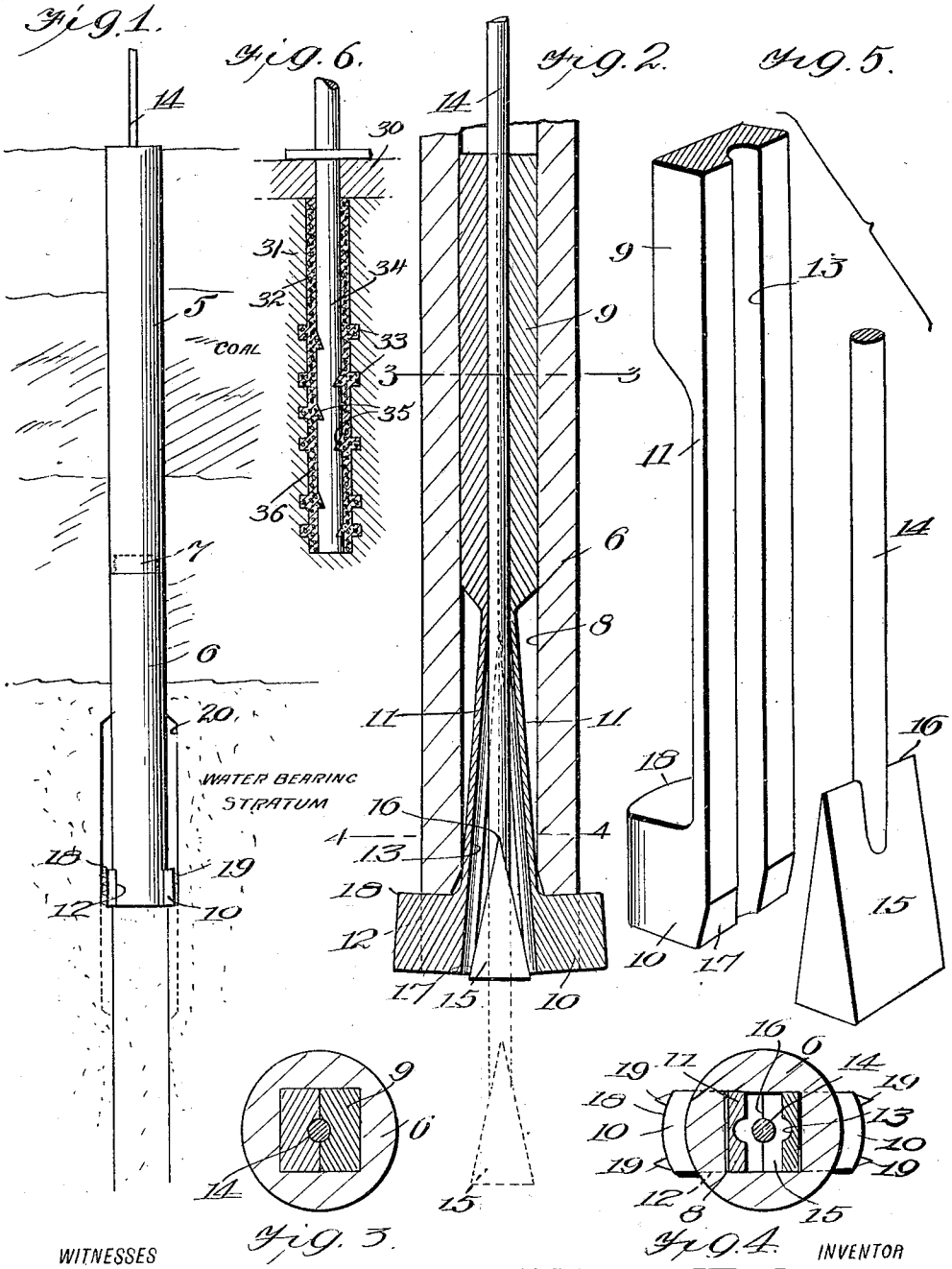
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REAMING BITS FOR PROSPECTING DRILLS.

APPLICATION FILED APR. 29, 1914.

**1,138,332.** **Patented May 4, 1915.**




WITNESSES

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# UNITED STATES PATENT OFFICE.

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## REAMING-BITS FOR PROSPECTING-DRILLS.

1,138,332. Specification of Letters Patent. Patented May 4, 1915.

Application filed April 29, 1914. Serial No. 835,125.

