C. SLY.

DETACHABLE DRILL BIT.

APPLICATION FILED MAY 28, 1915.

1,184,037.

Patented May 23, 1916.

2 SHEETS—SHEET 1.

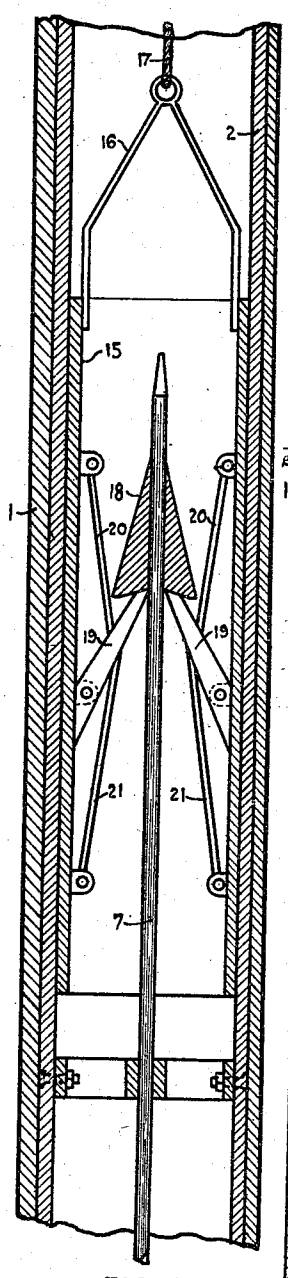


FIG. 4

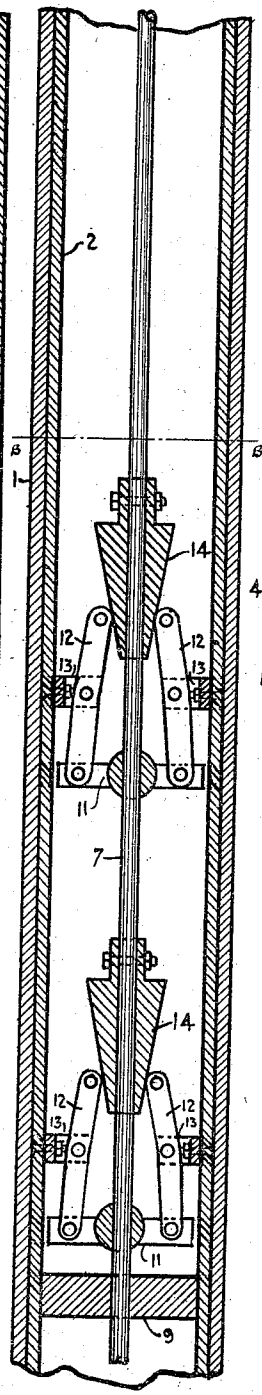


FIG. 2

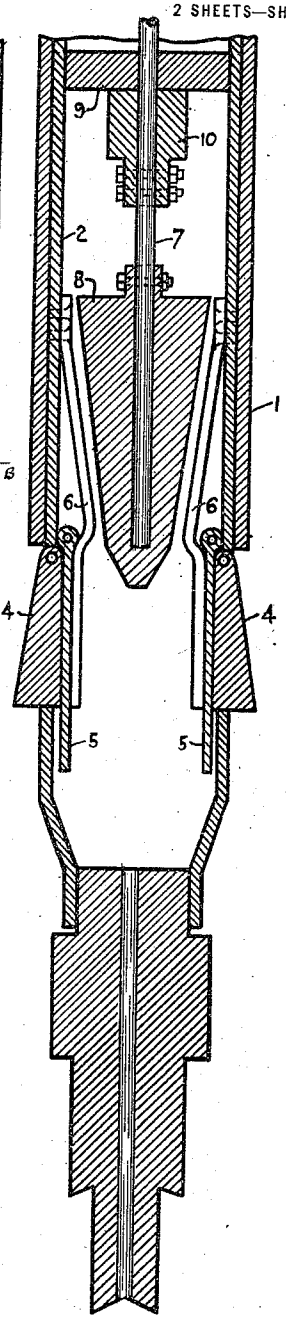


FIG. 1.

