W. R. GARDNER.

FISHTAIL BIT.

APPLICATION FILED SEPT. 19, 1921.

1,428,774.

Patented Sept. 12, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

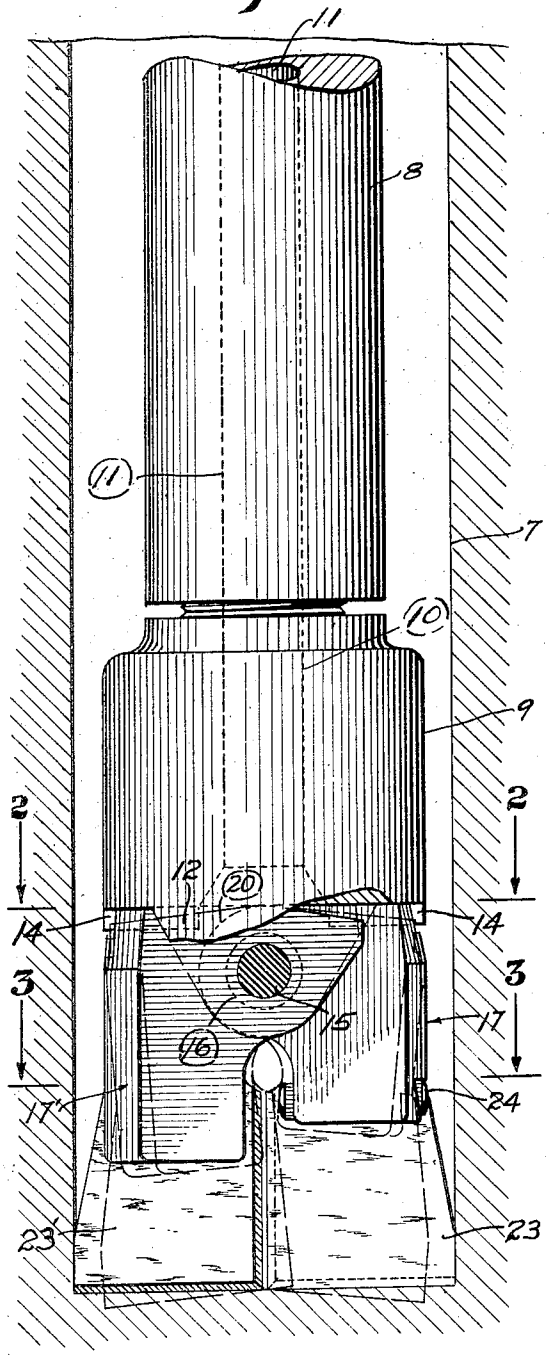


Fig. 2.

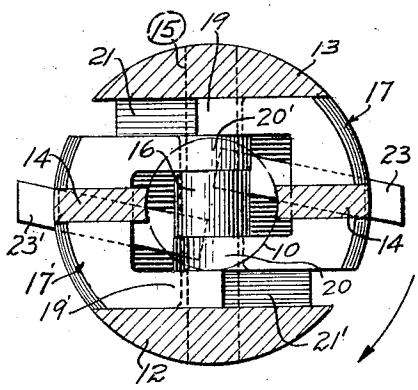
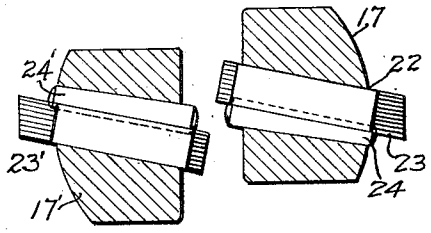


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

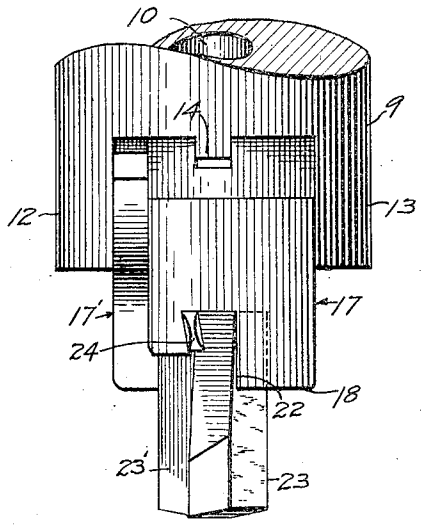


Fig. 5.

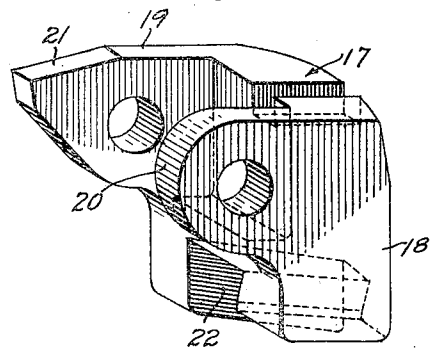
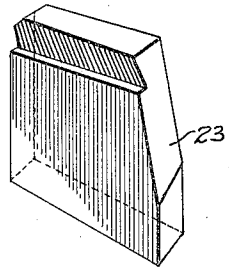


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM R. GARDNER, OF LOS ANGELES, CALIFORNIA.

FISHTAIL BIT.

Application filed September 19, 1921. Serial No. 501,725.