*To all whom it may concern:*

Be it known that I, WILLIAM T. UNDERWOOD, a citizen of the United States, and a resident of Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Improvement in Reaming-Bits for Prospecting-Drills, of which the following is a specification.

This invention relates to reamers, or expanding bits, for use in drilling holes for prospecting, and for other purposes, fastening bolts in a rock in order to anchor structures such as buildings, towers, bridges, trestles, etc.

It is well known that in the art to which this invention pertains that in sinking core and churn drill holes, that is, holes sunk for the purpose of prospecting for coal, iron, oil or other material, often times strata bearing water, or quick sand, or soft earth or other troublesome materials are encountered and in such instance it is necessary to exclude the troublesome material from the hole by means of casings or sleeves of metal disposed in the portions of the hole extending through the troublesome strata (sometimes through a cavity) and it is the principal object of this invention to provide a reamer or bit for enlarging the hole in those portions extending through troublesome strata in order to accommodate and fasten the protecting casings or sleeves.

Another object of the invention is to provide a device of the class described, including a barrel adapted to be secured to the drill pipe, a pair of cutting heads carried by resilient arms, and a wedge for separating the heads and pressing them outwardly beyond the barrel for forming the enlargement in the drill hole.

A further object of the invention is to provide a device of the class described which will be extremely simple in construction, durable, efficient in operation and inexpensive to manufacture.

With these and other objects in view which will become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawing in which like characters of reference indicate like parts throughout the several figures, of which—

Figure 1 represents a side elevational view of the assembled device, showing the same in operation, Fig. 2 represents a vertical sectional view taken diametrically through the barrel, the cutter heads and parts associated therewith, and the wedge, Fig. 3 represents a horizontal sectional view taken on the plane indicated by the line 3—3 of Fig. 2, Fig. 4 represents a view similar to Fig. 3, taken on the line 4—4 of Fig. 2, and Fig. 5 represents a perspective view of one of the cutter heads and its stem, and the wedge element disassembled. Fig. 6 represents a view showing an application of the reamer as used in setting the anchor rods for a structure.

Referring more particularly to the drawing, 5 indicates one of the sections of the drill pipe or stem, which is of ordinary construction, and 6 indicates the barrel of the reamer which is cylindrical in shape and of a diameter equal to the diameter of the drill pipe section, and has one end reduced and threaded as at 7, whereby it may be secured to the pipe section. The barrel is provided longitudinally throughout its length with a square or rectangular bore 8, in which are disposed the stems 9 of the cutter heads 10, said stems adjacent the heads being reduced to form resilient arms 11. The stems, arms and heads may be formed integrally or in separate pieces. A pair of stems is disposed within the barrel, the stems being substantially rectangular in cross section, and the stems are disposed oppositely within the barrel, their meeting edges occurring transversely of the barrel diametrically thereof. The barrel at its lower end or opposite end 7, is provided with diametrically disposed recesses 12, through which the cutter heads 10 are adapted to extend.

The stems are provided longitudinally thereof throughout their length on their inner surfaces with centrally disposed semi-tubular channels or bores 13, which when the stems are disposed within the barrel, form a round bore, and through said bore is adapted to extend a rod 14 carrying at its lower end the wedge member 15. The wedge is disposed with its thin edge 16 directed upwardly or toward the barrel, and said wedge is of a width equal to the width of the inner faces of stems 9, and is adapted when moved upwardly from the dotted line position shown in Fig. 2, to the full line position, to enter between the cutter heads 10 for spreading the same against the tension of arms 11, and to project them in opposite directions

beyond the edges of the barrel. The inner faces of the stems at the lower edges of the cutter heads are beveled as at 17, so that the wedge may readily enter between the cutter heads. The cutter heads have convexed outer surfaces indicated at 18 of a curvature equal to the curvature of the barrel, and disposed in spaced vertical rows on each head are the diamonds 19.

