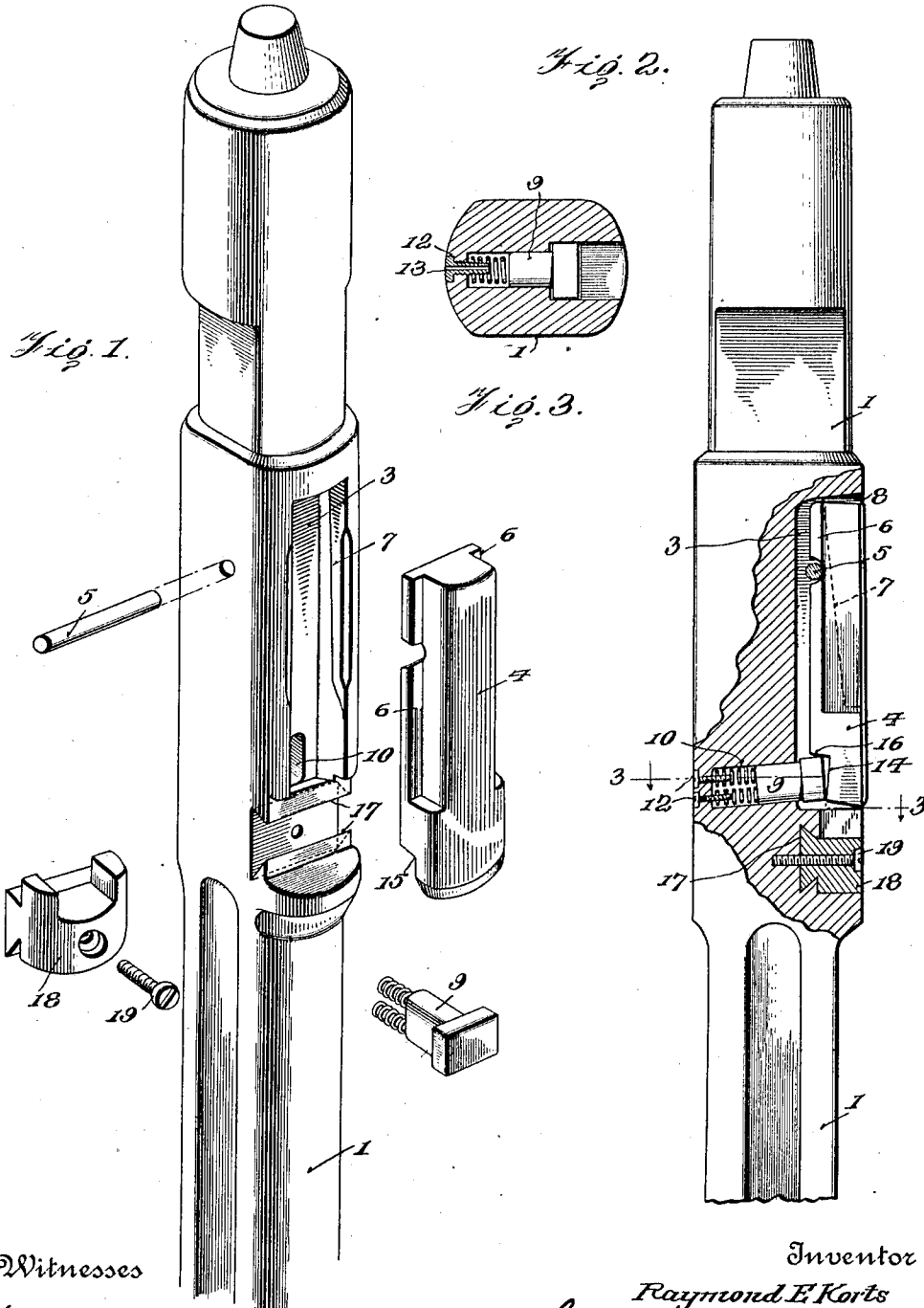


R. E. KORTS.
 COMBINED DRILL BIT AND UNDERREAMER.
 APPLICATION FILED DEC. 5, 1910.

1,012,563.

Patented Dec. 19, 1911.

2 SHEETS—SHEET 1.



Witnesses

Halgeott Murray
E. W. Witman

Inventor

Raymond E. Korts
by Howard A. Coombs
 his Attorney

R. E. KORTS.
 COMBINED DRILL BIT AND UNDERREAMER.
 APPLICATION FILED DEC. 5, 1910.

1,012,563.

Patented Dec. 19, 1911.