To all whom it may concern:

Be it known that I, WILLIAM R. GARDNER, 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 Fishtail Bits, of which the following is a specification.

This invention relates to a fish-tail bit adapted for rotary drilling, wherein the cuttings are carried away by water circulating through the drill stem.

The objects of this invention are first, to provide a novel form of collapsible bit whereby it may be inserted through the well casing and then expanded to cutting size; second, to provide a bit having the cutters so arranged that they will move the cuttings towards the center of the bit and in proximity to the opening through the bit head; and third, to provide a bit having cutters detachably mounted upon the shank, such that they may be easily removed for dressing, and interchangeable cutters may be employed.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is an elevation partly in section of a bit in a well hole with the cutters expanded, the dotted lines showing the cutters contracted; Fig. 2 is a section as seen on the line 2—2 of Fig. 1; Fig. 3 is a section as seen on the line 3—3 of Fig. 1; Fig. 4 is a fragmentary elevation taken at right angles to the elevation shown in Fig. 1; Fig. 5 is a perspective view of a cutter jaw; and Fig. 6 is a perspective view of a cutter.

Referring more particularly to the drawings, 7 indicates a well hole. Extending into the well hole is a hollow drill stem 8, to which is secured a bit shank 9. The shank 9 has a bore 10 registering and communicating with the bore 11 in the drill stem. The shank is provided with oppositely disposed ears 12 and 13, best shown in Figs. 2 and 4. An interrupted rib 14 extends diametrically across the shank serving as aligning means for the jaws of the cutters. Secured in the ears 12 and 13 is a pin 15, and fixed to the center thereof is a collar 16.

Pivotally mounted upon pin 15 is a jaw indicated generally by 17, best shown in Fig. 5. A cooperating jaw of the same shape is indicated by 17′. A detailed description of one of the jaws will be sufficient. The jaws each have a body 18 with a rounded outer face, and ears 19 and 20. Ear 19 is extended slightly to form an abutment 21. The ears are bored to receive the pin 15, and when in position straddle the collar 16. When the jaw 17′ is placed in position upon the pin 15, the ears on it will overlap with the ears on jaw 17, so that with the collar 16 the space between ears 13 and 12 of the shank is completely filled. The upper side of each jaw has a recess in which one section of rib 14 may be disposed. The lower end of the body 18 has a way to receive a cutter. The way indicated by 22 is at an angle to a radius and is cut to have a key way on one side.

The cutters indicated by 23 and 23′ are slotted to form key-ways to cooperate with the key-ways in the jaws. A cutter 23 is placed in position in the jaw 17 and locked therein by a key 24. It is obvious that by removing the key, the cutter may be removed and dressed or a new cutter inserted. By making the cutters interchangeable and detachable from the jaws, steel having the proper characteristics for the different parts may be used.

Referring to Fig. 1 which shows the assembled bit, the cutters are shown in expanded position in full lines. The cutters remain in this position as long as they bear upon the bottom of the well hole. By lifting the bit, the cutters will by their own weight swing inwardly into the position shown in dotted lines, the face 21 abutting the shanks to limit the movement. It is evident that by rotating the bit material will be cut in the hole and forced inwardly along the cutter faces sliding toward the center, being carried upwardly through the bore in the stem and drill shank while water will circulate. With the type of tool shown casing is intended to be placed in the well and follow the drill.

What I claim is:

1. A fish-tail bit comprising a hollow shank adapted to be secured to a hollow stem for the circulation of water therethrough, cutters pivotally secured to said shank so as to expand or contract, said cutters having their planes disposed at an angle to the radius of rotation of the bit so as to move cuttings toward the bore of said shank.

2. A fish-tail bit comprising a hollow shank adapted to be secured to a hollow stem

for the circulation of water therethrough, cutter jaws pivotally secured to said shank, cutters detachably secured to said jaws whereby said cutters may be expanded or contracted, said cutters having their planes disposed at an angle to the radius of rotation of the bit so as to move cuttings toward the bore of said shank.

3. A fish-tail bit comprising a hollow shank adapted to be secured to a hollow stem for the circulation of water therethrough, a pin extending diametrically across the bore of said shank, cutter jaws pivotally mounted on said pin, cutters detachably secured to said jaws whereby said cutters may be expanded or contracted, said cutters having their planes disposed at an angle to the radius of rotation of the disks so as to move cuttings toward the bore of said shank.

4. A fish-tail bit comprising a hollow shank adapted to be secured to a hollow stem for the circulation of water therethrough, jaws pivotally secured to said shank, said jaws having ways for receiving cutters, cutters mounted in said ways, keys to lock said cutters to said jaws, said cutters having their planes disposed at an angle to the radius of rotation of the bit so as to move cuttings toward the bore of said shank.

5. A fish-tail bit comprising a hollow shank adapted to be secured to a hollow stem for the circulation of water therethrough, a pin extending diametrically across the bore of said shank, jaws pivotally mounted on said pin, said jaws having ways for receiving cutters, cutters mounted in said ways, keys to lock said cutters to said jaws, said cutters having their planes disposed at an angle to the radius of rotation of the bit so as to move cuttings toward the bore of said shank.

In witness that I claim the foregoing I have hereunto subscribed my name this 10th day of September, 1921.

WILLIAM R. GARDNER.