

March 28, 1933.

J. D. NIXON

1,902,885

DRILL

Filed June 29, 1931

2 Sheets-Sheet 1

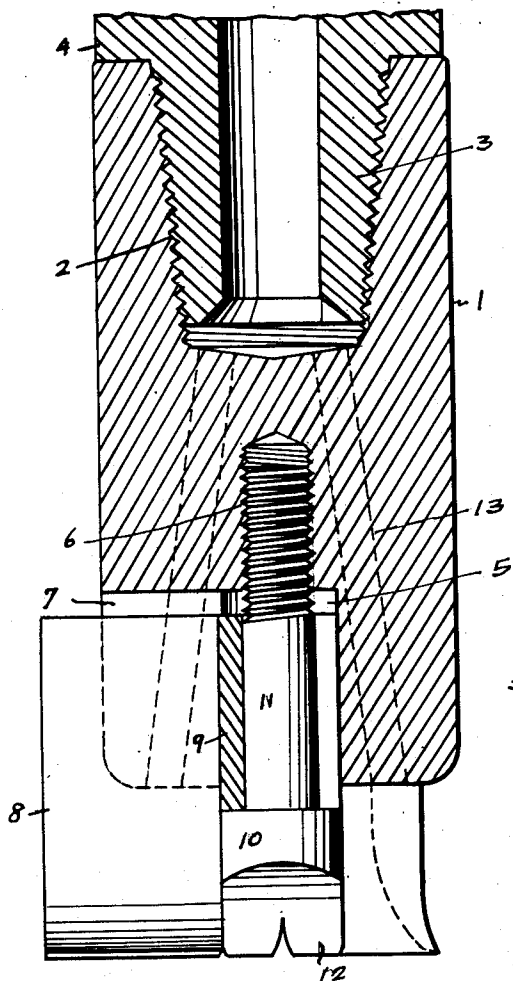


Fig. 1.

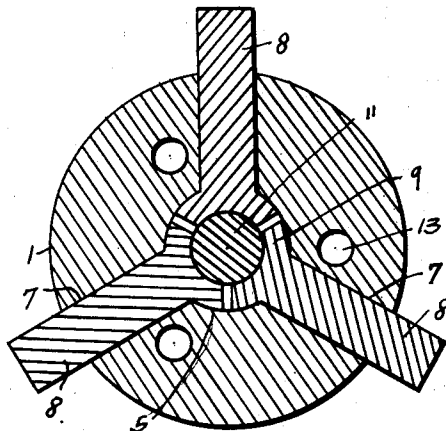


Fig. 3.

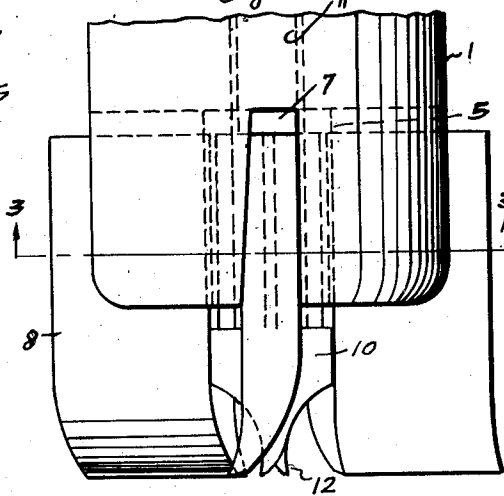


Fig. 2.

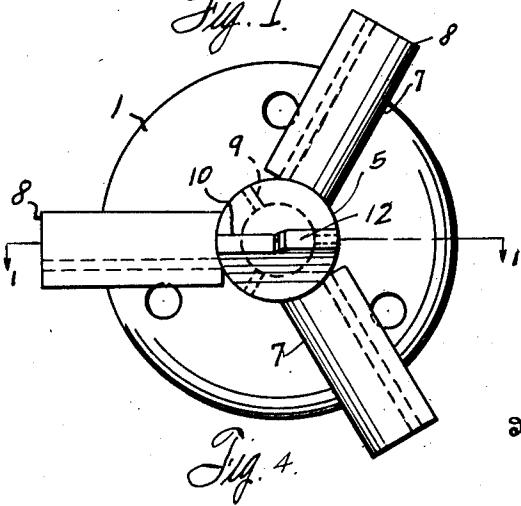


Fig. 4.

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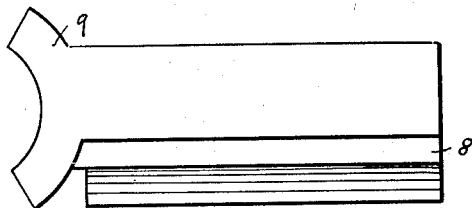


Fig. 5.

