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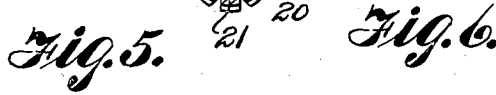
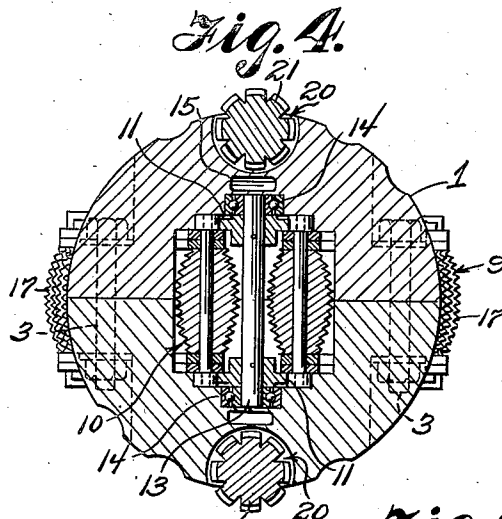
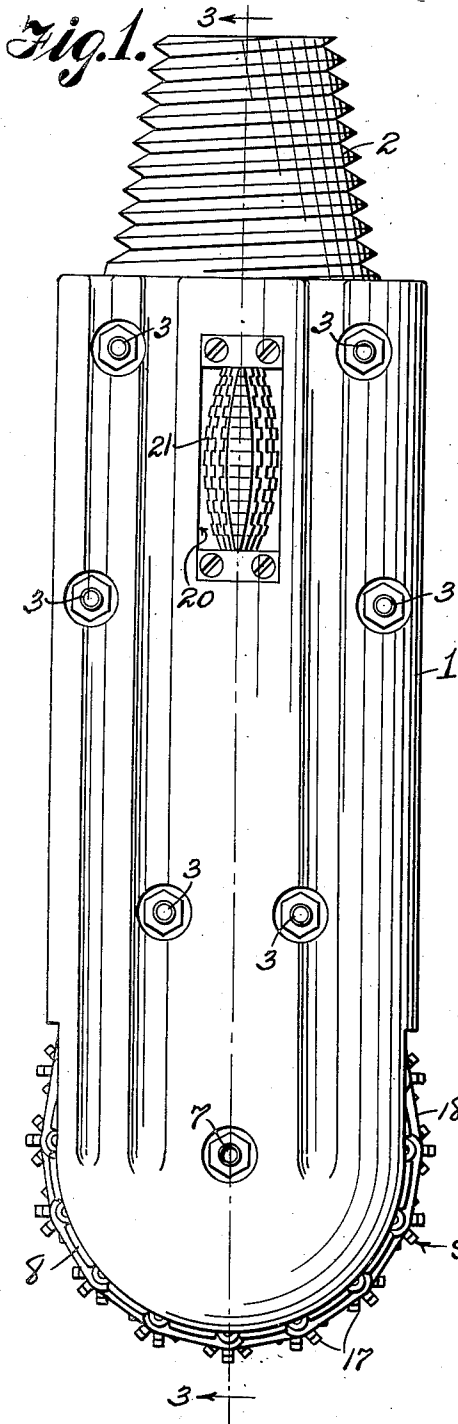
C. B. HOLT

2,134,164

ROTATABLE DRILL BIT

Filed Jan. 31, 1938

3 Sheets-Sheet 1



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BY Victor J. Evans & Co. ATTORNEYS

