A. L. HAWKESWORTH.

DRILL.

APPLICATION FILED NOV. 21, 1921.

1,422,265.

Patented July 11, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

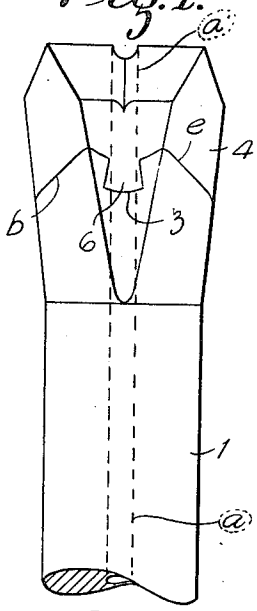


Fig. 2.

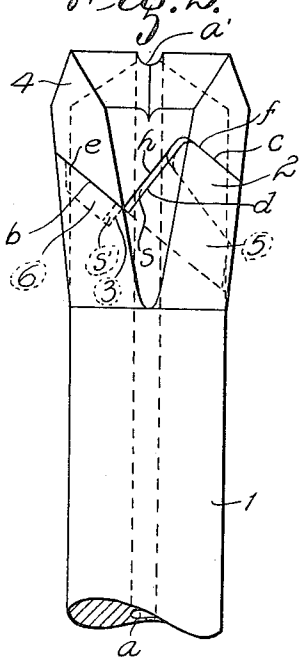


Fig. 3.

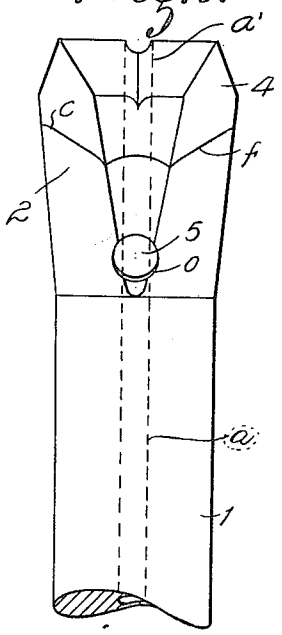


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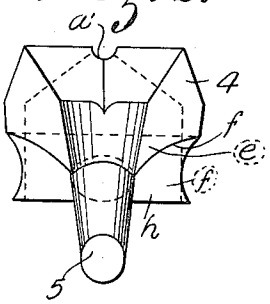


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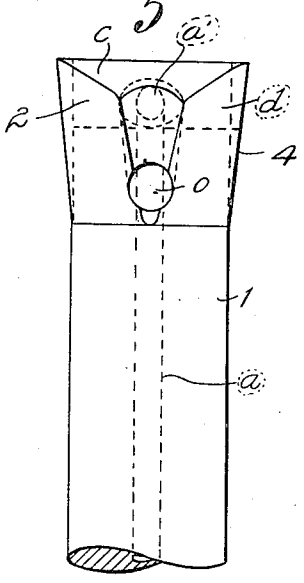


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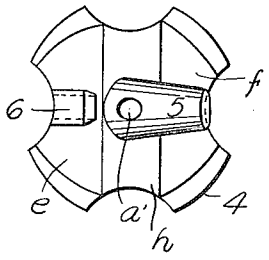
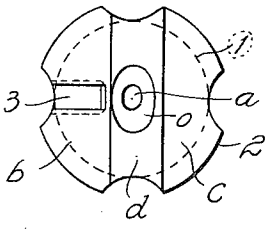


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 8.

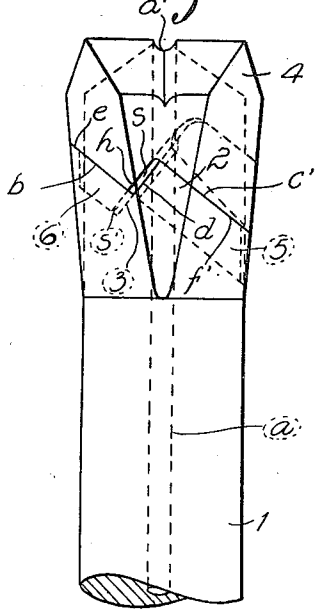


Fig. 9.

