July 28, 1970 W. F. FISHER 3,521,716

DRILL POINT

Filed Oct. 16, 1968

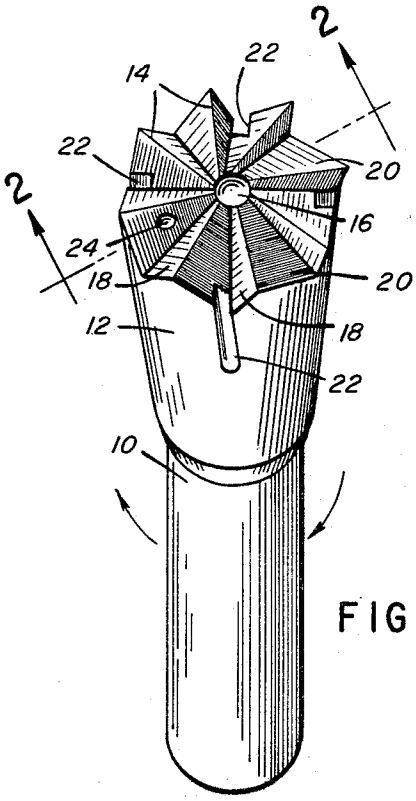

FIG. 1

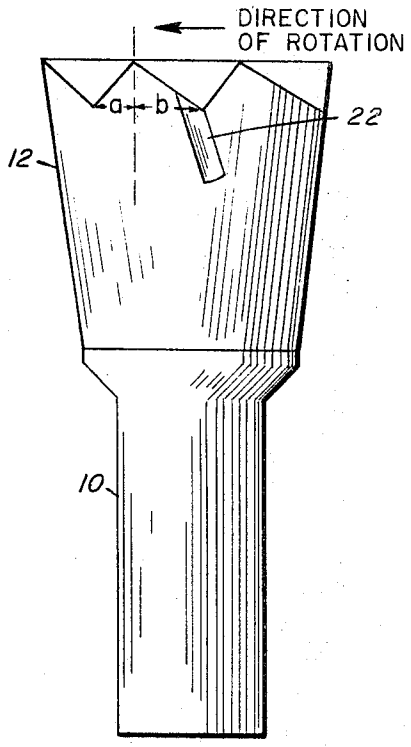

FIG. 3

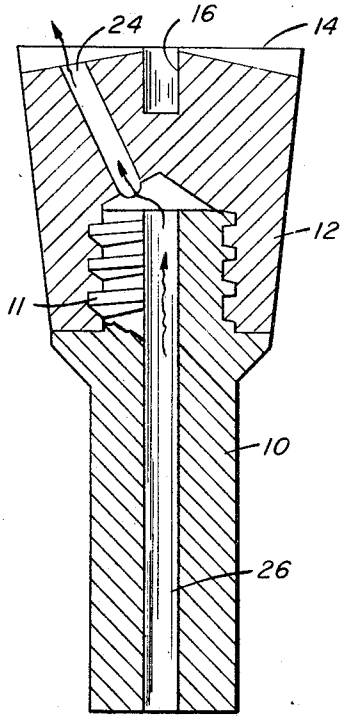

FIG. 2

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DRILL POINT

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U.S. Cl. 175—417 4 Claims

ABSTRACT OF THE DISCLOSURE

A drill point has a plurality of teeth, extending non-radially from the maximum diameter into a central recess, each tooth defined by a forward-downward rake face and a rearward-downward relief face. The slope ratio of the forward face is greater than that of the rearward. Exhaust cutout ports are angularly positioned from the base of alternate relief faces for maximum flow of fluid and/or cutting from an entry port or ports in at least one intermediate relief face.

BACKGROUND OF THE INVENTION

The drilling of rock, cement or other hardened material has typically employed a percussive drill on a rotary drill, depending upon the material to be encountered. In the percussion method apparatus is used which performs constant percussion blows against the rock with the bit being backed off between blows and/or rotated or indexed slightly to a new striking position. Fluid, such as air and/or water, may be utilized to be injected adjacent the bit to clean and cool the bit during its operation.