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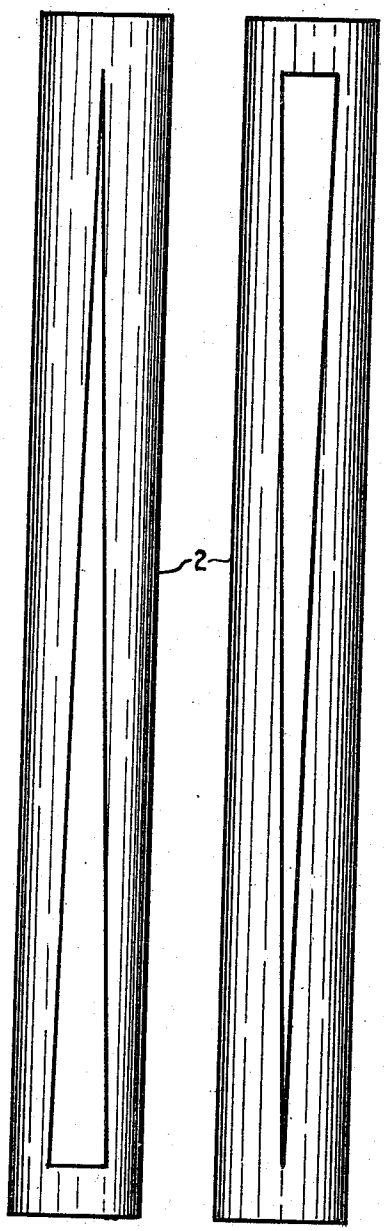


FIG. 5.

FIG. 6.

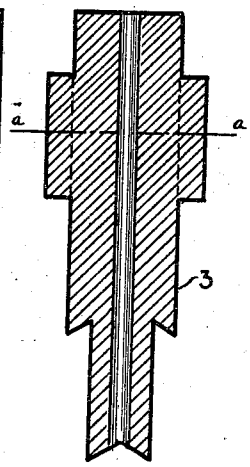


FIG. 7

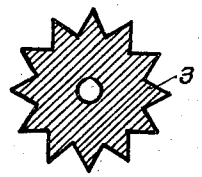


FIG. 8

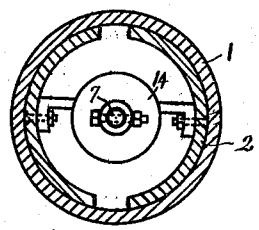


FIG. 3.

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DETACHABLE DRILL-BIT.

1,184,037. Specification of Letters Patent. Patented May 23, 1916.

Application filed May 28, 1915. Serial No. 30,927.

To all whom it may concern:

Be it known that I, CHARLES SLY, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Detachable Drill-Bits, of which the following is a specification.

This invention relates to new and useful improvements in a detachable drill bit.

The object of the invention is to provide a bit of the character described that may be attached to and detached from the lower end of a drill stem without withdrawing the drill stem from the bore.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification, and illustrated in the accompanying drawings wherein:

Figure 1, shows a vertical sectional view of the bit. Fig. 2, shows a vertical sectional view of the means for fixing the bit in the drill stem. Fig. 3, shows a transverse sectional view thereof. Fig. 4, shows a vertical sectional view of the device for lowering the bit into and withdrawing it from the drill stem. Figs. 5 and 6, show views, respectively, of the bit support taken from opposite sides. Fig. 7, shows a vertical sectional view of the pilot bit, and, Fig. 8, shows a transverse sectional view of the bit, taken on the line *a*—*a* of Fig. 7.

Referring now more particularly to the drawings wherein like numerals of reference designate similar parts in each of the figures, the numeral 1, refers to the drill stem, and the numeral 2, refers to a tubular section, to which the bit proper is attached. When in operation, this section is secured within the lower end of the stem and projects below the lower end of said stem and swedged or threaded into the lower end of the tubular section 2, is the pilot bit 3, which may be of any desired construction, but as shown, is in general contour of an inverted conical form, lessening in diameter toward the lower end or point thereof, in steps, as shown, presenting abrupt annular shoulders, so that the bore will be gradually enlarged as the drilling process proceeds. Side cutters 4, 4, are provided, which play through slots arranged in opposite sides of the tubular section 2, and which are pivoted at their upper ends to said section, and whose cutting edges project out through said slots. Plates 5, 5, are pivoted at their upper ends immediately above said slots, on each side, which normally close the slots against the passage of water, and flexible springs 6, 6, are secured at their upper ends to the inside wall of the section 2, and they converge toward each other, and their lower free ends rest against the inner sides of the plates 5, 5.

