

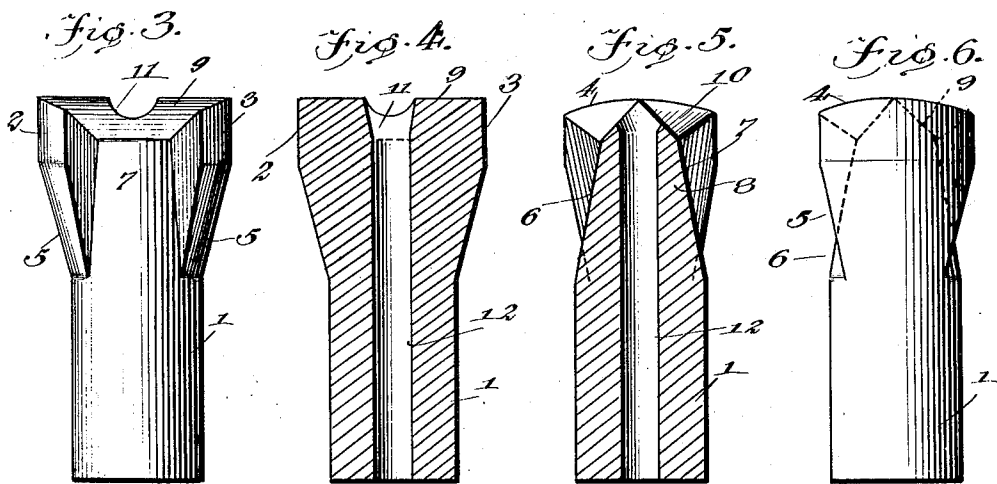
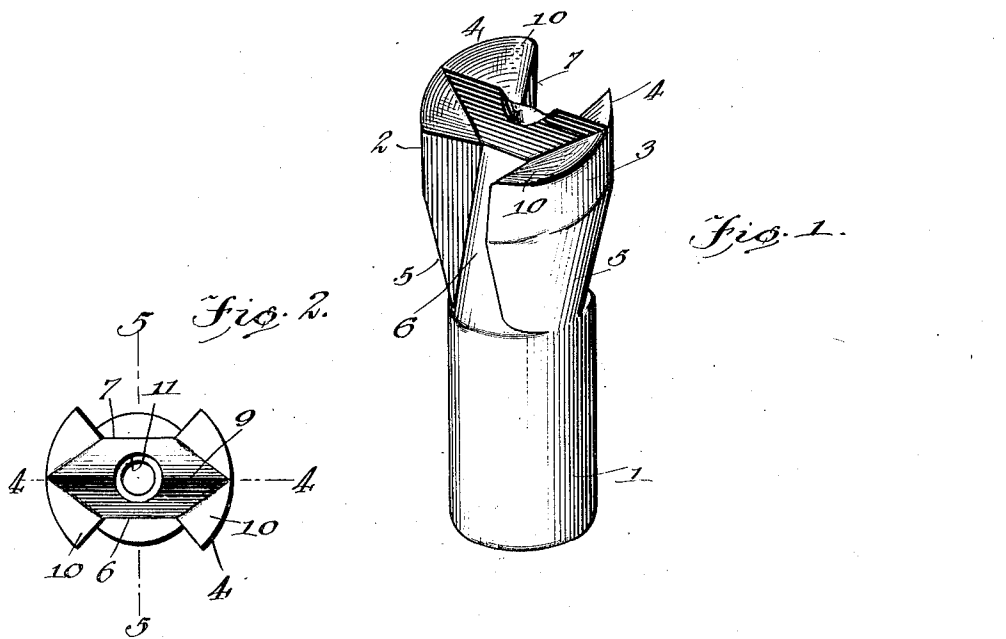
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DRILL BIT

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WITNESSES

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DRILL BIT.

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To all whom it may concern:

Be it known that I, CLARENCE O. STEE, a citizen of the United States, and a resident of Butte, in the county of Silver Bow and State of Montana, have invented certain new and useful Improvements in Drill Bits, of which the following is a specification.

Bits as at present constructed for drilling holes in hard rock have insufficient cutting edges with an unequal arrangement of said cutting edges; faulty reaming qualities; too limited clearance grooves for the rapid and free escape of cuttings thereby making it difficult to rotate the drills with added increase in the power consumption and which is normally too great for the amount of useful work done.

It is an object of my invention to provide a bit which is of such simple construction that the same may be readily manufactured on any common type of drill sharpening machine now in use.

A further object of the invention is the provision of a bit having its cutting edges so disposed near the periphery of the bit where said edges will be most effective for cutting rock and where such edges will not become readily rounded and cause the bit to bind.