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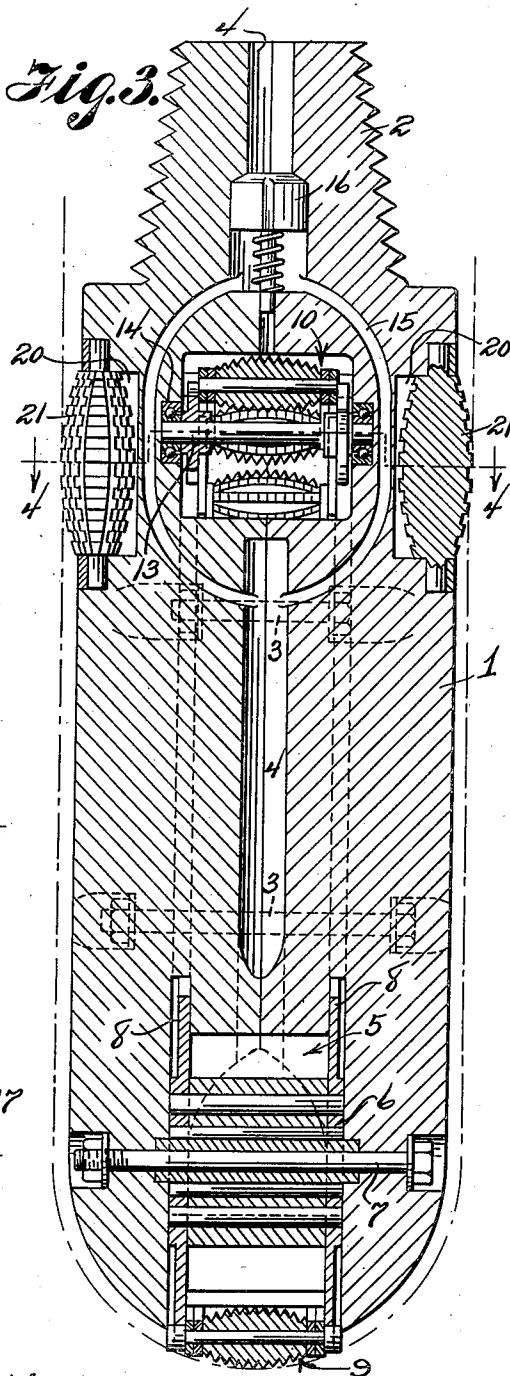
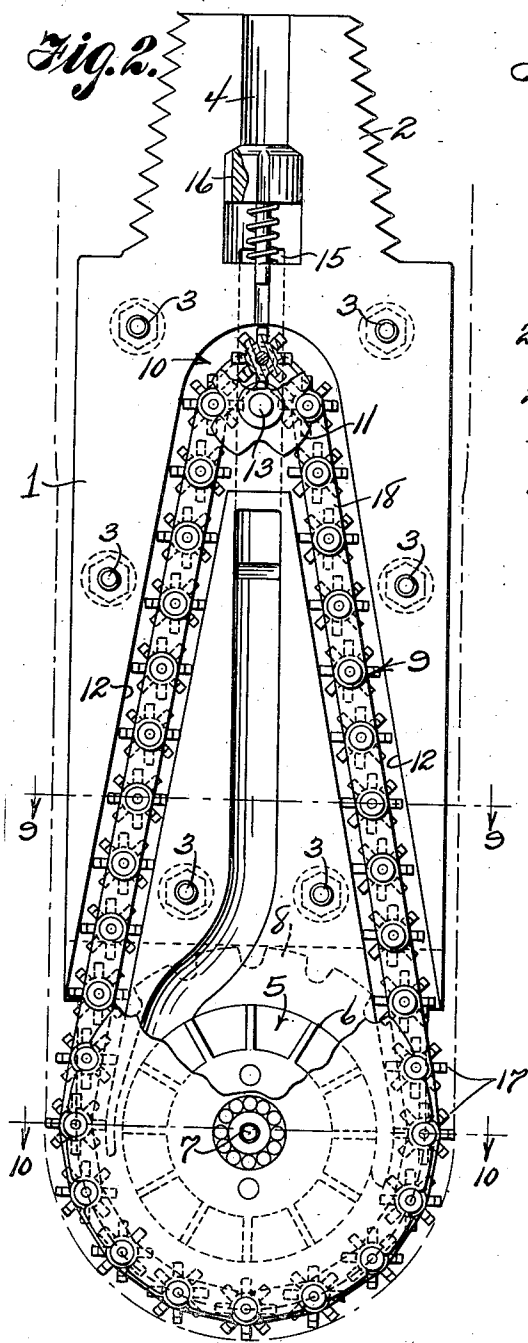
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ROTATABLE DRILL BIT