An axially extending shaft 7, is provided within the drill stem, to the lower end of which is fixed an inverted conical shaped wedge 8, which normally rests between springs 6, 6, and hold them against the plates 5, 5, which operate to force the cutters 4, 4, through their corresponding slots and hold them in extended position. Fixed in the section 2, is the disk 9, through a central orifice in which the shaft 7, extends and a collar 10, is fixed on the shaft underneath said disk, so that by an upward pull upon the shaft, said collar will operate to lift the entire bit and its support and elevate the same through said stem. Fixed to the shaft 7, and spaced apart therealong, are a plurality of cross bars 11, 11, and pivoted to each of said bars on opposite sides of the shaft, are the levers 12, 12, to the outer sides of which are attached the blocks 13, 13, which are bolted also to opposite sides of the section 2. Fixed upon said shaft and spaced apart at suitable intervals are the inverted frusto-conical shaped wedges 14, 14, and as the shaft 7, is lowered to the desired point, said wedges force apart the upper free ends of the levers 12, 12. The section 2, as shown in Figs. 5 and 6, has triangular sections cut from opposite sides and extending approximately from end to end, so as to permit the expansion of the section. When the levers 12, 12, are forced apart, the section 2, is expanded and grips the drill stem on the inside and said section 2, and the bit carried thereby, is thus fixed relative to the stem. The wedge 8 and wedges 14, 14, are so located that the former will be in position to force the blades 4, 4, outwardly when the latter pass between the levers 12, 12, so as to lock the bit in position, relative to the stem, at the proper time.

For the purpose of withdrawing the bit, a cylindrical section 15, is provided, which is of smaller diameter than the section 2, so as to pass within the same and the upper end thereof has the bail 16, to which a suitable cable, as 17, may be attached. The upper

end of the shaft 7, has a conical shaped head 18, and pivoted within the section 15, to opposite sides thereof, are the dogs 19, 19. When it is desired to withdraw the bit, the section 15, is let down by the cable 17, until the free ends of the dogs 19, 19, clear the lower end of the head 18, and they will be forced under said head by means of the respective flat springs 20, 20, which are secured to said section 15, on opposite sides and rest against said dog. By an upward pull upon the cable 17, the shaft 7, will be elevated, and the wedges 14, withdrawn from between the levers 12, and the wedge 8 withdrawn from between the springs 6, 6. The diameter of the section 2, will thus be reduced, the blades 4, 4, will be permitted to move inwardly through their slots and the bit may be drawn upwardly through the stem. When it is desired to lower the bit, the springs 20, 20, are disengaged from the dogs 19, 19, and the free ends of said dogs engaged under the head 18, and the device then lowered through the drill stem until the pilot bit 3, reaches the bottom of the bore. The weight of the section 15, will carry it on downwardly, freeing the dogs 19, 19 from the head 18. Flat springs 21, 21, are attached to opposite sides of the section 15, and their free ends rest under said dogs, so that when they are disengaged, they will be forced back against the section walls and permit the withdrawal of said section 15 from the drill stem. The springs 20 and 21, are so attached that they may be easily withdrawn from operation against the dogs 19, 19, as when one is used the other will not be required. In replacing the drill, when the pilot bit has reached the bottom of the bore, the wedges 8 and 14 will have again assumed a position between the springs 6, 6 and the corresponding levers 12, 12, and will operate to lock the section 2, and the blades 4, 4, in the position herein before explained and the weight of the shaft 7, and the appendants thereof are sufficient to hold the bit locked in position.

What I claim is:

1. A device of the character described including a drill stem, an expansible cylindrical section within said stem, a bit carried by said section and means for expanding the section and locking the same against movement relative to the stem.

2. A device of the character described including a drill stem, an expansible cylindrical section within said stem, a bit carried by the lower end of said section, a plurality of side cutters carried thereby, means for expanding said section and locking the same against movement relative to the stem, and means for locking said side cutters in a fixed position relative to said sections.

3. A device of the character described including a drill stem, an expansible cylindrical section within said stem, provided with slots cut through the wall thereof, a pilot bit carried by the lower end of said section, cutting blades pivoted thereto and adapted to project through said slots, means for expanding said section and locking the same against movement relative to the stem, and means for forcing said side cutters to project through said slots and locking the same in said position.

4. A device of the character described including a drill stem, an expansible section therein, a bit carried by the lower end of said section, means for expanding the section and locking the same relative to the stem, and means for withdrawing said locking means and releasing said section from said stem.

5. A device of the character described including a drill stem, an expansible section therein, a bit carried by the lower end of said section, means for expanding the section and locking the same relative to the stem and means for elevating said locking means and releasing the section from the stem.

6. A device of the character described including a drill stem, an expanding section therein, a bit carried by the lower end of said section, means for expanding the section and locking the same relative to the stem, a shaft arranged axially relative to the stem and controlling said locking means, and a mechanism for elevating said shaft and releasing the locking means whereby said section is released from said stem.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES SLY.

Witnesses:
J. W. YEAGLEY,
F. A. LIDDELL.

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