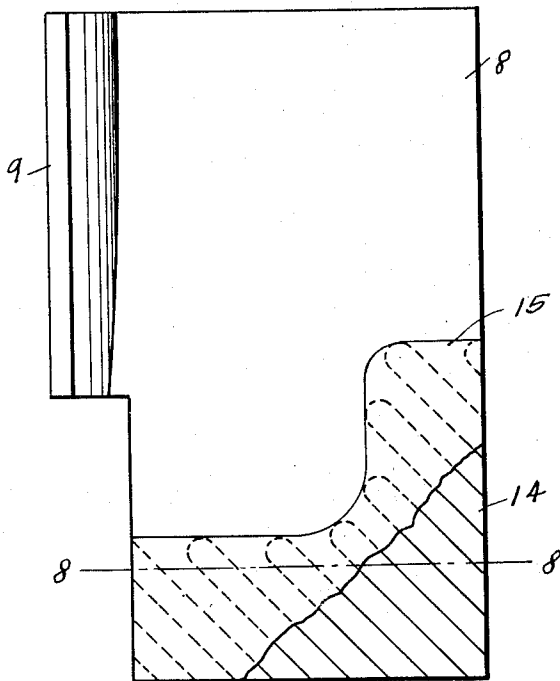


Fig. 6.

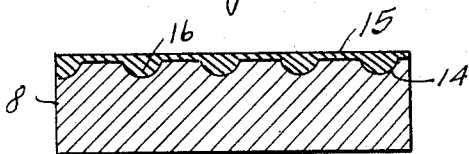


Fig. 8.

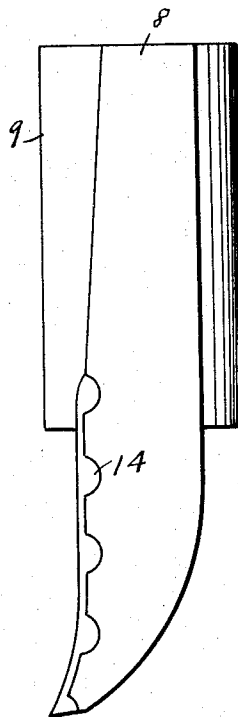


Fig. 7.

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UNITED STATES PATENT OFFICE

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DRILL

Application filed June 29, 1931. Serial No. 547,809.

This invention relates to a drill.

An object of the invention is to provide a drill having a head and detachable cutters secured thereto in a novel manner.

5 Another object of the invention is to provide a drill embodying a head and detachable cutters mounted therein with means whereby the cutters will be at all times clamped in immovable relation to the head.

10 Another object is to provide, in a drill, means for automatically taking up the slack, or movement, of the drill cutters relative to the head.

15 Another object of the invention is to provide, in a drill, a novel type of blade.

A still further object is to provide, in a drill, a blade having a novel type of hard surface cutting edge thereon.

20 With the above and other objects in view this invention has particular relation to certain novel features of construction, operation and arrangement of parts an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

25 Figure 1 shows a vertical sectional view of the drill taken on the line 1-1 of Figure 4.

30 Figure 2 shows a fragmentary side elevation.

Figure 3 shows a transverse sectional view taken on the line 3-3 of Figure 2.

Figure 4 shows a bottom end view.

35 Figure 5 shows an upper end view of a cutter blade employed.

Figure 6 shows a front elevation of said blade, partly broken away.

Figure 7 shows an edge view, and

40 Figure 8 shows a sectional view taken on the line 8-8 of Figure 6.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates the drill head which may be of a cylindrical form. The upper end of the head may have a tapering, internally threaded box 2 to receive the pin 3 of the drill collar 4 by means of which the drill may be attached to the drill stem.

The lower end of the head has an axial bore 5 whose upper end is reduced and internally threaded as at 6. The upper end of this bore terminates beneath the lower end of the box 2.

There are the vertical slots 7 which radiate from the enlarged portion of the bore 5 and which are spaced apart around the head. These slots, as shown, taper upwardly.

There are suitable cutters, as shown, said cutters being in the form of blades 8. These cutters have their upper ends fitted into the slots 7, said ends being tapered to wedge in said slots. The blades preferably extend out laterally beyond the head. The inner margins of the blades have the widened arcuate tenons 9, and said tenons conform to the shape of, and fit against, the wall of the bore 5.

