May 9, 1933. C. M. JACKSON 1,907,970

DRILL STEEL PULLER

Filed March 11, 1932

Fig. 1

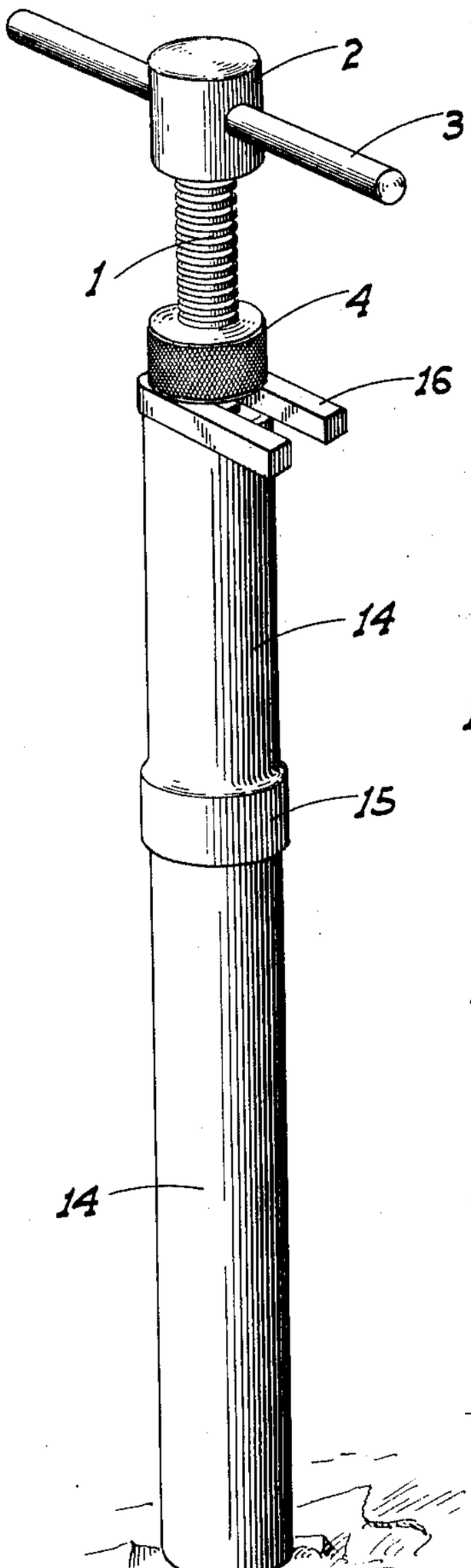


Fig. 2

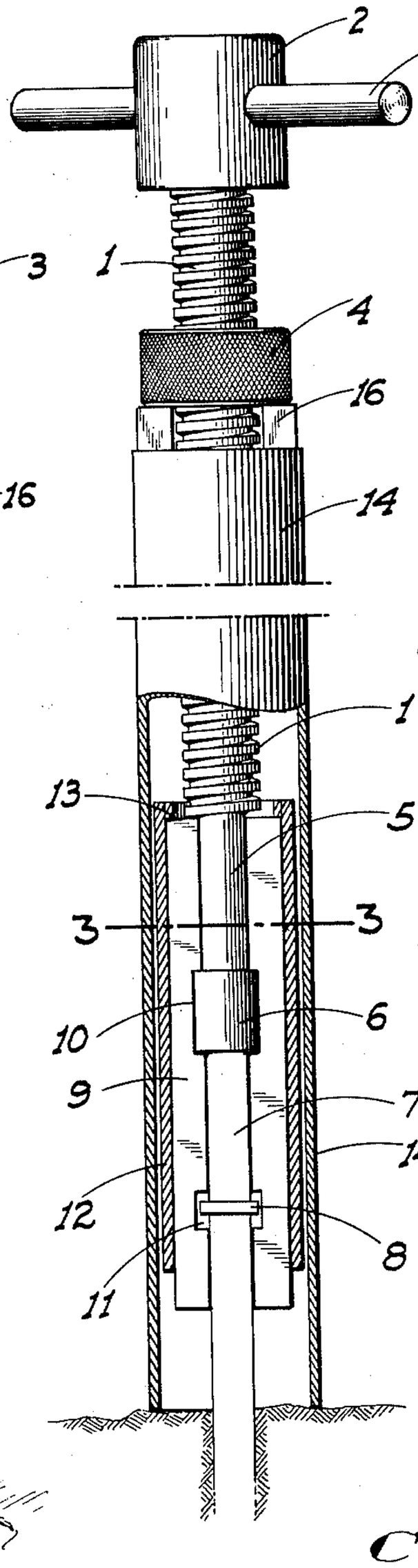


Fig. 3

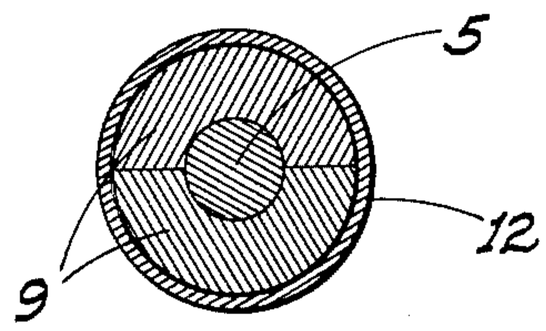
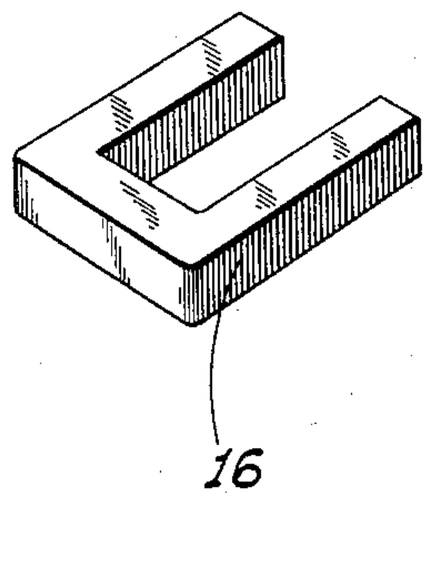


Fig. 4



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UNITED STATES PATENT OFFICE

CLARENCE M. JACKSON, OF BOULDER CITY, NEVADA

DRILL-STEEL PULLER

Application filed March 11, 1932. Serial No. 598,121.

This invention relates to devices for removing rock drills when they have become stuck in their holes—a frequent occurrence in construction work—especially in loose or gravelly strata as is well known. Sometimes a considerable number of jack hammers or similar steels become stuck beyond recovery during the operation of a single crew in the course of a shift. In addition to the cost of the steel itself, which is considerable, there is a greater loss to the contractor due to the time and the labor wasted on abandoned holes, the cost of putting the steel on the job, which is usually an appreciable item, and the delay to the drill and other crews and equipment whose functioning depends on the completion of the holes and the setting off of the blasts.

At present the sole method in use to remove stuck steel is by engaging the same with a crude form of wrench and pounding up on the wrench. There is frequently little or no room in which to swing a hammer so that only weak blows will be delivered against the wrench and in any case the force of the blow is never exactly straight up but is more of a glancing nature so that at best it is not highly effective. This method is obviously crude and inefficient so that steels must frequently be abandoned after considerable time has been lost in thus attempting to salvage the same.

The principal object of my invention is to eliminate this inefficient and crude method of steel recovery by providing a tool for the purpose by means of which the tool may be pulled straight up and with which a great leverage may be obtained in the pulling action. The tool is also arranged so that it may be quickly and easily mounted in connection with the steel and can be effectively used no matter what the ground contour or conditions adjacent the steel may be.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a perspective view of the tool as in operation.

Fig. 2 is a foreshortened elevation of the same partly in section and as connected to a drill steel.

Fig. 3 is a cross section of the stem and steel connecting unit detached, as on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of the nut supporting collar detached.

Referring now more particularly to the characters of reference on the drawing, the tool comprises a threaded jack stem 1 having an enlarged head 2 on its upper end provided with a transverse hole for removable engagement with a turning bar 3. A ring nut 4 is adjustably threaded on the stem. A relatively small unthreaded and short stem 5 depends from the screw stem as a continuation thereof, and terminates in a head 6, larger than the stem 5 but smaller than the threaded portion of the stem 1 so that the nut 4 may be slipped over the head 6.

