Nov. 25, 1924. 1,516,601

A. L. HAWKESWORTH

DRILL

Original Filed July 7, 1922

Fig. 1.

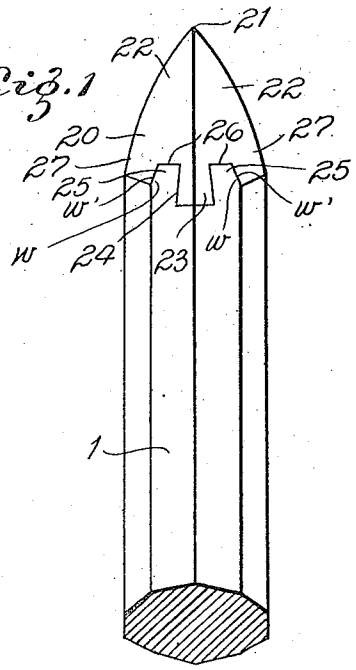


Fig. 2.

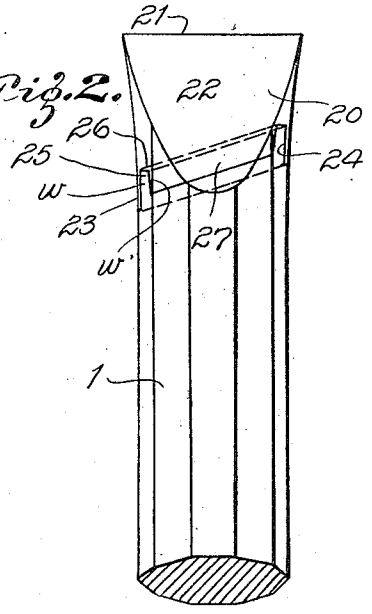


Fig. 3.

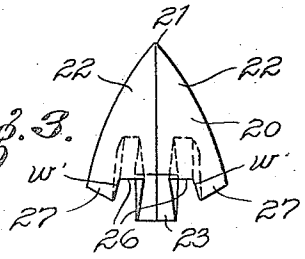


Fig. 4.

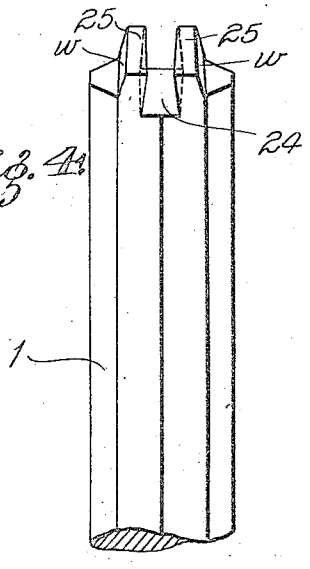
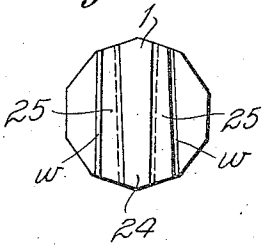


Fig. 5.



Inventor:
Arthur L. Hawkesworth.
By Harry A. Baum
Attorney.

Patented Nov. 25, 1924. 1,516,601

UNITED STATES PATENT OFFICE.

ARTHUR LEE HAWKESWORTH, OF BUTTE, MONTANA, ASSIGNOR TO HAWKESWORTH DRILL COMPANY, OF BUTTE, MONTANA, A CORPORATION OF DELAWARE.

DRILL.

Original application filed July 7, 1922, Serial No. 573,288. Divided and this application filed February 7, 1923. Serial No. 617,617.

To all whom it may concern:

Be it known that I, ARTHUR LEE HAWKESWORTH, a citizen of the United States, residing at Butte, in the county of Silver Bow and State of Montana, have invented certain new and useful Improvements in Drills, of which the following is a specification.

My invention has relation to improvements in drills having detachable bits which may be quickly and readily detached when occasion arises therefor, for example, where a bit must be removed for sharpening and a new bit substituted, or when it is desired to take the bit off for safe-keeping, or for any other purpose. A further object is to provide a drill having a detachable bit with sides inclining upwardly to a single cutting edge, the joint between bit and shank being so formed as to preserve the maximum strength thereof. Further objects will be better apparent from a detailed description of the invention in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of my improved drill turned to show the interlocking grooves and tongues in end elevation; Fig. 2 is a side elevation of the drill turned to an angle of 90° to Fig. 1; Fig. 3 is an elevation of the bit detached from the shank turned to present the narrow end of the central tongue; Fig. 4 is an elevation of the shank turned to present the narrow end of its central groove adapted to receive the tongue of the bit; Fig. 5 is a plan view of the tongue and groove formations on the shank.

