Dec. 17, 1929. C. E. LANG 1,739,846

DRILL BIT FOR BORING WELLS

Filed Nov. 21, 1927

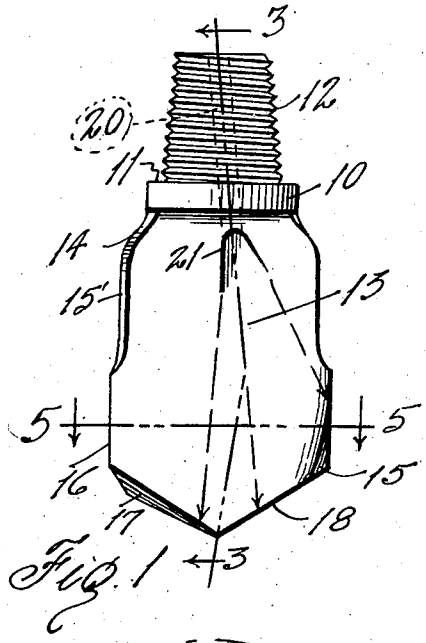

Fig. 1

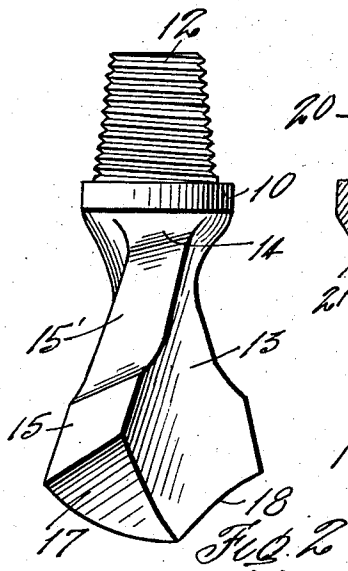

Fig. 2

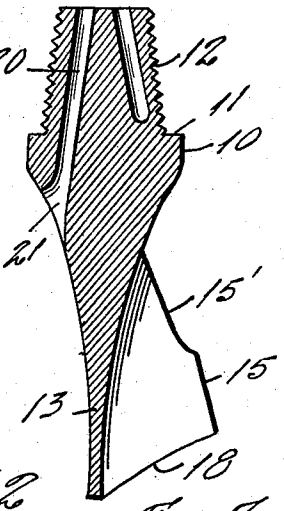

Fig. 3.

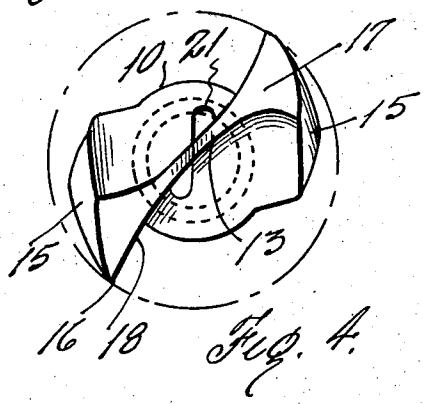

Fig. 4.

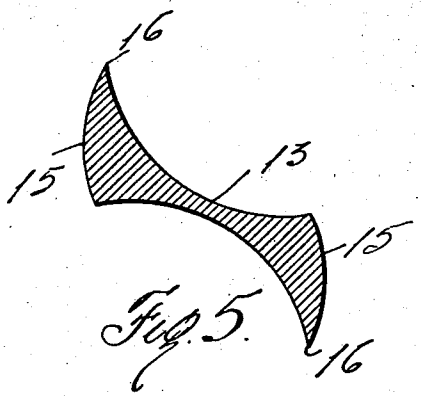

Fig. 5.

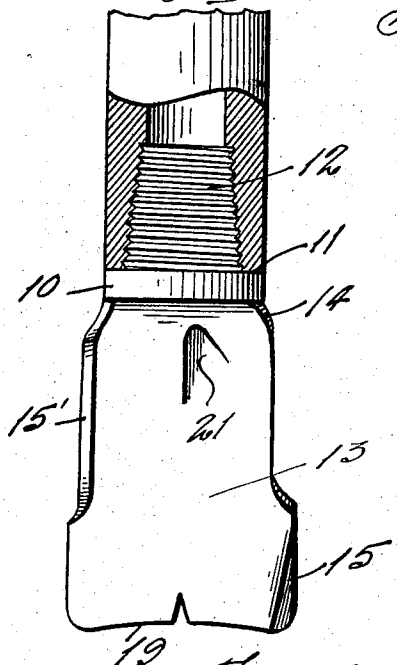

Fig. 6.

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UNITED STATES PATENT OFFICE

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DRILL BIT FOR BORING WELLS

Application filed November 21, 1927. Serial No. 234,803.

This invention relates to new and useful improvements in drill bits for boring wells.

