

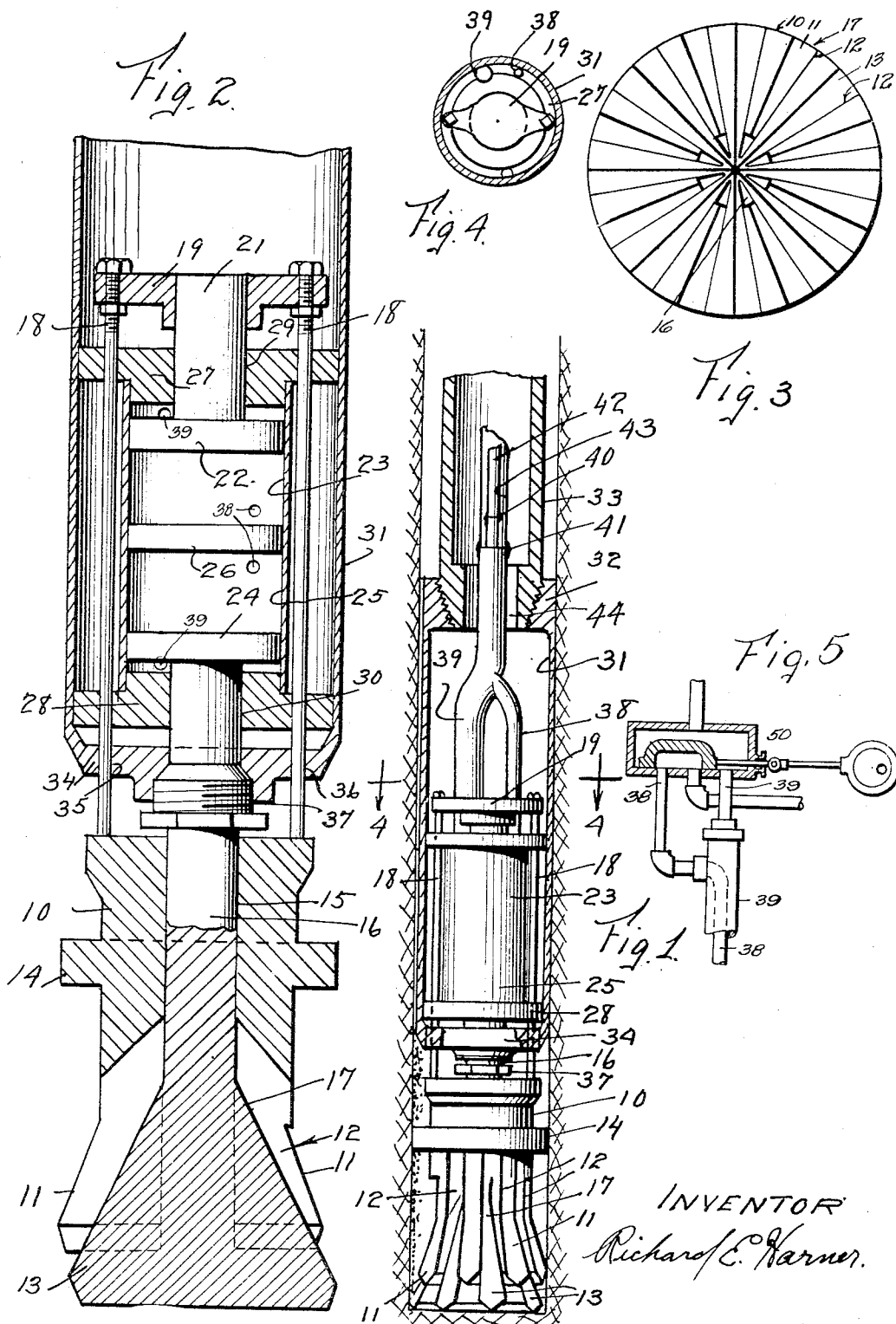
Oct. 31, 1933.

R. E. HARNER

1,932,891

OIL WELL DRILL

Filed Jan. 20, 1931



INVENTOR
Richard E. Harner.

UNITED STATES PATENT OFFICE

1,932,891

OIL WELL DRILL

Richard E. Harner, Los Angeles, Calif.

Application January 20, 1931. Serial No. 509,907

2 Claims. (Cl. 255—4)

My invention relates primarily to drills such as are used in drilling oil wells, particularly deep wells, and it has for its object the provision of a drill for the above purpose which is operated by air or other fluid under pressure with a reciprocatory movement by which the stratum is chipped or chiseled off instead of being scraped off as in the present method.

Another object is to provide a drill of the above character composed of two drill members, one within the other, reciprocating oppositely to each other.

A still further object is to provide a mechanism of the above character so constructed and arranged as to be self-cleaning, the cutting teeth of one drill member passing between the cutting teeth of the other drill member whereby any material which may happen to become lodged therebetween will be dislodged.

Another object is to provide a drill of the above character which will be simple and efficient in operation, simple in construction, and which will obviate the necessity for rotation while being used.

