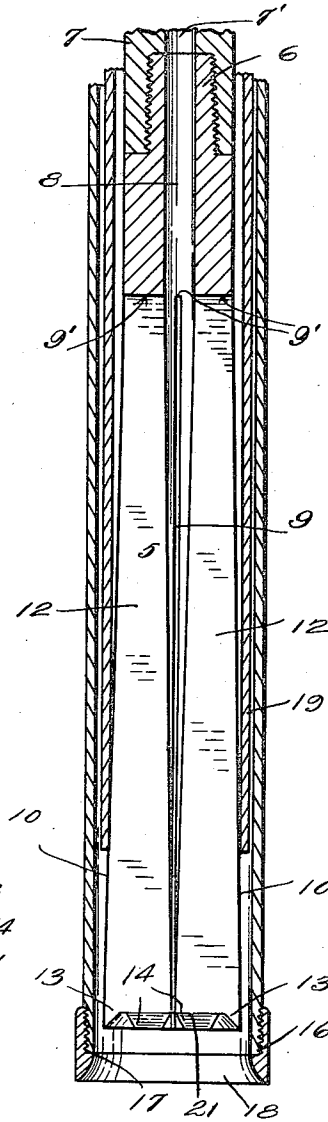
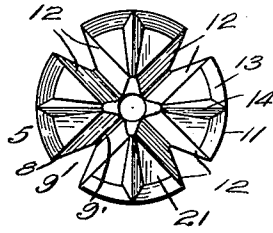
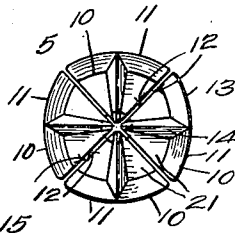
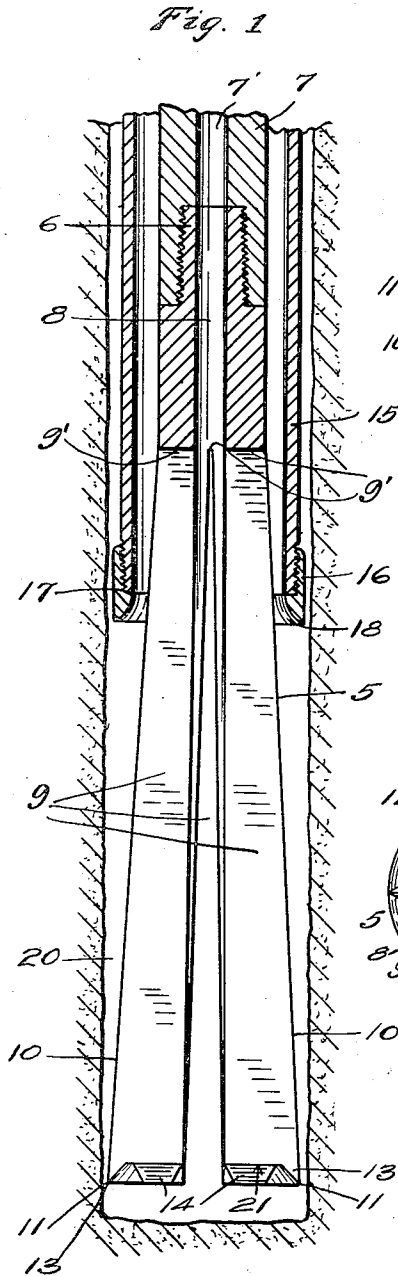


A. G. COLLINS.
 CONTRACTILE WELL BORING TOOL.
 APPLICATION FILED NOV. 15, 1909.

1,065,590.

Patented June 24, 1913.



WITNESSES:

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CONTRACTILE WELL-BORING TOOL.

1,065,590.

Specification of Letters Patent.

Patented June 24, 1913.

Application filed November 15, 1909. Serial No. 528,076.

To all whom it may concern:

Be it known that I, ASA G. COLLINS, a citizen of the United States, residing at Everett, in the county of Snohomish and State of Washington, have invented certain new and useful Improvements in Contractile Well-Boring Tools, of which the following is a specification.

This invention relates particularly to well boring as accomplished through the medium of a striking tool; and its object is the provision of a cutting tool of this class which is adapted to afford a hole somewhat greater than that of the well casing which is employed in the work and to thereby obviate the necessity of using reamers to effect the enlargement of a pioneer hole.

With this end in view the invention consists in the novel construction and adaptation of devices, as will be hereinafter described and claimed.

In the accompanying drawings, illustrating an embodiment of my invention, Figure 1 is a transverse vertical section of a boring tool, its stem, and the tube-casing, shown in their various operative positions. Fig. 2 is a similar view together with a supplementary tube embracing the boring tool for maintaining the same in contracted condition, as when lowering the tool through the tube casing prior to each successive stage of boring operations. Fig. 3 is an underside plan view of a boring tool in its normal condition. Fig. 4 is similar view thereof, shown partially contracted.

The reference numeral 5 designates a boring tool or bit which is of maximum diameter at the bottom, thence it is formed to taper upwardly and terminates in a stud 6 which is screw-threaded for engagement in a correspondingly threaded socket of a tubular extension 7. For a distance from its upper end, the bit is provided with an axially arranged hole 8 of substantially the same diameter with the bore 7' of said extension.