2 SHEETS-SHEET 2.

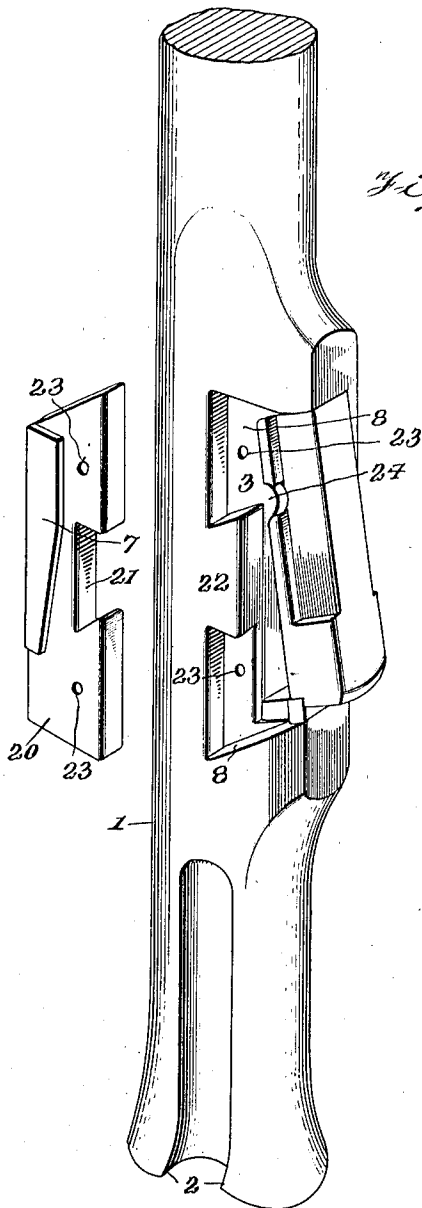


Fig. 4.

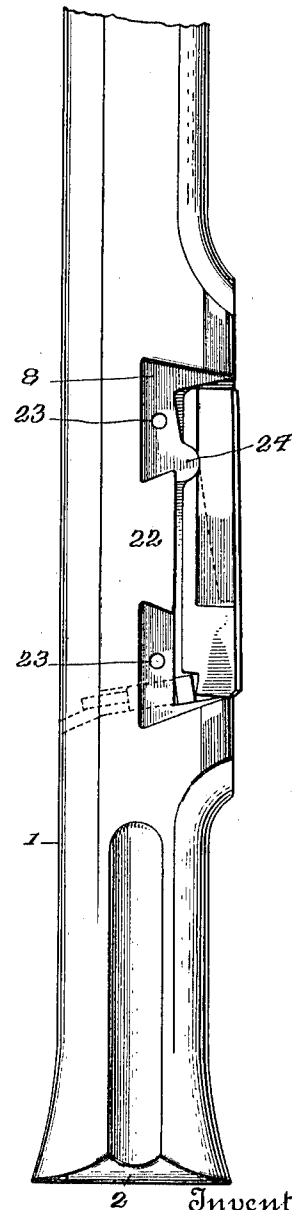


Fig. 5.

Witnesses

Alfred H. Murray
E. W. Wilman

2 Inventor

Raymond E. Korts

by Howard A. Combs
 his Attorney

UNITED STATES PATENT OFFICE.

RAYMOND EDWARD KORTS, OF WELLSVILLE, NEW YORK.

COMBINED DRILL-BIT AND UNDERREAMER.

1,012,563.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Continuation of application Serial No. 565,347, filed June 6, 1910. This application filed December 5, 1910.
Serial No. 595,813.

To all whom it may concern:

Be it known that I, RAYMOND E. KORTS, a citizen of the United States, residing at Wellsville, in the county of Allegany and State of New York, have invented new and useful Improvements in Combined Drill-Bits and Underreamers, of which the following is a specification.

My invention relates to certain new and useful improvements in drill-bits for use in drilling oil-wells, etc., and is particularly designed and intended for use in drilling well-holes which, owing to the loose nature of the soil, have to be cased or lined by a tube. The usual practice in such cases is to drill for a certain depth, then remove the drill and insert an under-reamer, which enlarges the hole made by the drill and permits the casing to be lowered farther down. The under-reamer, which must be made expandible, is then withdrawn through the casing, the drill replaced and the drilling is continued for a certain distance farther. Attempts have also been made to combine a drill and a reamer, so that it would be unnecessary to pull up the drill each time the hole has to be enlarged to lower the casing, but, as far as I am aware, such attempts have not resulted in practical success, owing I believe, to the complicated and unpractical construction of the reaming-cutter and its manner of mounting, whereby it either becomes clogged with earth so that it can not be retracted, or else the blades are of insufficient strength and are too easily broken off. By the construction described and claimed below, I have avoided these objections and have produced a combined drill-bit and reamer, in which the reamer, when it is in cutting position, is held rigidly between solid abutments and in which, at the same time, no openings for dirt to get into are presented.

In the accompanying drawings, Figure 1 is a perspective view of the drill-shank, with the reamer and the other parts cooperating therewith removed, but shown in position to be applied. Fig. 2 is a side elevation, partly in vertical section, of the same, with the parts in place. Fig. 3 is a cross-section taken on the line 3—3 of Fig. 2. Fig. 4 is a perspective view of a drill-bit and shank of slightly modified construction, and Fig. 5 is a side elevation of the same.