There is a center drill 10 which fits closely within the lower ends of the blades 8 and which has a reduced, upwardly extending shaft 11, preferably integral therewith.

The upper end of the drill 10 abuts the lower ends of the tenons 9 and the shaft 11 fits closely within said tenons and its upper end is threaded and screwed up into the threaded upper end of the bore 5, the upper end of said shaft being spaced from the opposing upper end of said bore.

The lower end of the blades 8 may be forwardly curved, as shown, if desired, and the center drill may also have forwardly curved blades 12. It is to be understood that the drill cutters may be made of any selected design and may be provided with cutting edges, or may have rolling cutters, or abrading members thereon.

When the drill is assembled, the upper ends of the blades will be spaced beneath the upper ends of the slots 7 as shown, and the lower ends of the tenons 9 will be correspondingly spaced beneath the lower end of the head 1, with the upper end of the center drill 10 abutting said lower ends of said tenons.

In use the stress and wear on the blades, and on the side walls of the slots 7 will enlarge, or widen, said slots and the torsional

strain on the center drill 10 will cause the shaft 11 to screw further up into the threaded portion of the socket 5, with the result that the blades will be wedged further up into said slots and the wear, and play of the blades taken up and the blades thus maintained immovably anchored in place.

The head may have the water courses 13 leading downwardly therethrough from the box 2 to the lower end of the head and terminating in front of the blades 8 through which a flushing fluid may be supplied to bottom of the bore to carry away the cuttings.

In Figures 6, 7 and 8 there is shown a special type of blade which is hardsurfaced in a novel manner. Adjacent the side and bottom cutting edges of the blade the front side, or face, of the blade is provided with grooves 14, said grooves preferably extending diagonally and terminating at said edges. A suitable hard surfacing material 15 is then run onto said grooved face, said material filling said grooves 14, as shown in Figure 8, thus forming the ribs 16 on the underside of the hard surfacing material, in said grooves. As the blades wear away the material of the blades and the hard surfacing material between said ribs will wear faster than the ribs themselves and said cutting edges will gradually assume a serrated contour forming teeth which will maintain the gauge of the bore and be very effective in abrading away the material at the bottom of the bore.

The drawings and description disclose what is now considered to be a preferred form of the invention, by way of illustration only while the broad principle of the invention will be defined by the appended claims.

What I claim is:

1. A drill including a head, detachable blades therein said head having downwardly flared slots and said blades having upwardly tapered portions in said slots, arcuate tenons on the inner margins of the blades, a center drill engageable against the lower ends of said tenons and having a shaft fitted between, and surrounded by the tenons which has a threaded connection with said head, said center drill being turnable, relative to the head during drilling operations, to exert a pressure against said blade tenons.

2. A drill including a head having an axial bore in its lower end and slots radiating from the bore, blades in said slots whose inner margins have arcuate tenons in said bore, a center drill abutting the lower ends of the tenons and having a shaft which is fitted between and surrounded by the tenons and has a threaded connection with the head, said threaded connection being formed to permit said shaft to be screwed further

home, during drilling operations, to constantly bind the center drill against said blades.

3. A drill including a head having an axial bore in its lower end and upwardly tapered slots radiating from said bore, blades fitted into said slots having marginal abutments which engage the walls of the bore, a center drill whose upper end engages said abutments, a shaft on said center drill which fits between said abutments and has a threaded connection with the head, said connection being formed to permit the shaft to turn relative to the head during drilling operations.

4. A drill for forming a bore including a cutter support having upwardly tapered side slots, detachable cutters thereon having tapered portions in said slots, means having a threaded connection with the drill and engaging the cutters and shaped to engage the material at the bottom of the bore whereby said means may be caused to rotate and to move upwardly, relative to the support, upon rotation of the drill in the bore to take up the wear of said cutters whereby said tapered portions will be maintained tightly wedged in said slots.

5. An earth boring drill including a cutter support whose lower end is formed with a bore having side slots and having its upper end internally threaded, cutting means having a vertical bearing in said bore, said cutting means extending out laterally through said slots, said cutting means having a downwardly facing abutment, a center drill having an upwardly extended shank which fits through said bearing and whose upper end is threaded into the threaded portion of said bore, said center drill engaging said abutment, said center drill being shaped to engage the material at the bottom of the bore being drilled whereby said center drill may be caused to rotate and to move upwardly, relative to the support, upon rotation of the drill in the bore, to take up the wear of said cutting means, whereby the cutting means will be maintained tightly clamped in said slots.

In testimony whereof I have signed my name to this specification.

JEDDY D. NIXON.