Referring to the drawings, 1 represents a drill-bar or shank and 20 the bit adapted to be passed across the axis thereof, said shank and bit having cooperative formations whereby they are effectively interlocked against relative displacement, the bit, at the same time, being readily detachable from the shank. These interlocking formations consist in a dovetail groove 24 in the shank bounded by inwardly inclined tongues 25, 25 which cooperate with a dovetail tongue 23 on the bit bounded by inwardly inclined grooves 26, 26, all of said formations being inclined to the axis of the drill. The side walls of the tongues 25, 25 taper in the general direction toward the cutting end of the drill while the side walls of groove 24 taper in the opposite direction so that on inserting the narrow end of tongue 23 into the wide end of groove 24 the narrow ends of tongues 25, 25, of the shank will at the same time be received by the wide ends of grooves 26, 26 of the bit, and as the bit is moved across the shank, the respective formations will interlock until further movement of the bit is arrested, when the axis of shank and bit are in alinement, and the bottom of the grooves and outer surfaces of the tongues (the transverse engaging surfaces) are in engagement. This arrest is effected by the wedging action between tongue 23 and groove 24 on the one hand, and the tongues 25, 25 and grooves 26, 26 on the other hand, the reverse tapers of the respective tongues and their cooperating grooves operating to effect a positive locking of the bit to the shank. Obviously, the blows to which the drill is subjected in drilling operations will tend to tighten the bit on the shank, said bit being readily removed, however, by a slight blow with a hammer against the bit on the same side with the narrow end of tongue 23.

In the present case the drill is provided with a bit 20 having but a single cutting edge 21, the opposite sides 22, 22 of the bit being inclined toward each other to form this edge, thus decreasing the width of the bit across the interlocking formations. While the central tongue 23 of the bit and its cooperating groove 24 in the shank are dovetailed, the tongues 25, 25 of the shank and cooperating grooves 26, 26 of the bit bounding tongue 23 and groove 24 are not dovetailed since it would unnecessarily weaken the bit to incline outwardly the outer walls w, w, of tongues 25, 25, and outer walls w', w' of grooves 26, 26. Therefore these walls are inclined inwardly, or toward the center of the bit, so that if a plane be passed through the drill parallel to its axis and perpendicular to edge 21, the lines in which this plane intersects the surfaces of each tongue 25 will be parallel. This inclination of walls w', w' gives increased thickness to the outer bounding shoulders 27, 27 of the bit.

From the foregoing it is apparent that with the walls *w*, *w* inclined inwardly there is less possibility of a line of fracture developing under the strain of the work across the bases of shoulders 27, 27.

The herein described improvements may also be embodied with advantages in a drill of the construction of that shown in my copending case, Serial No. 573,288, of which this is a division.

Having described my invention, I claim:

1. In combination with a drill bar or shank, a bit movable across the axis of the shank, a transverse dovetail tongue tapering in a given direction and bounding grooves tapering in the opposite direction formed on one of the members, bounding lines of the side walls of each groove lying in a common plane intersecting said grooves being substantially parallel, a corresponding dovetail groove and bounding tongues on the opposite member interlocking with the formations on the first member, the transverse engaging surfaces between the members being inclined to the axis of the shank.

2. In combination with a drill bar or shank, a bit movable across the axis of the shank, a transverse dovetail tongue tapering in a given direction and bounding grooves tapering in the opposite direction formed on one of the members, a corresponding dovetail groove and bounding tongues on the opposite member interlocking with the formations on the first member, the outer engaging walls of the bounding tongues and grooves inclining toward the axis of the bit, and the transverse engaging surfaces between the members inclining to the axis of the shank.

3. In combination with a drill bar or shank, a bit movable across the axis of the shank, said bit having side walls inclining upwardly toward each other to form the cutting edge thereof, a transverse dovetail tongue tapering in a given direction and bounding grooves tapering in the opposite direction formed on the bit, the shank having a corresponding dovetail groove and bounding tongues interlocking with the formations on the bit, the outer engaging walls of the bounding tongues and grooves inclining in the same general direction as the bit side walls.

In testimony whereof I hereunto affix my signature.

ARTHUR LEE HAWKESWORTH.