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3 Sheets-Sheet 2



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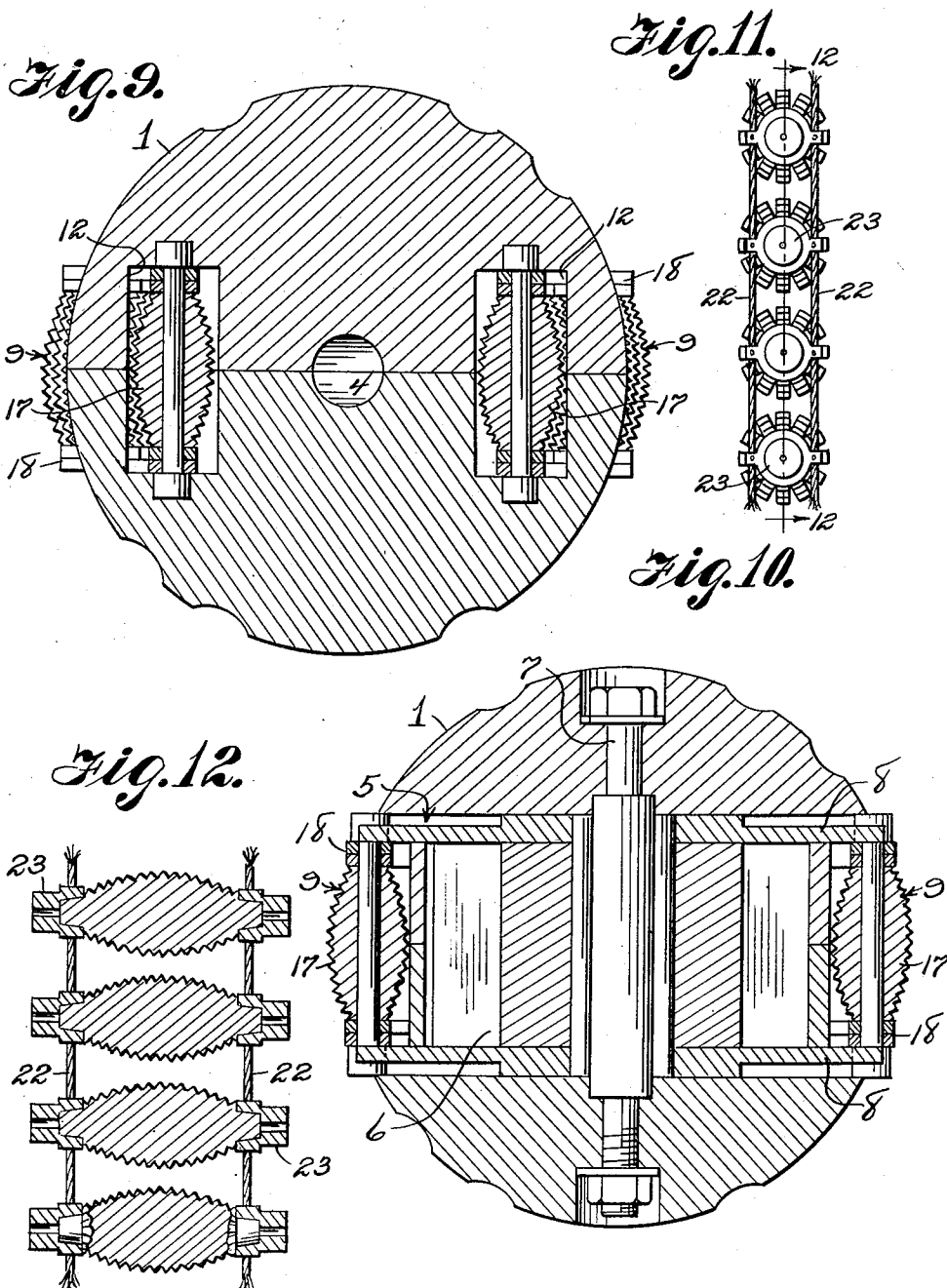
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ROTATABLE DRILL BIT

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,134,164

ROTATABLE DRILL BIT

Clinton B. Holt, Cotton Valley, La.

Application January 31, 1938, Serial No. 187,953

3 Claims. (Cl. 255—4)

This invention relates to a rotatable drill bit especially adapted for cutting rock and other similar hard formations and is of the type set forth in my copending application filed July 29, 1937, and Serial No. 156,391, wherein the rotatable bit body and the endless cutting mechanism thereof is equipped with means whereby said endless cutting mechanism will be hydraulically driven, the fluid exhausting therefrom being employed to clean the cutting elements of the cutting mechanism of cuttings and other foreign matter and acting to drive said cuttings upwardly and out of the hole formed by the drill bit.

With these and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation illustrating a rotary drill bit constructed in accordance with my invention.

Figure 2 is a side elevation, partly in section, showing one of the halves of the body of the drill bit and with the endless cutting mechanism thereon.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a plan view showing one of the sprocket gears for the endless cutting mechanism.

Figure 6 is an edge elevation illustrating said sprocket gear.

Figure 7 is an end view illustrating a fluid operated wheel.

Figure 8 is a side elevation illustrating said wheel.

Figure 9 is a sectional view taken on line 9—9 of Figure 2.

Figure 10 is a sectional view taken on line 10—10 of Figure 2.

Figure 11 is a fragmentary edge elevation showing a modification of the endless cutting mechanism.

Figure 12 is a sectional view taken on the line 12—12 of Figure 11.