For economy largely, the bits used are of a one piece construction with typical wings or teeth formed integral with the body and radiating outwardly from the center or apex of the cutting face. It is difficult and expensive to use wear resistant cutting elements due to complicated machining operations. Accordingly most bits have been made from a one piece forged member of selected materials specially treated and machined. In many instances the teeth of the bit terminate in sharp angular corners at the periphery of the head. Since the greatest rates of bit wear occur near the outer gauge of the bit due to the face that the amount of rock broken out per unit length of bit edge increases in proportion to the radial distance from the axis of rotation. Hence these corner portions are subjected to the greatest force and friction in use and consequently cause shorten wear life. In many instances this worn and reduced diameter will in turn cause a smaller diameter hole than desired and must be replaced.

SUMMARY

It is the primary object of this invention to provide a bit for use with rotary and/or percussion drilling instruments which overcomes the disadvantages and objections with prior tools of similar use. Accordingly, an integral bit design is provided wherein the forward end is maintained substantially of a constant diameter by the provision of a plurality of cutting teeth edges which comprise a forward rake face and a rearward relief face, the slope and length of slope of the former being greater than that of the latter. An exhaust cutout portion exists in the lower portion of the relief face just forward to the next adjacent rake face cutting tooth and extends in a direction upwardly and rearwardly relative to the direction of the rotation when in position. Additionally at least one fluid entry port is provided in a relief face other than where exhaust ports are provided.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the bit of this invention.

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1.

FIG. 3 is an elevational view of the bit of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The drill bit of this invention has a shank portion **10** which extends into or is connected with a drill body portion **12** as by threads **11**. At the working or front end of the body portion are a plurality of cutting teeth **14** which extend from the outer extreme periphery toward, and not necessarily radially, a blind center hole **16**. Each of the cutting teeth provided with a rake portion **18** and a relief portion **20**. The rake portion slopes upwardly relative to the vertical axis shown dotted in FIG. 3 slightly less than the angle of said relief slope. That is, the distance *a* is substantially less than distance *b*. Hence the cutting force is supported by a greater extent of relief material.

As shown, the lower outer portion of every other relief slope **20** includes an exhaust cut out **22** which is positioned at an acute angle upstream of the plane of direction of rotation. At least one fluid or air entry opening **24** is provided to provide communication from the interior conduit **26** of shank **10** to provide a means for cooling the bit and blowing out cutting or trailings removed by the action of the drill point. This opening is preferably provided to enter along that relief slope other than that provided with an exhaust cutout.

What is claimed:

1. A drill point comprising:

a body portion having means at one end to attach to a drill stem or drill shank;

said body portion tapering outward from said one end to a cutting end;

a blind hole centrally open to said cutting end;

the cutting end defined by a plurality of cutting edges which extend from said outward body portion angularly to said blind hole;

each of said edges comprising, relative to the direction of rotation, a forward-downward rake face and a rearward-downward relief face wherein the distance from a vertical axis along said edge to the intersection of said rake face and the next forwardmost relief face is less than the distance from said vertical plane to the intersection of said relief face and the next rearward rake face;

at least one exhaust cutout port positioned in the outer periphery of said body portion and extending downwardly therefrom at an acute angle rearwardly relative to the direction of rotation and of width extending from the base of said rake face into the next adjacent relief face; and

at least one fluid entry portion communicating from the interior of said drill stem or shank to the cutting face area.

2. A drill point of claim 1 wherein said exhaust cutout port exists at the same position in every other cutting tooth.

3. A drill point of claim 1 wherein said fluid entry point communicates with the interior conduit of said drill stem or drill shank to a point entering through a relief slope of a cutting tooth.

4. A drill point of claim 3 wherein said relief area is that other than the location of said exhaust cutout port.

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