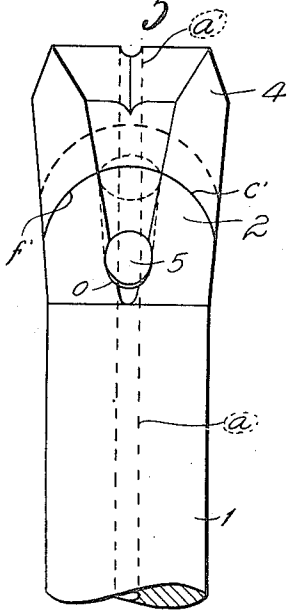


Fig. 10.

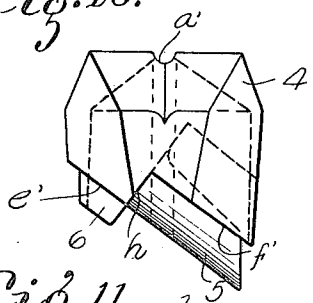


Fig. 11.

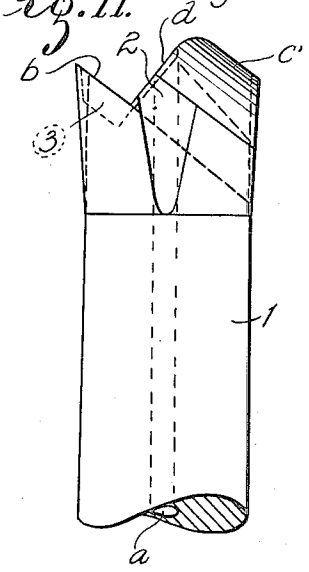


Fig. 12.

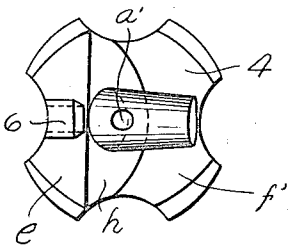
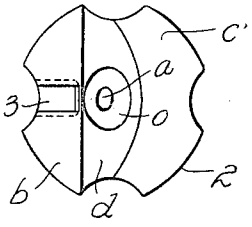


Fig. 13.



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UNITED STATES PATENT OFFICE.

ARTHUR L. HAWKESWORTH, OF BUTTE, MONTANA.

DRILL.

1,422,265. Specification of Letters Patent. Patented July 11, 1922.

Application filed November 21, 1921. Serial No. 516,784.

To all whom it may concern:

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

The present invention has relation to improvements in drills having detachable bits, the object sought being to provide interlocking means between the bit and shank whereby the bit may be effectively retained against displacement while in working position. A further object is to provide interlocking means which will permit of ready and quick detaching of the bit whenever occasion therefor arises, as for example where a bit must be removed to be sharpened and a new bit substituted, or when it is desired to take off the bit for safe-keeping, or for any other reason. The present improvement possesses many advantages from a structural standpoint as will be more fully apparent from the following detailed description in connection with the accompanying drawings, in which—

Figure 1 represents an elevational view of my improved drill turned to present the ends of the dove-tail tongue on the bit and complementary groove in shank which receives the tongue; Fig. 2 is a side elevation of the drill; Fig. 3 is an elevational view of the drill turned to present the end of the conical tongue on the bit which is adapted to be wedged into the conical hole in the shank for locking the bit on the shank; Figs. 4 and 5 are detached side elevations of the bit and shank respectively; Fig. 6 is a bottom plan view of the bit; Fig. 7 is an end view of the shank showing in top plan the formations which cooperate with those on the bit for locking the latter on the shank; Fig. 8 is an elevational view of a modified form of the invention; Fig. 9 is an elevational view of the modified form of drill turned to present the end of taper tongue and groove of bit and shank respectively; Figs. 10 and 11 are detached elevational views of the modified form of bit and shank respectively; Fig. 12 is a bottom plan of bit shown in Fig. 10 and Fig. 13 is an end view of the shank shown in Fig. 11.