Other objects and advantages will appear hereinafter and, while I have shown and will describe the preferred form of my invention it will be understood that I do not limit myself to such preferred form, but that various changes and adaptations may be made therein without departing from the spirit of my invention.

In the drawing accompanying and forming a part hereof:

Fig. 1 is a side elevation of my drill positioned within a well and in position for use.

Fig. 2 is an enlarged vertical section, partly in elevation of my drill proper.

Fig. 3 is a bottom view of my drill,

Fig. 4 is a section on the line 4—4 of Fig. 1,

Fig. 5 is a longitudinal section of the valve for controlling the air to the cylinders for reciprocating the drill members.

Referring to the drawing my drill comprises an outer drill member 10 and an inner drill member 17 upon the lower ends of which members are formed radially extending teeth 11 and 13 respectively, the lower ends of which teeth are preferably chisel pointed, with the slots or openings 12 between the teeth 11 of the outer member 10 extending for a distance upwardly and the teeth 13 of the inner drill member 17 slidably fitted in said slots 12 between the teeth 11 of said outer drill member. The outer drill member 10 is provided, at a distance from the upper end, with an annular ring or projection 14 and also with a

central bore 15 in which is slidably positioned the stem 16 of the inner drill member 17. The lower ends of the inner drill teeth 13 are also chisel pointed and are preferably of a size and shape to correspond with the teeth 11 of the outer drill member. Projecting upwardly from opposite sides of the upper end of the outer drill member 10 are brace rods 18 which extend upwardly for a suitable distance and have their upper ends secured in a tie bar 19 and extending downwardly from this tie bar 19, centrally thereof, is a piston stem 21, the lower end of which carries a piston 22 which piston is slidably positioned within a cylinder 23. The stem 16 of the inner drill member 17 extends upwardly for a suitable distance and carries upon its upper end a piston 24, which piston is slidably mounted within a cylinder 25 positioned immediately below the cylinder 23 and in alinement therewith. The inner ends of said cylinders are provided with a common head 26 and the outer ends of said cylinders are closed by heads 27 and 28, suitable packing glands being provided for packing the openings 29 and 30 through which the stems 16 and 21 pass whereby a tight joint is provided. The cylinder heads 27 and 28 project outwardly beyond the cylinders 23 and 25 and provide support for the tubular casing 31 which surrounds the same and is provided at its upper end with suitable means 32 for connection to a drill or other suitable pipe 33. The lower end of the casing 31 tapers slightly inwardly and is closed by a plate 34, said plate being provided with apertures 35 and 36 through which the brace rods 18 slide and a central aperture through which the stem 16 passes, a packing gland 37 being provided for the usual purpose. Suitable control valves such as a D slide valve 50 are provided for the cylinders 23 and 25, the object of which will be obvious. Pipes 38 and 39 are connected between said slide valve and opposite ends of cylinders 23 and 25. It will be noted that pipes 38 and 39 extend upwardly for a distance within casing 31 and are then brought together and pipe 38 positioned within pipe 39, this construction continuing upwardly and said pipes being connected at their upper ends to the valve 50. Positioned upon the projecting end pipes 38 and 39 are suitable packing rings 40 and 41, preferably of rubber although any other suitable material may be used. Upon this packing is positioned the lower ends of the pipes 42 and 43, a union coupling connection being used to secure these ends together.

A passage 44 is provided through the open end

of casing 31, which provides an opening through which circulation is maintained.

In the operation of my device, the parts are normally positioned as shown in the drawing, with the casing 31 suspended upon the lower end of a drill pipe 33, the air supply pipe 42 connecting to a source of air supply under pressure above ground. As the air is admitted to the cylinders, the drill members 10 and 17 will be reciprocated vertically in opposition to each other, thereby chipping the strata through which the well is being dug. The chips, thus removed, being carried to the surface by the circulating fluid in the usual manner. As the strata are cut away, the drill will be lowered in the usual manner but will not under ordinary circumstances be rotated. If, however, it is found necessary or desirable, the same may be rotated.

Having described my invention, what I claim is:

1. A drill comprising an outer drill member formed with spaced drilling teeth, an inner drill member formed with spaced drilling teeth, slidably fitted between the teeth of said outer drill

member, said inner drill member being formed with a stem slidably mounted in and extending upwardly through said outer drill member, means connected to said stem for moving said inner drill member with relation to said outer drill member, and means connected to said outer drill member for moving said outer drill member with relation to said inner drill member.

2. A well drilling device comprising a housing adapted to be mounted upon the lower end of a drill pipe, a pair of superimposed cylinders mounted within said housing concentric therewith, a piston mounted in each of said cylinders to reciprocate vertically, a stem extending from each of said pistons, a cutter carried by each of said stems, said cutters being located below said housing, each of said cutters being provided with a plurality of downwardly-projecting, equally-spaced cutting teeth, said cutter teeth being so arranged that the teeth of one cutter pass between the teeth of the other cutter, said pistons being reciprocable opposite to each other by air under pressure to reciprocate said cutters.

RICHARD E. HARNER.

25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150