When being arranged for use the head 6 is engaged with the top of the stuck drill steel 7 which always has a collar or flange 8 rigid therewith a short distance from its upper end. To then tie the head 6 and drill steel together in longitudinally alined and pulling relation I provide a pair of matching semicircular sleeves 9. These sleeve sections are drilled lengthwise to form a bore to receive the stem 5 and steel 7; which bore has an enlarged portion 10 to receive the head 6 and an enlarged portion 11 to receive the flange 8. The portion 10 is arranged to snugly fit the

head 6, since said head always occupies the same position relative to the jack stem. The portion 11 however is deeper than the thickness of the flange 8 since the position of the latter on the drill steel may vary somewhat and it is desirable that one pair of sleeves shall be capable of use with any steel. The matching sleeves being placed about the parts, they are held together by a single sleeve 12 removably slipped over the same from above and limited in its downward movement by a flange 13 on its upper end which overhangs and rests on the top of the sleeve 9. The sleeve 12 must be placed on the jack stem from its lower end before the latter is engaged with the drill steel since it is smaller than the nut 4 or head 2.

A rigid tubular unit 14 is then slipped over the jack stem from above and before the bar 3 is mounted in place and allowed to engage the ground surrounding the drill steel. This tubing also fits over the sleeve 12 in clearance relation thereto, its length being such that its upper end is below the head 2 and ring nut 4. In order that the unit may fit all conditions I preferably provide as equipment with the tool a plurality of sections of tubing of different lengths adapted to be detachably fitted to each other as by means of bell connections, as at 15.

I then place a C collar 16 on top of the tubing under the nut 4 and on which the latter rests; the opening in the collar being large enough to take the stem 4 but not the nut.

With the parts of the tool thus assembled in connection with the drill steel it will be seen that turning of the jack stem in the proper direction relative to the cut of the threads will cause the nut 4 to be pressed firmly against the collar 16 while the jack stem is raised. Since the sleeves 9 are attached to the lower end of the jack stem and are engaged with the steel flange, the steel will be pulled up with the jack stem. Also, since the jack is longitudinally alined with the steel the pull on the latter will be axially of the steel, or so that it will be pulled straight out of the hole without any tendency to binding or distortion. The pulling pressure which may be applied to the jack stem is limited solely by the strength of the stem supporting tubing and the length of the bar 3 all of which may be designed of such material and of such proportions as to withstand any pressures which it may ever be necessary to apply.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A drill-steel puller comprising a screw stem adapted to be longitudinally alined with a steel partially embedded in the ground, means to tie the steel and stem together in pulling relationship, means to rotate the stem, a tubular unit disposed over the stem and steel and engaging the ground, a nut on the stem, and a member about the stem under the nut to be engaged thereby and supported by the upper end of the unit; said member being in the form of a C-collar separate from the unit and having a side opening to receive the stem, whereby said member may be placed in position after the unit is disposed in place.

2. A drill-steel puller comprising a screw stem adapted to be longitudinally alined with a steel partially embedded in the ground, means to tie the steel and stem together in pulling relationship, means to rotate the stem, a tubular unit disposed over the stem and steel and engaging the ground, a nut on the stem, said unit being of larger interior diameter than the nut whereby it may be slipped over the stem and nut from above, and a member separate from and adapted to be disposed between the nut and unit after the latter is in place so as to rest on top of the unit and form a support for the nut.

3. A drill-steel puller comprising a screw stem adapted to be longitudinally alined with a steel partially embedded in the ground, said steel having an enlarged flange adjacent its upper end, a head formed on the lower end of the stem below the threaded portion to rest on top of the steel, means to hold the head and flange together in pulling relationship and means between the stem and ground to cause the stem when rotated to impart an upward movement to the stem.

4. A drill-steel puller comprising a screw stem adapted to be longitudinally alined with a steel partially embedded in the ground, said steel having an enlarged flange adjacent its upper end, a head formed on the lower end of the stem below the threaded portion to rest on top of the steel, cooperating vertically split sleeve sections together having a centrally disposed bore to receive the upper portion of the steel and the portion of the stem immediately above the head, said bore having enlarged portions to receive the head and steel-flange, means to hold the sleeve sections in cooperating relationship and means between the screw stem and ground to cause the stem when rotated to impart an upward movement to the stem.

5. A structure as in claim 4, in which said sleeve holding means comprises a tube to fit over the same and having stop means to limit its downward movement.

In testimony whereof I affix my signature.

CLARENCE M. JACKSON.