The object of the invention is to provide a bit having a twisted blade shaped and formed to drill through the various formations of soil and rock, with marked rapidity and whereby a straight hole may be made without under-reaming.

A particular object is to provide a drill which, owing to its peculiar construction, will not clog up or cause the drill pipe to break, due to crystallization.

Another object is to provide a drill which will reduce the cost of drilling due to the fact that it can be used for a longer period to drill a greater length, without coming out of the hole for sharpening or replacing, as well as by cutting faster while operating, than is now obtainable by the bits in common use with rotary rigs.

An important object of the invention is to provide ample clearance along each vertical cutting edge of the bit so that it will properly rotate in the hole.

A further object is to so locate and direct the water holes as to efficiently wash off the surfaces and cutting edges of the bit.

A construction designed to carry out the invention together with other novel features of construction will be hereinafter more fully described.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which examples of the invention are shown and wherein:

Fig. 1 is a side elevation of a bit constructed in accordance with my invention,

Fig. 2 is an edge elevation of the same,

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1,

Fig. 4 is an underside view,

Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 1, and

Fig. 6 is a side elevation of a modified form.

In the drawings the numeral 10 designates an annular head having a shoulder 11 surrounding an upwardly directed tapered screw threaded pin 12, which latter is suitably shaped to fit in the usual drill stem collar. From the collar depends a twisted blade 13. This blade has opposite shoulders 14 curved outwardly. The upper edges 15′ of the bit are cut back to provide clearance and also to give the bit a gage. Cutting edges 15 extend downwardly from the portions 15′.

The blade is gradually reduced in thickness downwardly of its vertical axis and inwardly from each vertical edge, as is shown in Figs. 3, 4 and 5. It is pointed out that the circumferential face of the edge 15 remains substantially constant in width throughout its length. These faces, however, are curved transversely so as to recede from the cutting edges 16, as is evident from the dot and dash circle of Fig. 4. By reason of the broad faces 15 the cutting edges are built up to give sufficient strength and to have ample stock to wear.

The lower end of the blade may be formed into a diamond point by opposite bevels 17 with front cutting edges 18 contiguous to the cutting edges 16. If desired the lower end may be formed with cutters 19, the same as a fish-tail bit, as is shown in Fig. 6. The twist is sufficient to give the proper torque to the cutting edges 16 and the faces 15 recede and converge to such a degree as to give ample clearance to prevent dragging or undue torsional strain.

The washing of the cutting edges is highly important as is also the cleansing of the sides or radial faces of the bit. In order to carry out this feature, water holes or passages 20 are drilled through the pin 12 and head 10 on each side of the vertical axis of the bit and at such an angle as to direct the center of the stream of water toward the cutting edge 18, at a point offset outwardly from the center of the bit, as is indicated by the arrows in Fig. 1. Each passage has its lower end 21 flared so as to spread the stream and direct over the entire cutting edge 18 as well as a portion of the cutting edge 16.

It will be noted that the shoulders 14 are given such a slope as to clear all obstructions in coming out of the well. In resharpening instead of grinding the cutting edges as the bit comes out of the well, it is a better practice to build up the metal by

means of a torch and then grind the added stock to form the cutting edges.

Various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim, is:

1. A rotary well drilling bit comprising a blade having a head at its upper end and twisted to form torsional vertical cutting edges, said blade continuously converging downwardly along its vertical axis from said head to said edges and increasing continuously in transverse diameter radially outward from said axis to said edges.

2. A rotary well drilling bit comprising a blade having a head at its upper end and twisted to form torsional vertical cutting edges, said blade continuously converging downwardly along its vertical axis from said head to said edges and increasing continuously in transverse diameter radially outward from said axis to said edges, the blade being formed with curvilinear faces contiguous to its vertical cutting edges receding inwardly from the cutting edge at its orbit of rotation and extending downwardly.

3. A rotary well drilling bit comprising a blade having a head at its upper end and twisted to form torsional vertical cutting edges, said blade continuously converging downwardly along its vertical axis from said head to said blades and inwardly from the blades to said axis, and transverse cutting edges on the lower end of the blade inclined upwardly from the axis to the vertical cutting edges.

4. A rotary well drilling bit comprising a blade having a head at its upper end and twisted to form torsional vertical cutting edges, said blade continuously converging downwardly along its vertical axis from said head to said edges and increasing continuously in transverse diameter radially outward from said axis to said edges, and transverse cutting edges on the lower end of the blade inclined upwardly from the axis to the vertical cutting edges, said blade being formed with water passages having flared outlets disposed to spread a stream of water flowing therefrom over each transverse cutting edge at a point radially offset from the vertical axis of the blade.

In testimony whereof I affix my signature.

CHARLES E. LANG.