

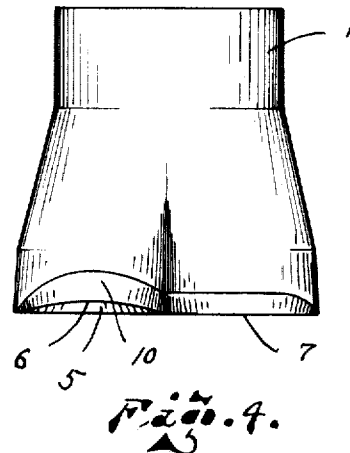
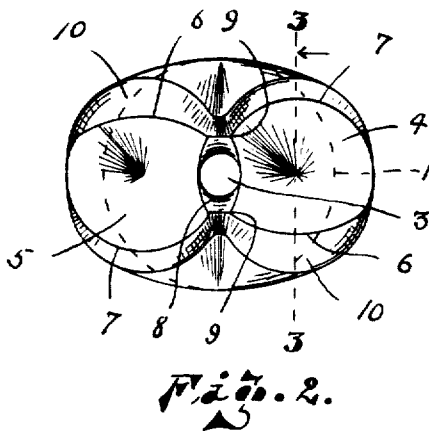
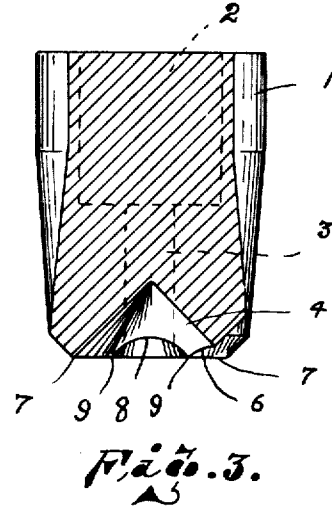
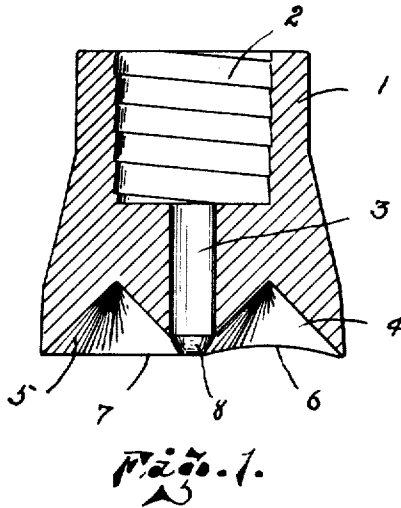
May 2, 1939.

M. HOKANSON

2,156,287

DRILL BIT

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UNITED STATES PATENT OFFICE

2,156,287

DRILL BIT

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Application November 21, 1936, Serial No. 112,100

8 Claims. (Cl. 255—64)

This invention relates to improvements in drill bits and has particular reference to that class of bit illustrated in my copending applications Serial Numbers 26,418 and 107,563.

5 Of the drill bits now used the cross or star bit is the most common, and, while this type of bit is a fast cutting bit, it has a great number of disadvantages. For example it wears very rapidly to a point where it is unfit for further use,
10 losing its gauge quickly. Also the hole drilled with such a bit is usually quite a bit rifled, resulting in trouble and danger when explosives are placed into the hole. Furthermore when starting to drill in a rock face, a rose bit must
15 be used, because the cross bit rifles the hole so much.

To overcome all of these disadvantages of the most common bit now used and to furthermore provide a bit which may be reconditioned in but
20 a minute's time and on the job, and one that may be reconditioned as much as four times even when drilling in the hardest granite, is the principal object of the present invention.

A further object of the invention is to provide
25 a faster cutting and longer wearing bit than heretofore known, and one that will not rifle the hole drilled.

A still further object of the present invention is to provide a drill bit having a uniform
30 distribution of the cutting edge, and one which reams the hole as it cuts, these being two essential characteristics of a good bit.

Other objects and advantages of the invention will appear in the following description
35 thereof.

Referring now to the accompanying drawing, forming part of this application, and wherein like reference characters indicate like parts:

Figure 1 is a central vertical sectional view
40 through a twin circle bit embodying my present invention.

Figure 2 is a plan view of the face of the bit.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a side elevation of Figure 2.

The bit here illustrated is adapted to be screw threadedly applied to the end of the drill rod of a drilling machine, and the shank end of the body portion 1 of the bit is hollow and internally screw threaded as at 2 for this purpose.
50 Axially through the remainder of the bit from the base of the screw threaded opening to the cutting or working face thereof is provided the relatively small bore 3 for the introduction of
55 water to the bottom of the hole for washing away

the material cut by the bit, the same being countersunk at its lowermost extremity.

In the cutting or working face of the bit are formed two concavities of conic shape, indicated at 4 and 5, one upon either side of the axis of the bit and diametrically opposite to each other. These conical depressions are of such a size and depth that were it not for the bore 3 they would meet or be tangent to each other at the axis of the bit, and also tangent with the periphery or longest diameter of the cutting face. This results in a bit face being of substantially elliptical form, and the body portion of the bit from the shank thereof to the cutting face on one diameter diverges, whereas at the diameter at right
15 angles thereto it converges.