Referring to the drawings, and for the present to Figs. 1 to 7 inclusive, 1 represents a drill bar or shank provided with a central passageway or duct *a* for the flow of water usually employed in drilling operations as well understood in the art. The shank terminates at its bit-supporting end in a zigzag formation comprising a surface *b* inclined away from the general direction of the cutting end of the tool and toward the longitudinal axis of the shank, and a surface *c* disposed in a plane parallel with surface *b* and inclined away from the general direction of the cutting end of the tool and away from the axis of the shank. The surface *b* lies on one side of the axis of the shank, and the surface *c* lies on the other side of said axis, the surfaces *a* and *b* being connected by a plane surface *d* inclined in a direction opposite to that of surfaces *b* and *c*. The surface *d* is substantially perpendicular to surfaces *b* and *c*. The disposition of surfaces *c* and *d* results in the formation of an abutment wall 2 on one side of the shank axis through which extends a tapered or conical hole *o* having the innermost part of its bounding wall extending in the same plane with that of surface *b*. A dove-tail groove 3 is formed in the surface *b* extending from one side thereof toward the axis of the shank. The faces *b* and *c* are adapted to form the supporting surfaces for a bit 4 which is provided with formations complementary to those on the shank just described, the bit formations comprising parallel inclined faces *e* and *f* joined by a face *h* substantially perpendicular to them.

The face *h* has projecting from it a conical tongue 5, the outermost point in the periphery of which lies in the same plane as the face *e*, said tongue being adapted to wedge in the taper hole *o* when the bit and shank are assembled. A dove-tail tongue 6 projects outwardly from the face *e* and extends from one side of said face toward the face *h*, said tongue being adapted to enter the groove 3 in the face *b* of the shank.

As axially disposed port *a'* traverses the bit, said port registering with port *a* to form a continuous passage through the drill when the bit is in place on the shank.

In assembling bit and shank the bit is passed across the axis of the shank with the tongue 5 pointed into the hole *o*, and as faces *e* and *f* ride over faces *b* and *c* respectively, the tongue 5 will gradually be wedged in the hole *o* and the tongue 6 will ride in the groove 3. Obviously a clearance *s* between faces *d* and *h* must be provided as well as a clearance *s'* between the ends of

tongue 6 and groove 3 so that these respective surfaces will not engage before the tongue 5 becomes tightly wedged in the hole *o*.

In Figs. 8 to 13 inclusive I show a modified form of the invention, in which faces *c'* and *f'* are arched instead of plane. This will assist in preventing relative movement between bit and shank under tortional strains such as are incurred in rotary drilling.

Obviously the formations on bit and shank may be reversed without departing from the spirit of the invention; and it is immaterial whether the drill used be reciprocating or rotary, so long as the parts cooperate as above set forth to tighten while in use but, nevertheless, to be easily detached when desired.

Having described my invention, I claim:

1. In combination with a shank, a cutting tool adapted to be detachably secured thereto, said shank being provided on the cutting end thereof with a zigzag formation including an abutment wall provided with a tapered hole, said cutting tool being provided with complementary formations for cooperating with those on the shank, and having a tapered tongue adapted to be wedged in the aforesaid hole when tool and shank are assembled.

2. In combination with a shank, a cutting tool adapted to be detachably secured thereto, said shank terminating at one end in a zigzag formation comprising two inclined faces disposed in parallel planes and an oppositely inclined face connecting the two faces aforesaid, an abutment wall bounded by two adjacent faces, a tapered hole in said abutment wall, said cutting tool being provided with a formation complementary to that on the shank comprising two faces in parallel planes and a connecting face, the last mentioned face having a tapered tongue projecting from it and adapted to be wedged in the aforesaid hole when shank and tool are assembled.

3. In combination with a shank, a cutting tool adapted to be detachably secured thereto, said shank terminating at one end in a zigzag formation comprising two faces, one of which is plane and the other arcuate, said faces inclining in the same general direction and being connected by an oppositely inclined face and an abutment wall provided with a tapered hole, said cutting tool terminating in a complementary formation comprising faces complementary to those on the shank, and a tapered tongue projecting from one of said complementary faces, said tongue being adapted to wedge in the aforesaid hole when bit and shank are assembled.

4. In combination with a shank, a cutting tool adapted to be detachably secured thereto, said shank terminating at one end in a zigzag formation comprising two inclined faces disposed in parallel planes and connected by an oppositely inclined face, and an abutment wall, one of said faces being provided with a groove and the abutment wall being provided with a tapered hole, said cutting tool terminating at one end in a formation having faces complementary to those on the shank, and a tongue projecting from one of said faces adapted to be wedged in the aforesaid hole, and a second tongue projecting from another face adapted to enter the aforesaid groove when bit and shank are assembled.

In testimony whereof I hereunto affix my signature.

ARTHUR L. HAWKESWORTH.