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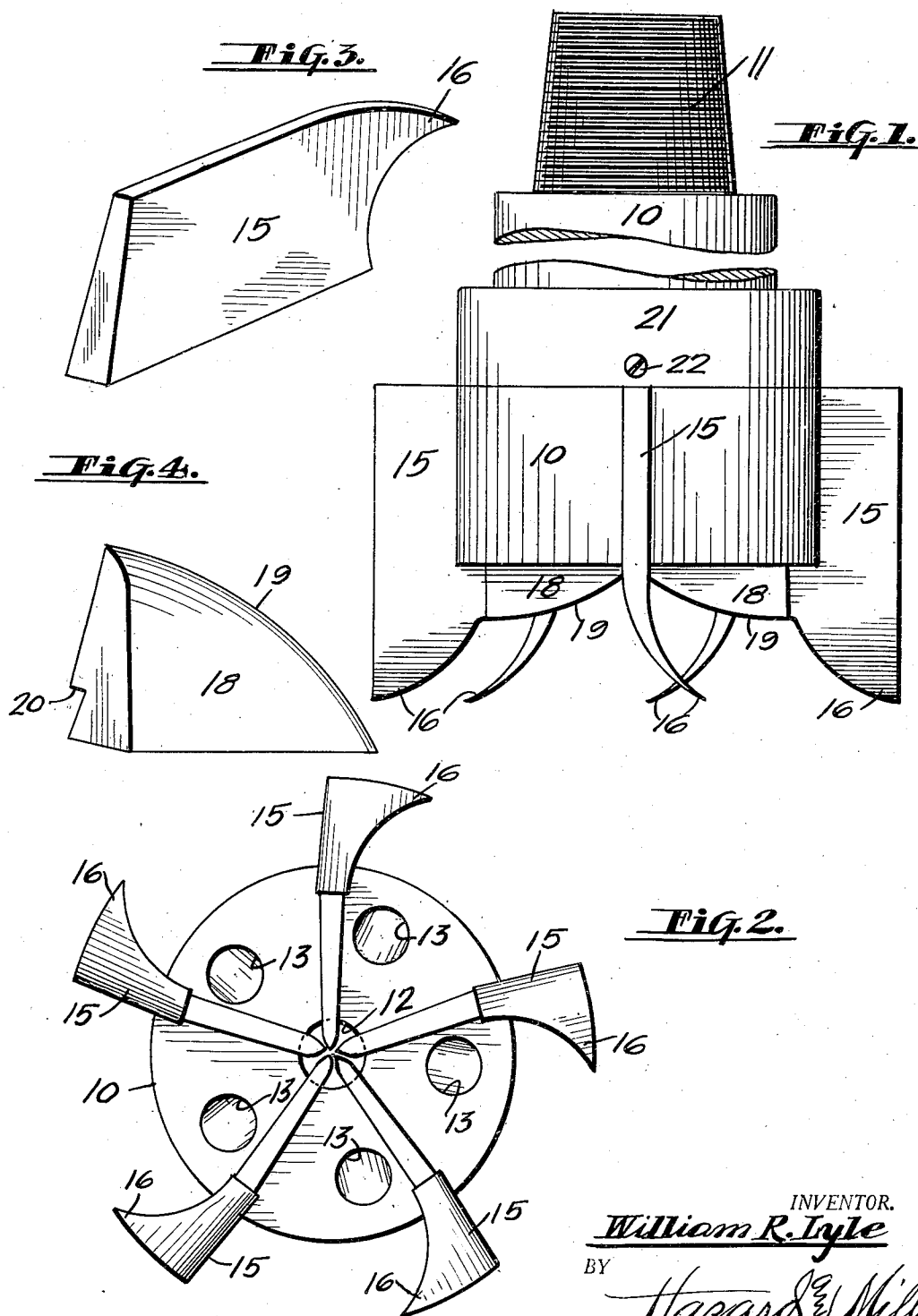
1,479,668