These conical depressions forming the inner walls of the cutting edges result in the latter being of arcuate shape, and if the face of the bit were in a flat plane these cutting edges would
20 be perfect circles. In the sharpening of these cutting edges I prefer to grind away the stock of which the bit is composed about these cutting edges and at the same angle thereof as that of the inner wall, preferably at substantially 45°,
25 this being the angle shown in the drawing and maintained through the cutting face of the bit except at the opposite edges thereof where the circles of the cutting edges are tangent to the wall of the hole being drilled.

The principal improvement in the instant embodiment of the invention is the forming in one side of each cutting edge an arcuate or concave depression. This depression occurs on the following or rear side of each cutting edge in respect to its rotation when at work, as illustrated at 6 in the drawing. The leading portion of each cutting edge is shown at 7, it being assumed that the rotation of the bit when in action is anticlockwise as viewing Figure 2. It will be noted
40 that the water conducting bore 3 in the bit head is countersunk as at 8, and the outer periphery of the countersinking intersects or contacts the circle of each cutting edge at two different points, which points are illustrated at 9 in the drawing, and it is at one of these points upon the following side of each cutting edge where the inner terminus of the arcuately depressed portion 6 of its respective cutting edge terminates, while the opposite termini of said depressed cutting edges 6 occurs in the same plane
50 with the leading portion of said cutting edge adjacent the outermost extremity thereof, and at which point there is the least reinforcing outer wall for said cutting edge. This, it will be noted,
55

results in a much wider and extensive shoulder or outer reinforcing wall indicated at 10 for the depressed cutting edges, though not necessarily essential other than to provide for their sharpening by the same conical depression which sharpens the remainder of the cutting edge, and that as the leading portion of the cutting edges of the bit wear away more of the depressed cutting edges will come into service and thereby materially lengthen the life of the bit.

It will be understood that the cutting away or stepping in this manner of a portion of each cutting edge is primarily for the purpose of providing a sluiceway for the spalls or cuttings of the bit, and in actual practice has proven to augment the efficiency of such a bit materially and to greatly surpass anything possible by a common cross bit of like diameter.

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

1. A drill bit comprising a body portion having a working surface provided with a plurality of substantially circular cutting edges, the following edge, relative to the direction of rotation of the bit, of each circular edge having a depressing therein, and the remainder of each circular edge being in a plane at right angles to the bit axis.

2. A drill bit comprising a body portion having an axially disposed fluid opening there-through and a plurality of substantially circular cutting edges, the following edge, relative to the direction of rotation of the bit, of each circular edge having a depression therein, said depressions extending from approximately the axis of the bit to the periphery thereof, and the remainder of each circular edge being in a plane at right angles to the bit axis.

3. A drill bit comprising a unitary body portion having a working surface provided with a plurality of concavities forming equally sized and shaped continuous cutting edges, corresponding portions of each cutting edge of the bit having a depression therein, the remaining portions of each cutting edge being in a plane at right angles to the axis of the bit.

4. A drill bit comprising a unitary body portion for removable attachment to the end of a drill rod, and having a working surface provided with a plurality of concavities forming equally

sized and shaped continuous cutting edges and means for the access of sluice water thereto, and a sluiceway in corresponding and symmetrical portions of each cutting edge, the remaining portions of each cutting edge being in a plane at right angles to the axis of the bit.

5. A drill bit comprising a body portion having a working surface provided with a plurality of substantially circular cutting edges, each forming a substantially uninterrupted circuit between the center of the bit and the periphery thereof, the following approximate half of each cutting edge, relative to the direction of rotation of the bit, being depressed from the plane of the remainder thereto, the remainder of each cutting edge being in a plane at right angles to the axis of the bit.

6. The combination with a drill bit having an axial bore therein and conical depressions in the working face thereof forming equally sized and spaced continuous cutting edges about the axis thereof, approximately one-half of each cutting edge being cut-away to provide clearance for the escape of cuttings of the drill, the remainder of each cutting edge being in a plane at right angles to the bit axis.

7. A drill bit having an axial bore therein, the working face thereof having formed therein a plurality of conical depressions equally spaced about the axis of the bit and forming continuous cutting edges extending substantially between said bore and the periphery of the bit, characterized by approximately one-half of each cutting edge being cut-away to provide free passage therefrom of the spalls cut by the bit, the remainder of each cutting edge being in a plane at right angles to the bit axis.

8. A detachable pneumatic drill bit having an axial bore therein for the access of fluid for removing the cuttings of the bit, the working face of said bit being provided with conical depressions forming substantially continuous cutting edges extending substantially between said bore and the periphery of the bit, approximately one-half of each cutting edge being cut-away to provide clearance for the passage of the cuttings of the bit away from the working face thereof, the remaining effective cutting edges being in a plane at right angles to the bit axis.

MARTIN HOKANSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,156,287.

May 2, 1939.

MARTIN HOKANSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 25-26, claim 1, for the word "depressing" read depression; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of June, A. D. 1939.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.

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