A further object of the invention is the provision of a bit which may be readily rotated because of the more perfect reaming qualities and because of the triangular shaped transverse cutting blade which connects a pair of arc-shaped outer cutting and reaming edges, the apex of the angle being 90°. The arc shaped cutting edges determine the straight forward track of the bit, thus causing the bit to revolve in the bore and thereby prevent it from entering, following or becoming stuck in fissures, cracks or soft streaks in the rock.

A still further object of the invention is the provision of a pair of arc shaped cutting blades connected by a triangular shaped diametrically disposed blade with the arcuately shaped blades separated by outwardly flaring grooves whereby the cutting edges will drive the rock particles toward and readily through the flaring grooves, the operation being aided by the action of the stream of water passing through a central passage in the bit, the large clearance grooves and the effective position of the

blades with respect to said grooves effects the reduction in the amount of power required to operate the drilling machine.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications, which shall define no material departure from the salient features of the invention as expressed in the appended claim.

In the drawings:

Figure 1 is a view in perspective of a bit constructed according to my invention.

Figure 2 is a plan view of the same.

Figure 3 is a view in side elevation of my improved bit.

Figure 4 is a vertical section taken along the line 4—4 of Figure 2.

Figure 5 is a vertical section of a bit taken along the line 5—5 of Figure 2.

Figure 6 is a view in elevation of the bit at right angles to the elevation shown in Figure 3.

Referring more particularly to the drawings, 1 indicates a hollow cylindrical shank having an enlarged cutting head upon its outer end. Said head comprises a pair of diametrically opposite exteriorly convexed and interiorly concaved blades 2 and 3 and provided with cutting edges 4 formed along the arc of a circle of which the center is located in the axis of the shank 1. The inner ends of the blades taper, as shown at 5, towards and merge into the shank 1. The upper portions of the blades form segments of a cylinder, as shown more particularly in Figure 1. The enlarged head is cut away at diametrically opposite points to not only form the blades 2 and 3, but to form outwardly flaring grooves 6 and 7.

As shown more particularly in Figure 5, the cutting of the grooves 6 and 7 provides a portion 8 tapering towards the outer end of the bit and merging into a triangular cutting blade 9 which is disposed diametrically across the outer end of the bit and connected at its opposite ends to the concavely curved interior portions 10. The angle at the apex of the triangular blade 9 is 90° and the center of the blade 9 is provided with a

perforation 11 which forms the outer end of a passage 12 extending longitudinally through the shank and through the head.

It will be noted that the cutting edges of my improved bit are so placed on the face of the same relative to the amount of rock to be cut or broken that the wear on each unit length of cutting edge will be more or less uniform since the cutting edges are formed along an arc of a circle whose diameter is greater than the diameter of the shank whereby the cutting edges will readily climb over irregularities and fractures in the rock which may be encountered at the bottom of the bore and therefore the wedging and friction due to inefficient reaming is eliminated.

Furthermore, the large clearance grooves flaring outwardly towards the wall of the bore cut in the rock permits a free and rapid escape of the cuttings from the face of the hole and these grooves are so located that the angle of the cutting edges will drive the rock particles towards them and the water from the central passage in the bit will have a maximum effect in washing the particles away. The cutting edges in action, besides determining the gauge of the bore, serves to cut a groove around the periphery of the drill hole thereby reducing the work of the diagonally disposed cutter 9, since the arcuately shaped cutting edges determine in advance the limitations of the bore. The exterior sides of the bit being cut from a cylinder are curved on the arc of a circle. This cylindrical portion provides more mass back of the cutting edge and consequently the bit will stand up better in the hardest rock.

The drill bit in practical operation cuts a

hole that has a slightly larger diameter than the bit and this fact permits making the exterior sides of the bit for substantially $\frac{1}{2}$ inch from the cutting edges, cylindrical in shape without danger of the steel sticking or binding in the bore which is cut in the rock and furthermore the fitting of the bit in the bore like a round shaft will have a tendency to cause the bore to be drilled straight and prevent the drill from following soft streaks or fractures in the rock.

The reaming edges formed by the grooves 6 and 7 have sufficient body back of the same for reaming the wall of the bore in a rock without danger of breakage to the tool.

What I claim is:

A drill having a shank and an enlarged head, said head comprising a pair of diametrically disposed concaved blades separated by diametrically disposed flaring grooves, said grooves forming with the blades reaming edges, and an inverted V-shaped blade diametrically connecting the cutting blades, the inner edges of the V-shaped blade terminating at the inner end of the flaring grooves, and a longitudinal passage disposed centrally within the shank and opening through the center of the cutting edge of the V-shaped blade and into the ends of the flaring grooves, the diametrically disposed cutting blades conforming to the arcs of a circle, the diameter of which is greater than the diameter of the shank, said cutting blades being cylindrical for a portion of their lengths and the remaining portions being directed inwardly and finally merging into the wall of the shank.

CLARENCE O. STEE.