In Figs. 1 and 2, 1 represents the drill-bit,

which is provided with the usual cutting-edge (shown at 2 in Figs. 4 and 5), and in the shank of said bit is formed a recess 3 in which the reamer 4 is mounted to rock on a removable pin 5, engaging a semicircular recess in the reamer. The reamer is provided with lateral flanges 6, 6, which limit its outward movement, engaging under shoulders 7, formed on the sides of the recess 3 in the shank. The upper shoulder 8 of the recess 3, in which the reamer is mounted, is inclined as shown, so that the end of the reamer, when in operative position, fits squarely against said shoulder, which thereby takes all the thrust, the reamer at that time not being in actual contact with the fulcrum pin 5. The means, for normally projecting the cutting end of the reamer and for forcing it solidly up against said shoulder 8, consists of a block 9, slidably mounted in a socket 10 formed in the bottom of the recess 3, and pressed out by springs 11, mounted in the inner end of said socket and surrounding screw-pins 12, passed through the back of the shank. These pins have small holes 13 drilled through them, to relieve the air pressure caused by the inward movement of said block in the socket. This block bears against the side 14 of a substantially rectangular recess or notch 15, cut in the lower end of the reamer, the inclination of said side being such that the end of said block fits squarely thereagainst when the reamer is projected into operative position. At the same time, the upper side of the end of said block bears against the upper side 16 of said recess or notch, whereby the reamer is solidly wedged between said block and the upper shoulder 8 of the recess and is held as rigidly as if it were an integral part of the bit. To enable the reamer to be removed, a transverse, dovetail guide-way 17 is formed in the shank at the bottom of the recess 3, and in this guide-way is slidably mounted a small block, 18, the surface of which, when in position, is flush with the surface of the shank. This block is held in place by a screw 19 and prevents endwise movement of the reamer. By withdrawing the said block, and the fulcrum-pin 5, the reamer can be slid forwardly out of the recess 3.

In the form shown in Figs. 4 and 5, one side of the recess 3 is cut away and the

shoulder 7 on that side is carried by a removable side-plate 20, said plate having a dovetail recess 21, fitting over a similarly-shaped projection 22, formed in the side of the shank, and having inclined ends fitting under the undercut shoulders 8 at the ends of the recess 3. This plate is secured in place by screws, engaging in the holes 23. In this form the reamer is mounted to rock on a transverse, semi-circular rib 24 formed integrally with the shank. To retract the reamer, the bit is pulled up smartly against the lower end of the tubular casing, whereby the spring is compressed and the reamer takes the position shown in Figs. 2 and 5.

The operation of the improved drill-bit and reamer will be understood from the above description. The essential features of the improvement are the means whereby the reamer is solidly clamped in the bit-shank when projected for cutting and whereby, at the same time, no opening is left below the end of the reamer for dirt to get in behind it.

Having thus described my invention, what I claim is:—

1. A combined drill-bit and reamer, comprising, in combination, a drill-bit having a recess, a reamer mounted to rock in said recess and having a notch in its lower end, shoulders on the sides of said recess and flanges on the sides of the reamer, which limit the outward movement of the latter, and a spring-pressed block mounted in the bit behind the lower end of the reamer and having a bearing on both sides of the notch in said end when the reamer is in operative position, whereby the reamer is rigidly held in the bit when protruded therefrom and the end of said block closes the recess beneath the end of the reamer against admission of dirt.

2. A combined drill-bit and reamer, comprising, in combination, a drill-bit and its shank, the latter having a recess formed therein, a reamer mounted in said recess, and a spring-pressed block engaging behind and beneath the cutting end of the reamer and normally forcing said end outwardly

into operative position, at the same time forcing the upper end of the reamer against the upper shoulder of said recess and closing the space in said recess below the end of the reamer.

3. A well-drilling tool, comprising a drill-bit having a recess in its shank and a fulcrum-bearing therein, a reamer mounted on the fulcrum-bearing in said recess, means tending to rock said reamer into operative position, said means having a bearing behind and beneath the lower end of the reamer, whereby, as it forces said end outwardly, it also lifts the reamer off its fulcrum-bearing and forces its upper end against the upper shoulder of said recess, said means also closing the space beneath the lower end of the reamer and the lower shoulder of said recess, and removable means secured to the shank adjacent to the recess to normally prevent removal of the reamer.

4. A well-drilling tool, comprising a drill-bit having a recess sunk in one side, said recess having an inclined upper end, a transverse fulcrum in said recess, a reamer mounted to rock on said fulcrum, cooperating means on the sides of the reamer and recess to limit the outward movement of the former, the wall of the recess near the bottom of the latter having a socket sunk therein, a block slidably mounted in said socket, a spring behind said block, the outer end of said block being so shaped as to press the reamer, when in operative position, upwardly against the said inclined upper end of the recess and at the same time to fill the space beneath the lower end of the reamer, so as to prevent the entrance of dirt, and removable means secured to said shank to prevent removal of the reamer.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RAYMOND EDWARD KORTS.

Witnesses:

MAC ELBREW,

DANIEL L. GILKEN.