From the lower end of the bit and extending longitudinally thereof are radially disposed slots 9 of greatest widths at the bottom and converging upwardly to terminate at apices 9' within a short distance from the upper end of the bit. The divided portions, or members, 10 of the bit, as best shown in Fig. 3, are of approximately sector shape in horizontal planes, that is to say, their outer peripheries 11 are disposed in the circumference of a circle concentric to the axis of the

bit when in its normal, or outspread, condition; while the angular sides 12 of each such member is formed to be in planes radially, or nearly so, with the axis of the bit when the members are drawn inwardly to occupy the positions in which they are represented in Fig. 4. Each of the members 10 is formed with an annular cutting edge 13 extending about its arcuate margin 11 and with a radial slightly tapered cutting edge 14 extending therefrom so as to bisect the angle included between the adjacent sides 12. The inner termini of the radial cutting edges substantially meet in a point when the arms are completely contracted, the arms being shown as nearly contracted and said termini of these edges as nearly meeting in Fig. 4 of the drawings.

When the arms 5 are contracted, the bore 8 in the head assumes a closed position to prevent any water or other matter passing therefrom, and upon the closing of the arms, the dirt which may have collected within said bore will be forced therefrom, thereby providing a hollow cutting tool, which may be entirely closed at its lower end.

15 represents a tubular casing or "follower" having an external diameter less than the normal diameter of the bit so that the well hole which is bored by the latter will accommodate the casing. Detachably secured to the lower end of said casing, as by a screw connection, is a collar 16 having intermediate its length an annular shoulder 17 to receive the extremity of the casing. The outer surface of the collar is preferably cylindrical and of a diameter exceeding that of the casing. The internal diameters of the casing and the collar in proximity to said shoulder are the same, or nearly so, and therebelow the collar is formed with a bell-mouth 18.

19 represents a pipe of a diameter to permit the same being passed freely through the casing 15.

The operation of the invention may be explained as follows: In order to introduce the bit 5 through the casing 15 into the well-hole 20 (Fig. 1), the bit is first contracted and so held by being embraced by the pipe 19. Thus constrained, the bit may be passed through the casing, as will be understood from Fig. 2. After the bit has been lowered into the well-hole the pipe 19 is withdrawn, whereupon the bit members are distended to their normal positions, as shown in Fig. 1.

The work of sinking the well-hole is then accomplished by a succession of blows imparted by the bit in falling from elevated positions through power derived from suitable apparatus on the ground surface and which causes the bit to be partially rotated subsequent to the successive falls of the same. During the progress of the work, or intermittently if desired, the well-hole is charged with water through the space in the casing about the bit and its extension 7 and which is then withdrawn by suction created above the ground through the communicating bores of the bit and the extension. The bit in thus operating will by impact effect the disintegration of the material at the bottom of the well-hole and then cause the loosened material to be mixed up with the water, as by churning, so to speak, and thus be in a state such as to be readily pumped from the well-hole.

To remove the bit from the well-hole and the casing 15, it is simply elevated and in passing the collar 16 the bit parts 10 are crowded inwardly sufficiently to enter and then pass through the casing. The function of the arc-shaped cutting-edges 13 is to cut contiguous to the circular wall of the well-hole and the other cutting edges 14 are to attack the surface in radial directions as they are rotatively advanced prior to the delivery of the successive blows of the bit. The flat surfaces 21 of the bit-members then act to comminute, as by mashing, the material which is broken away by the cutting edges 13 and 14. It may be said that in boring operations of this nature the well-hole is made greater even than the compass of the bit and consequently the excess in the diameter of the bit with respect to the casing may be relatively small, for example, a half an inch difference in diameters for drilling sandstone, or the like, will ordinarily afford ample clearance for the sinking of the casing.

Having described my invention, what I claim as new, is—

1. A well boring tool comprising a conoidal-shaped body formed with a series of

radially-disposed elongated slots each extending from a point removed from the upper end of the body to the lower end thereof, said body-portion having a central longitudinal bore extending from the upper end thereof and merging with said slots, said slots providing said body with more than two elongated contractible arms each having angular sides of the same height throughout, each of said arms further being sector-shaped in cross-section and having its lower end provided with an arc-shaped annular cutting edge at the outer marginal portion thereof and further provided with a tapered radial cutting edge extending from said annular cutting edge and bisecting the angle included between the sides of the arms and said annular cutting edge of each of said arms being of a uniform width throughout at each side of the outer terminus of the other cutting edge of the arm, the inner termini of the radial cutting edges of the arms substantially meeting upon a complete contraction of the arms, and a pipe adapted to engage said contractible arms to hold the same in a closed position.

2. A well boring tool comprising a conoidal-shaped body formed with a series of radially-disposed elongated slots each extending from a point removed from the upper end of the body to the lower end thereof, said body portion having a central longitudinal bore extending from the upper end thereof and merging with said slots, said slots providing said body with elongated contractible arms, an uninterrupted combined curved and straight cutting edge upon the lower end of each of said arms, and the inner termini of the straight portion of said cutting edges of the arms substantially meeting at a point upon the complete contraction of all of the arms, and a pipe adapted to engage said contractible arms to hold the same in a closed position.

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Witnesses:

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