June 18, 1940. J. H. BURT 2,205,238

CABLE TOOL

Filed June 19, 1939

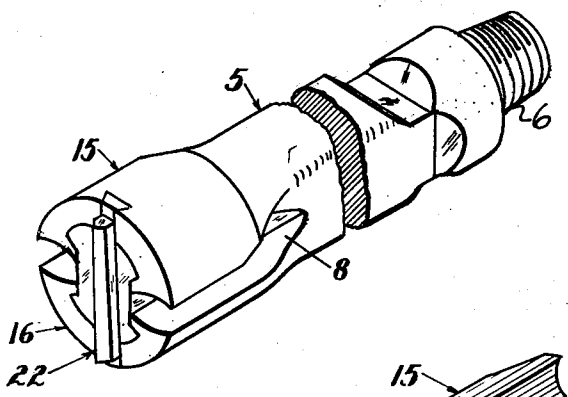


Fig. 1.

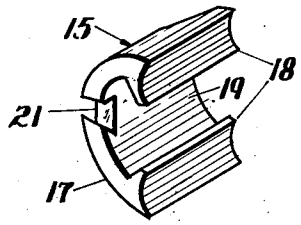


Fig. 2.

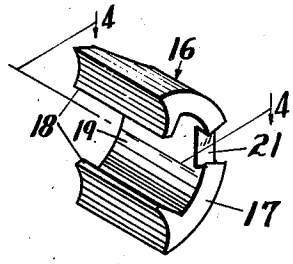


Fig. 3

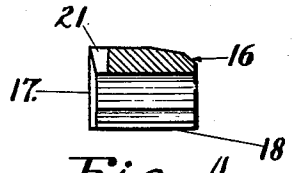


Fig. 4.

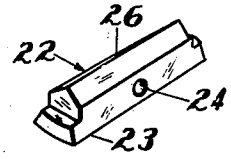


Fig. 5.

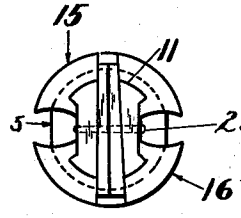


Fig. 6.

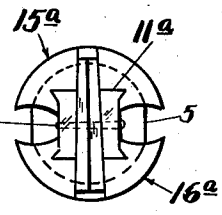


Fig. 8.

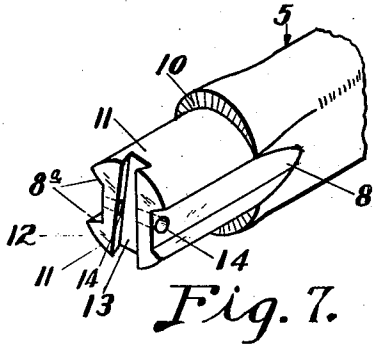


Fig. 7.

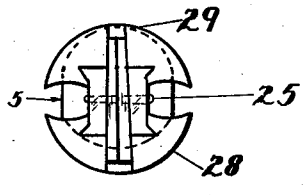


Fig. 9.

INVENTOR.

BY J. H. Burt
A. C. Fisher

ATTORNEY.

Patented June 18, 1940

2,205,238

UNITED STATES PATENT OFFICE

2,205,238

CABLE TOOL

Joseph H. Burt, Hermann, Mo.

Application June 19, 1939, Serial No. 279,834

4 Claims. (Cl. 255—63)

This invention relates to cable tools, and more particularly to percussion drill bits as commonly used in oil well drilling, and has for its main object to reduce the cost of maintenance and repair of such tools.

Another object is to provide a sectional or jointed cable tool of the kind referred to, embodying an elongated shank of comparatively mild steel, mortised and shaped at its lower end, so that drill bits of hardened tool or cast steel may be rigidly yet removably mounted thereon, whereby the bits may be readily removed for replacement, sharpening or repair, at comparatively small expense.

Still another object is to provide, in a tool of the kind referred to, an elongated shank of conventional shape and contour, including longitudinally extended water grooves at opposite sides, the lower end of the shank being inset to form shoulders and being cut or formed squarely across perpendicularly to the longitudinal axis of the shank, and having a dove-tail mortise or key-groove formed across its face between the water grooves, whereby this end of the shank is adapted to slidably receive complementally mortised bit supporting sections longitudinally mounted thereon and having lateral dove-tail mortises to align with the key groove of the shank, the whole being then locked together by a bit slid transversely through the said dove-tail mortises of the parts.

The foregoing objects are attained by means of the structures shown in the accompanying drawing, illustrating a preferred embodiment of the invention, and wherein:

Figure 1 is a perspective view of a cable tool, a medial section being broken out, and showing my invention embodied at the lower end.

Figures 2 and 3 are details in perspective of the pair of bit supporting sections.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a detail in perspective of a drill bit for mounting at the outer end of the assembly.

Figure 6 is a bottom end view of the assembly shown in Figure 1.

Figure 7 is a perspective view of the lower end of the shank of a cable tool formed in accordance with this invention, the bit and bit supporting sections being removed.

Figure 8 is a bottom end view of a slightly modified form of parts and assembly thereof.