W. R. LYLE

WELL DRILL BIT

Filed June 20, 1921

2 Sheets-Sheet 1



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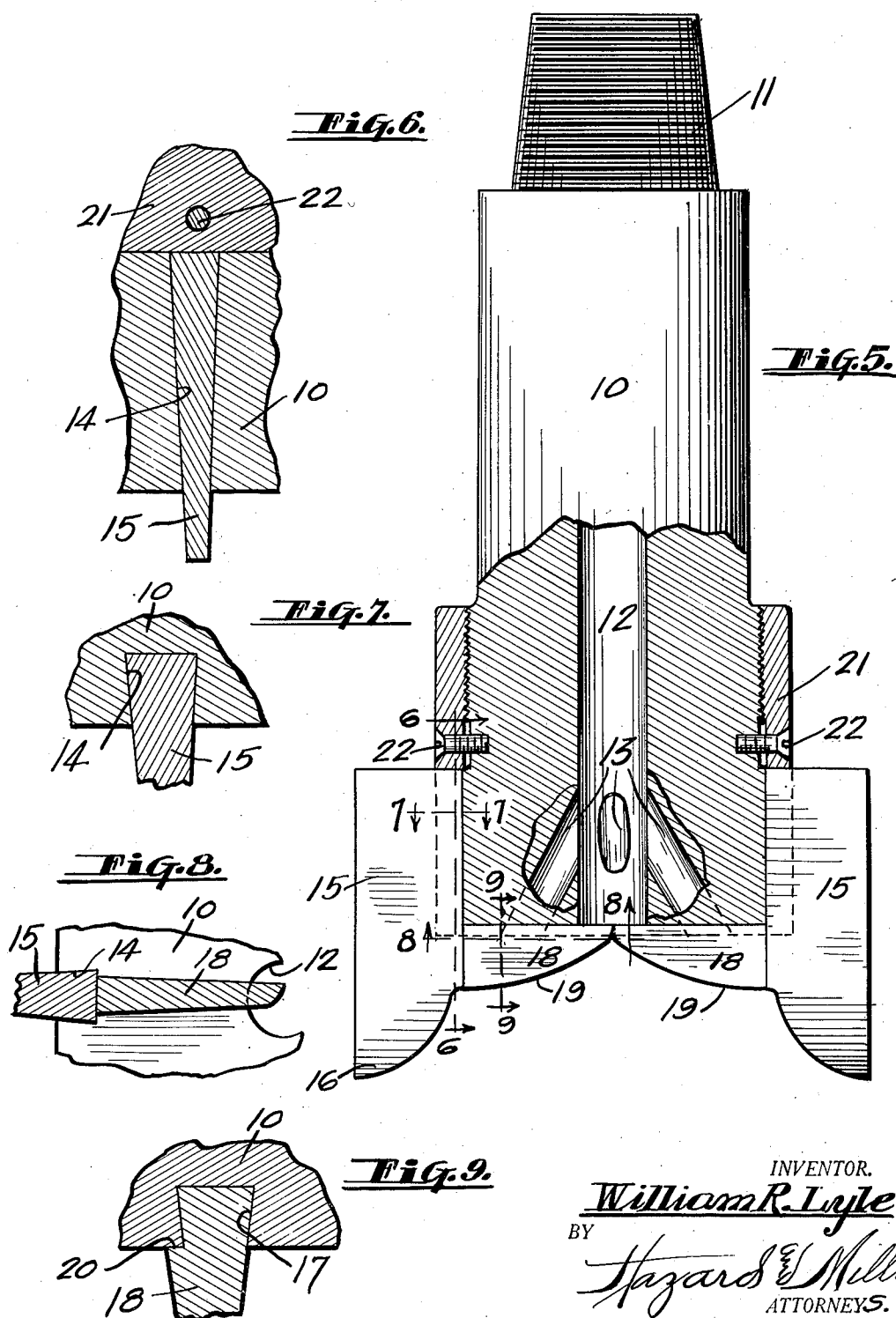
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UNITED STATES PATENT OFFICE.

WILLIAM R. LYLE, OF LOS ANGELES, CALIFORNIA.

WELL-DRILL BIT.

Application filed June 20, 1921. Serial No. 478,942.

To all whom it may concern:

Be it known that I, WILLIAM R. LYLE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Well-Drill Bits, of which the following is a specification.

My invention relates generally to well drilling appliances, and more particularly to drill bits; the principal objects of my invention being to generally improve upon and simplify the construction of the existing types of well drilling bits, to provide a drill having a plurality of sets of bits, each set being composed of a pair of co-operating bit members that are radially arranged within the drill shank, to provide simple and efficient means for firmly securing the bit members in the shank or body of the drill, to construct the drill shank and bits so that the latter may be readily removed in the event of excessive wear or breakage; and further to provide means for delivering and discharging jets of water directly in front of each bit in order to carry off the cuttings from the bits, and also for the purpose of softening the ground and thereby facilitating the operation of the drill.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view of a well drilling tool of my improved construction.

Fig. 2 is a view looking against the under side of the drill.

Fig. 3 is a perspective view of the outer bit member of my improved drill.

Fig. 4 is a perspective view of the inner bit member.

Fig. 5 is an elevational view of the drill with the lower portion thereof in vertical section.

Fig. 6 is a vertical section taken approximately on the line 6—6 of Fig. 5.

Fig. 7 is an enlarged horizontal section taken on the line 7—7 of Fig. 5.

Fig. 8 is an enlarged horizontal section taken on the line 8—8 of Fig. 5.