The operation of the device may be briefly described as follows: A troublesome stratum indicated at 21 in Fig. 1, having been struck during the course of sinking the hole, the drill pipe is withdrawn and the barrel secured thereto, the stems 9 and cutter heads being disposed in the barrel, and the rod 14 being disposed between the stems, with the wedge 15 below the cutter heads, so that the latter together with the diamonds are disposed within the recesses 12, that is, within the circumference of the barrel, and the drill pipe is then entered and lowered in the hole until the troublesome stratum is encountered by the reamer. The rod 14 extends upwardly through the pipe sections, it being understood that said rod may be made in segments adapted to be secured together for providing the required length of rod, and said rod may then be drawn upwardly by any suitable means until the wedge 15, entering between the cutter heads, spreads the same, and as the reamer is rotated through the medium of the usual machinery, the hole is enlarged as indicated at 20 in Fig. 1. The distance in which the wedge is entered between the cutter heads, is regulated to determine the diameter of the enlargement 20, it being understood that the farther the wedge moves between the cutter heads, the farther the latter will be spread apart, and hence the more the diameter of the enlargement will be increased. The enlargement having been completed, the wedge is lowered, whereupon the cutter heads return to their initial position, by action of the resilient arms 11, and the reamer can then be withdrawn from the hole.

If a soft metal casing is used, it may be crimped or corrugated lengthwise, lowered in the hole to the place needed and then pressed downwardly and fastened in place against the sides of the hole by use of an expansion bit constructed according to my invention but divested of the cutting diamonds. If the upper part of the hole has already been protected with a casing or casings then the hole can be widened or reamed out below the level of the lowermost casing and other casings added at the top of the hole, and the string of casings driven on down to cover the troublesome strata.

In Fig. 6, which shows the application of the reamer in setting anchor rods for a building or other structure, 30 indicates the sill or foundation of the structure, which rests on the rock bottom indicated at 31, and 32 indicates a hole drilled in the rock over which the sill extends, and at 33 is indicated a plurality of circular recesses or notches reamed out of the rock by an expansion bit constructed according to my invention. An anchor rod as indicated at 34, is disposed in the drilled hole 32 and extends through or is positioned adjacent to the sill and suitably fastened thereto, the diameter of the hole being greater than the diameter of the anchor rod, and said rod is provided, as shown, with a plurality of notches indicated at 35, and in order to maintain the rod in immovable position the hole is filled in around the rod with cement as indicated at 36, which fills the hole to the level of the sill, and enters the notches in the rod and the reamed notches 33, and which when it hardens immovably maintains the anchor rod in position.

Although I have described the preferred embodiment of my invention, I may desire to make such changes in the construction, combination and arrangement of parts as do not depart from the spirit of the invention and the scope of the appended claims.

I claim:

1. A device of the class described, comprising a barrel adapted to be secured to a drill pipe section, said barrel provided with a rectangular bore extending therethrough and provided at one end with diametrically opposed recesses communicating with the bore, a pair of stems substantially rectangular in cross-section disposed within the bore, said stems having their lower ends reduced to form resilient arms, oppositely disposed cutter heads on the lower ends of said resilient arms and disposed within the recesses in the barrel, diamonds carried by said cutter heads, said stems provided longitudinally of their meeting faces with centrally disposed substantially semitubular grooves forming a bore through the stems, a rod disposed with the last said bore, and a wedge carried by said rod, said wedge normally disposed with its thin edge toward the cutter heads, said cutter heads at their meeting edges being beveled to form a guide for the wedge, said wedge adapted to be entered between said cutter heads for spreading the latter beyond the periphery of the barrel.

2. A device of the class described, comprising a barrel having a squared bore extending longitudinally and centrally therethrough and provided at one end with a pair of diametrically disposed recesses, said barrel adapted to be secured to a drill stem section, oppositely disposed cutter heads positioned within the recesses of the barrel, said cutter heads being movable away from each other, a rod disposed in a bore between

the cutter heads and a wedge carried by said bore adapted to be entered between the cutter heads for spreading the latter beyond the periphery of the barrel.

3. A device of the class described, comprising a hollow barrel, said barrel at one end provided with recesses, cutter heads disposed within the recesses, resilient means for maintaining said cutter heads within the recesses, and in proximity to each other, and means for entering between said cutter heads whereby to spread the latter beyond the periphery of the barrel.

4. A device of the class described, comprising a pair of cutter heads, means associated with the cutter heads for securing the latter to a drill pipe section, resilient means for normally maintaining said cutter heads within the circumference of a hole formed by the drill pipe, and means operable at will for spreading said cutter heads beyond the perimeter of the hole for enlarging the latter.

5. A device of the class described, comprising a pair of oppositely disposed cutter heads, means for securing the latter non-rotatably with relation to a drill pipe, means for normally maintaining said cutter heads in intimate relation with each other, and means for spreading the cutter heads at will.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."