insertion into the trench and then expanded to bear outwardly on the walls thereof, or press cribbing boards to the walls to prevent their collapse.

Another object is to provide a device of this kind which may be lowered into the trench from the ground surface and adjusted to place without requiring that the workmen enter the trench. Thus, all adjustments and installation being carried out from the side of the trench where the workmen are safe.

Still another object is to provide a device of this nature having provision for conventional extension in length according to the depth of the trench.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

Fig. 1 is a plan view of a section of trench cribbed and protected by two of the units making up my invention.

Fig. 2 is an enlarged vertical cross section through the trench and cribbing.

Fig. 3 is a fragmentary horizontal sectional view along the line 3—3 in Fig. 2.

Fig. 4 is a detail view of extension sections for the pull rod and sides of the trench jack.

Referring now more particularly and by reference characters to the drawing A designates generally a trench jack of my invention (two of such being shown in Fig. 1) and it includes a center or hanger frame or supporting means comprising a channel 10 supporting turret bars 11 which angle upwardly and at their apex 12 form a vertical bearing for an adjusting bar or pull rod 13. Cross rods 14 also join the flanges of the channel 10 near their ends and this assembly may be conveniently fabricated by welding the parts together. The pull rod 13, however, may turn in its bearing at the apex 12 and its upper end is threaded to accommodate the threaded hub of a hand wheel 15 positioned above the said apex bearing. The hand wheel may, of course, be turned to raise or lower the pull rod 13 and the wheel will limit down movement of the rod.

Positioned below the channel 10 is a pair of side bars 16 also formed from channel and these bars are supported for opposite sliding movements toward and away from each other, while hanging in upright positions, by pins 17 welded to their upper ends, extending upward through an elongated slot 18 in the center of the channel 10 and surmounted by large washers 19 held by

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pins or cotter keys 20. At vertically spaced points the side bars 16 have rigidly affixed, inwardly turned apertured ears 21 to which are pivoted at 22 the outer ends of inwardly extending toggle links 23. These links are also made of channels with the webs cut away and extensions applied thereto so that the inner ends 24 of the links may cross, one cut-away shown at 25 in Fig. 3 being of such width as just to accommodate the pull rod 13. These crossing inner ends 24 of the links are pivotally connected to each other and to the pull rod by pins 26. A plurality of openings are provided in the links, as seen at 27, for the pins 26 so that the effective length of the toggle links, and therefore the spread of the side bars 16 may be adjusted.

Rollers 28 are journaled between the upper ends of the flanges of the side bars 16 to roll against the underside of the channel 10.

In use for temporarily shoring or cribbing a trench such as shown at B the trench jacks A are spaced along the length of the trench as may be required and with the side bars 16 pulled inward and spaced from the trench sides room is provided by which cribbing boards C may be dropped down at each side. These boards come to rest on and are supported by stop pins 29 extending outwardly from the side bars near the lower ends. The hand wheels 15 are now turned to pull the pull rod 13 upwardly and this motion tends to straighten out the toggle links 23, with the result that the side bars 16 are thrust outwardly and powerfully against the sides of the trench forcing the boards C tightly thereagainst. When the cribbing is to be removed the hand wheels are, of course, turned oppositely to pull in the side bars as will be readily understood.

It will be noted that the jacks may be handled and lowered into or removed from the trench by workmen standing alongside the trench, the rods 14 serving as convenient handles in the process. Thus it is not necessary for the men to enter the trench where they may be exposed to the dangers of cave-ins, as is the case now in installing present day trench jacks.

Each trench jack preferably consists of a comparatively short basic unit such as shown in Fig. 2 and for deeper trenches provision is made for the addition of sections 13a and 16a to the pull rod 13 and side bars 16 as may be required. For this purpose the lower bracket ears 21 have also depending apertured lugs 30 to which the upper apertured ends of the sections 16a may be pinned while the added sections 13a of the pull rod may be attached by the pins 26. Obviously, the extra sections will have toggle links 23 are required and a jack of any necessary length may be quickly set up in this fashion.