Fig. 9 is an enlarged vertical section taken on the line 9—9 of Fig. 5.

Referring by numerals to the accompanying drawings which illustrate a practical

embodiment of my invention, 10 designates the body of the drill that is substantially cylindrical in form and provided at its upper end with a threaded extension 11 of reduced diameter whereby said drill may be readily connected to, or disconnected from, the rotary drill carrying tube (not shown).

Formed through the body or shank 10 of the drill is an axially disposed passageway 12 from the lower portion of which lead downwardly and outwardly inclined branch passageways 13, the lower ends of which open onto the bottom or under side of drill body 10, so that water passing through said passageways will be discharged downwardly and outwardly from said drill body.

Formed in the outer face of the lower portion of the drill shank or body 10 is a series of vertically disposed grooves 14 that are substantially dovetail shaped in cross section, and said grooves gradually decrease in width toward their lower ends. Removably positioned in each groove is a drill bit 15 formed of hardened metal, and the inner portion of the body thereof occupies the groove 14.

Obviously in order to fit snugly within said groove, the body of the bit 15 gradually decreases in thickness toward its lower end, and it is substantially wedge-shaped in horizontal section so as to correspond with the dovetail shape of said groove. The width of each bit 15 is such that a substantial portion of its body projects beyond the periphery of the drill shank 10, and the lower outer portion of each bit body is extended downwardly and curved laterally with respect to the plane occupied by said body so as to form a curved point 16 that is adapted to plow downwardly into the ground while the drill is in operation.

Formed in the under side of the drill body 10 is a series of radially disposed grooves 17 that are of dovetail shape in cross section and which gradually decrease in width toward their inner ends. These radially disposed grooves 17 correspond in number with, and they extend inwardly from, the lower ends of the vertically disposed grooves 14 that are occupied by the outer bit members 15.

Removably seated in each radially disposed groove is the upper portion of an inner bit member 18, the upper portion of the body of which gradually decreases in width toward its inner end, and being sub-

stantially dovetail shape in cross section in order to fit snugly within the groove 17. Each inner bit member 18 is substantially triangular in outline, and its lower edge 19 is curved and sharpened to form a cutting edge that extends from the inner edge of the curved portion 16 of the outer bit member inwardly and upwardly to the center of the tool (see Figs. 1 and 5). Each inner bit member 18 is provided on one of its side faces at a point adjacent to its upper edge with a horizontally arranged shoulder 20 which, when the inner bit member is properly positioned on the body of the drill, engages directly against the under surface of said drill body thereby providing a strong and substantial bearing that will offset any tendency of the inner bit member to tilt in a rearward direction during operation of the bit.

When the inner and outer bit members are properly arranged on the lower portion of the drill body, the lower inner portions of the bodies of the outer bit members 15 overlie the straight outer ends of the inner bit members 18, thereby effectually locking the latter to the drill body. In order to retain the outer bit members in proper position on said drill body, a retaining ring 21 is screw seated upon the drill body immediately above the upper ends of said outer bit members 15. This retaining ring is screwed downwardly until its lower edge bears directly against the upper ends of the outer bit members 15, and to lock said retaining ring against unscrewing movement while the drill is in operation, screws 22 are inserted through suitably located apertures in the lower portion of said ring, and the inner ends of said screws being seated in threaded apertures that are formed in the drill body 10.

Thus it will be seen that I have provided a relatively simple and practical form of rotary drill that includes a plurality of radially disposed bits, and which latter, in addition to having firm and substantial interlocking engagement with the drill body,

are capable of being readily removed in the event that they become unfit for service as a result of wear or breakage.

The curved lower end portions of the outer bit members 15 enter the ground and make the outer cut of the drill during the rotation thereof, and following this outer cut, the curved lower edges 19 of the inner bit members 18 engage and cut away that portion of the ground encompassed by the outer cut made by the points 16, and as a result the bits very rapidly perform their intended functions, and the cuttings are rapidly carried off by the jets of water delivered through the axially disposed passageway 12 and branch passageways 13.

It will be readily understood that minor changes in size, form and construction of the various parts of my improved well drill bit may be made and substituted for those herein shown and described without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. The combination with a drill body, of inner bit members removably positioned on the under side of said drill body, the lower edges of which inner bit members are curved, outer bit members arranged on the lower portion of the drill body, portions of which outer bit members overlie the outer ends of the inner bit members, and the lower ends of said outer bit members being pointed and curved laterally in the same direction with respect to the axis of the drill body.

2. In combination, a drill body, a series of radially disposed bits mounted in the under side of the body and a series of vertically disposed bits mounted on the outer side of the body, the second set of bits having their lower ends projecting below the first set of bits.

In testimony whereof I have signed my name to this specification.

WILLIAM B. LYLE.