Figure 9 is a bottom end view showing application of the invention to an eccentrically weighted form of tool, whereby one end of the drill bit is projected eccentrically to one side for cutting a relatively large hole through a rock formation, by simultaneous rotation and reciprocation of the tool.

The invention includes an elongated shank or bit stock 5, made of any suitable metal or material such as mild steel and having screw connection 6 at the upper end as means for attaching a cable (not shown). The usual water grooves 8 are extended longitudinally down along diametrically opposite sides of the shank.

In accordance with my invention, the lower or working end of this shank is inset or undercut at the portions intermediate the water grooves, to provide oppositely aligned shoulders 10 overhanging the curved or cylindrical sides 11, the lower end or face 12 of this inset portion is cut squarely across perpendicularly to the axis of the shank, the margins of the water grooves thereat are flared outwardly as shown at 8a, and a tapered, dove-tail mortise, key-way or bit groove 13 is cut or formed diametrically across the flat face 12, into the end of the shank, the same being extended between the water grooves 8, and being slightly tapered from end to end as shown. A tapered key pin hole 14 is pierced through the shank end, cutting medially and transversely through the bit-groove. A pair of right and left bit supporting sections or reaming edges 15 and 16 are provided, the same being arcuate in cross section, with walls 17 of a length and thickness to nicely fill in the cut-away portions of the inset working end of the shank, from the shoulders 10 outward to the end face 12, over the curved sides 11, and having inturned flanges or lips 18 extended along their margins in parallel relation, leaving intermediate channels or mortises 19, dimensioned and adapted to nicely and slidably pass over the margins 8a of the water grooves 8, and the curved sides 11, in a longitudinal direction, until the inner ends of the sections snugly abut the shoulders 10, and the outer end faces of the sections 15 and 16 fall flush with the end face 12 of the shank. Dove-tail mortises 21 are formed medially in the outer ends of the sections 15 and 16, and are adapted to exactly register with the ends of the bit groove 13 when properly mounted on the shank.

One form of drill bit or penetrating edge 22 is here shown, same being adapted for cutting through rock formations. Other forms of bits may be equally used, as adapted to various purposes. The bit 22 (or other forms) comprises an elongated rectangular base 23, of dove-tail formation, and dimensioned and tapered endwise to

correspond with and nicely fit into the bit groove 13, into which it is forced endwise. A tapered pin hole 24 is pierced medially and transversely through the base 23 and is adapted to align and register with the pin hole 14 in the end of the shank. A tapered lock pin 25 is provided for driving through the said aligned holes for locking the bit in place. The outstanding cutting edge 26 of the bit is here shown as angular, but as above suggested, bits of other forms and having any desired form of cutting edge, may be adapted to the invention. The parts are so dimensioned that when assembled the water grooves 8 will be preserved and open clear out through the end of the tool.

As shown in Figure 8, the reduced working end of the shank may be formed with flat sides or surfaces 11*a* instead of cylindrical as at 11, the bit supporting sections 15*a* and 16*a* being shaped to correspond.

Figure 9 shows an unbalanced or eccentric form of tool, having its mass so disposed as to throw one side 28 outwardly off center, or eccentric relation to the tool as a whole, as indicated at 29. By this arrangement a relatively larger hole may be drilled by rotating the tool as it is reciprocated.

The bits and bit supporting sections are to be made of tough cast or tool steel of the best quality, or any other suitable material, and by the construction shown these parts may be readily disassembled for sharpening or repair, at comparatively little cost or loss of time, as duplicate parts may be assembled on the shank while one set of parts is removed for repair.

Owing to the longitudinal mounting of the bit supporting sections, they are automatically held in place as the tool works up and down in the drill hole, the bit itself being effectually retained against lateral slippage by means of the tapered lock pin 25. The parts are readily disassembled by merely knocking out this pin and then driving out the bit and pulling off the sections.

It is thought that the construction and use of the tool will be fully understood from the foregoing description, and while I have here shown and described certain embodiments of the invention and certain structural features thereof, it is understood that the same may be changed to meet practical requirements, within the scope of the appended claims.

I claim:

1. A cable tool bit comprising an elongated shank having its working end reduced to provide shoulders, bit supporting sections adapted to slide longitudinally upon opposite sides of the reduced end, there being aligned dove-tail bit grooves formed diametrically across the end face of the shank and medially through the ends of the bit supporting sections, and a bit having a dove-tail base adapted to slide into the said bit grooves of shank and sections.

2. In a structure as defined in claim 1, means for locking the bit against slippage.

3. A cable tool comprising an elongated shank having diametrically opposite, longitudinally extended water grooves opening out at the working end thereof, the working end of the shank being reduced intermediate the water grooves to provide shoulders, bit supporting sections dimensioned to fill in the reduced end of the shank and having inturned flanges for slidably engaging the margins of the water grooves of the shank at opposite sides, there being bit engaging grooves formed dimetrically across the end faces of shank and bit supporting sections between the said water grooves, a bit formed at its base to slide into said bit grooves of shank and sections, whereby the latter are locked in place.

4. In a structure as defined in claim 3, releasable means for locking the bit in place.

JOSEPH H. BURT.