Referring in detail to the drawings, the numeral 1 indicates a rotary drill bit having one end reduced and externally screw threaded to form an attaching shank 2 adapted to be threaded onto a drill rigging of any well known construction.

The other end of the body is rounded to present a work end. The body also is composed of companion sections detachably connected by tie bolts 3. A fluid passage 4 extends through the shank 2 and into the body terminating at one end into a chamber 5. Rotatably mounted in this chamber is a fluid operated wheel 6. The chamber 5 opens outwardly through the rounded end of the body. The fluid operated wheel is supported on a shaft 7 by anti-friction roller bearings. The shaft 7 is carried by the body 1. The fluid actuated wheel has secured to its ends end plates 8 defining sprocket gears over which is trained an endless cutting mechanism 9. As the endless cutting mechanism 9 travels over the sprocket gears it is exposed at the rounded or work end of the body so as to come in contact with the formations to be cut during the rotation of the body 1. Also journaled in a chamber 10 of the body are sprocket gears 11 over which travels the endless cutting mechanism 9. Track channels 12 are provided in the body between the chambers 10 and 5 through which the runs of the endless cutting mechanism pass. The sprocket gears 11 are secured on a shaft 13 supported by anti-friction bearings 14. The anti-friction bearings may be lubricated in any well known manner. The fluid passage 4 is branched, as shown at 15, to extend about the chamber 10. Also the fluid passage has operating therein a check valve 16. The fluid under pressure enters the passage 4 at the shank end 2 and escapes against the blades of the wheel. The fluid under pressure impinging against the blades of the wheel brings about rotation of the latter and consequently the driving of the endless cutting mechanism 9. The cutting mechanism includes a plurality of rotatable cutters 17, the shafts of which are connected by links 18. The shafts of the cutters engage in the notches of the sprocket gears 8.

The body 1 is provided with oppositely arranged recesses 20 in which are journaled reamers 21 acting to guide the body during the rotation thereof in a hole formed by the endless cutting mechanism, besides having a reaming action upon the walls of the hole.

The fluid exhausting from the wheel or chamber 5 of said wheel contacts the cutters and removes therefrom cuttings. Also, the fluid being under pressure will drive the cuttings away from the work end of the bit and upwardly and out of the hole formed by the bit.

Instead of employing the links 18 for connecting the rotatable cutters of the cutting mechanism

nism, flexible cables 22 may be employed, as shown in Figures 11 and 12. In this modification the cutters carry at the ends thereof cap-like elements 23 to engage in the notches of the sprocket gears, the flexible elements 22 being secured to the cap-like elements to connect the cutters in endless formation. The cutters are free to rotate in the cap-like elements 23.

What is claimed is:

- 10 1. A rotary drill bit comprising a body including an attaching portion and a rounded work end and having a chamber in said end opening outwardly therethrough, said body having a second chamber and guide grooves connecting said chambers, a fluid actuated wheel journaled in the first chamber and including sprocket means, sprocket means journaled in the second chamber, and an endless cutting mechanism supported by said sprocket means and including a plurality of rotatable cutters movable outwardly of said body as they pass about the sprocket means of said fluid actuated wheel, and means for admitting fluid under pressure into the first chamber for driving the fluid actuated wheel and exhausting from said chamber through the cutting mechanism to remove cuttings therefrom.
- 25 2. A rotary drill bit comprising a body including an attaching portion and a rounded work end and having a chamber in said end opening outwardly therethrough, said body having a second chamber and guide grooves connecting said chambers, a fluid actuated wheel journaled in the first chamber and including sprocket means,

sprocket means journaled in the second chamber, an endless cutting mechanism supported by said sprocket means and including a plurality of rotatable cutters movable outwardly of said body as they pass about the sprocket means of said fluid actuated wheel, said body having a fluid passage adapted to be connected with a fluid pressure source and entering the first chamber to direct the fluid pressure on said wheel for driving the endless cutting mechanism and adapted to exhaust from the first chamber through the cutting mechanism to remove cuttings from the cutters thereof.

3. A rotary drill bit comprising a body including companion sections having a fluid passage to receive fluid under pressure and having a chamber opening outwardly through one end and provided with a second chamber connected to the first chamber by guide grooves, sprocket gears journaled in said chambers, a fluid actuated wheel operating in the first chamber and connected to the sprocket gears therein, an endless cutting mechanism traveling through said guide grooves and over the sprocket gears and moving outwardly of the first chamber for cutting purposes, said body having a fluid passage entering the first chamber to direct fluid under pressure on said fluid actuated wheel for the rotation thereof and the driving of the endless cutting mechanism, and reamers journaled on said body.

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