It is understood that suitable modifications may be made in the structure as disclosed, pro-

vided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. A jack of the character described for bracing apart the sides of an excavation, comprising side members and toggle means for moving the side members apart and toward the sides of the trench, and supporting means and operating means for the side members and toggle means, said supporting means being adapted to span the sides of the excavation.

2. A jack of the character described for bracing apart the sides of an excavation, comprising side members and toggle means for moving the side members apart and toward the sides of the trench, and supporting means and operating means for the side members and toggle means, said supporting means being adapted to span the sides of the excavation and having handles by which the jack may be lowered into and removed from the excavation from the top sides thereof.

3. A jack of the character described for bracing apart the sides of an excavation, comprising side members and toggle means for moving the side members apart and toward the sides of the trench, and a supporting member adapted to span the sides of the excavation and support the side members in the excavation as they are adjusted therein.

4. A jack of the character described for bracing apart the sides of an excavation, comprising side members and toggle means for moving the side members apart and toward the sides of the trench, and a supporting member adapted to span the sides of an excavation and support the side members in the excavation as they are adjusted therein and handles at the ends of the supporting member for manipulation of the jack by workmen stationed alongside the excavation.

5. In a trench jack of the character described, a supporting channel having an elongated slot, side bars depending below the channel and having means extending upwardly through and slidably and supportably engaging the edges of the slot, and toggle mechanism for moving the side bars toward and away from each other.

6. In a trench jack of the character described, a supporting channel having an elongated slot, side bars depending below the channel and having means extending upwardly through and slidably and supportably engaging the edges of the slot, toggle mechanism for moving the side bars toward and away from each other, and rollers on the upper ends of the side bars for upwardly engaging the underside of the channel.

7. In a trench jack of the character described, a supporting channel having an elongated slot, side bars depending below the channel and having pins at their upper ends slidably extending up through the slot, washers held on the upper ends of the pins and overlying the margins of the slots, and toggle mechanism connecting the side bars and operative to move them toward and away from each other.

8. In a trench jack of the character described, a supporting channel having an elongated slot, side bars depending below the channel and having pins at their upper ends slidably extending up through the slot, washers held on the upper ends of the pins and overlying the margins of the slots, and toggle mechanism connecting the side bars and operative to move them toward and away from each other, said toggle mechanism comprising a pull rod depending down through the channel between the side bars, toggle links pivoted at opposite ends to the side bars and the pull rod, and a hand wheel threaded on the upper end of the pull rod and operative to move it axially for actuating the toggle links.

9. In a trench jack of the character described, a supporting channel having an elongated slot, side bars depending below the channel and having pins at their upper ends slidably extending up through the slot, washers held on the upper ends of the pins and overlying the margins of the slots, and toggle mechanism connecting the side bars and operative to move them toward and away from each other, said toggle mechanism including toggle links and a movable pull rod, and means for adjusting the effective length of the toggle links and varying the mean spacing between the side bars.

10. In a trench jack of the character described, a supporting member, side bars hung from the supporting member and adjustable toward and away from each other, toggle mechanism including toggle links and a pull rod for so adjusting the side bars, and extra sections for suspension and connection from the side bars and pull rod for increasing the length of the jack according to the depth of the trench.

11. In a trench jack of the character described, upright side bars, mechanism for spreading the bars against the sides of a trench, means operative to span the trench and suspend the bars therein, and said spreading mechanism including a manually operative member positioned above the level of the trench sides when the jack is suspended in the trench.

12. In a trench jack having members for engaging the sides of the trench and mechanism for spreading the members against the trench sides, the improvement which consists in a supporting member for the jack which is operative to span the upper edges of the trench and suspend the jack therein, and a member for operating said spreading mechanism so located on the jack that it may be reached from the upper edges of the trench.

13. In a trench jack having members for engaging the sides of the trench and mechanism for spreading the members against the trench sides, the improvement which consists in a supporting member for the jack which is operative to span the upper edges of the trench and suspend the jack therein, and a hand wheel operatively connected to said spreading mechanism and located on said supporting member for operation from alongside the trench.

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