

No. 654,164.

Patented July 24, 1900.

H. J. LAWRENCE.
EXPANSION DRILL.

(Application filed Oct. 12, 1899.)

(No Model.)

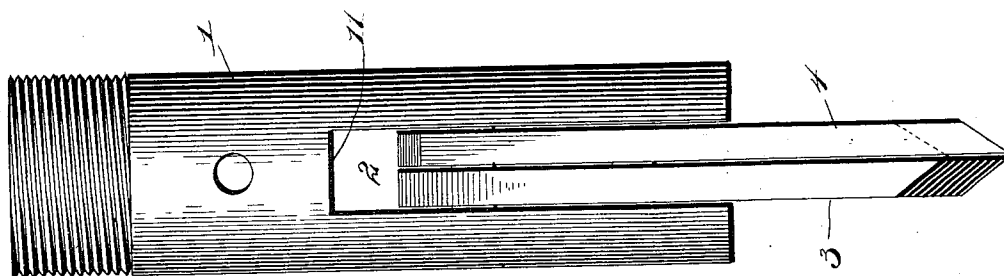


Fig. 3.

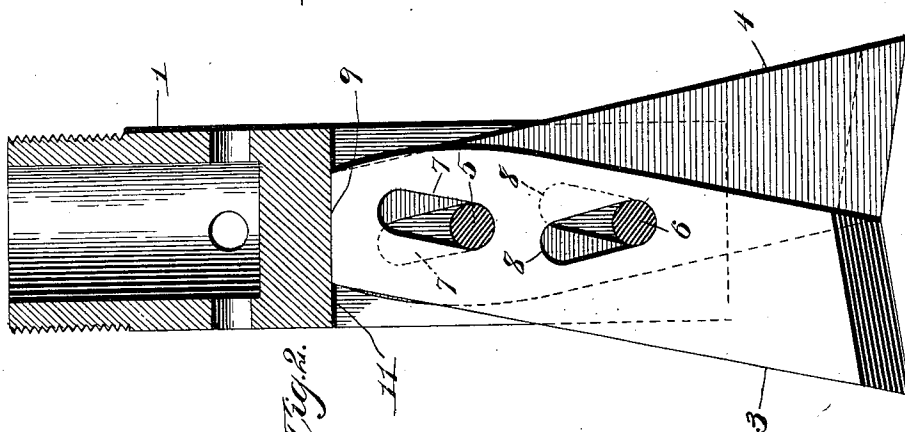


Fig. 2.

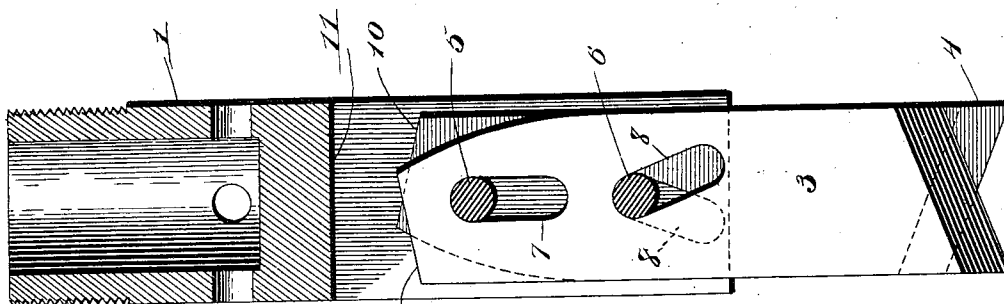


Fig. 1.

Witnesses

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EXPANSION-DRILL.

SPECIFICATION forming part of Letters Patent No. 654,164, dated July 24, 1900.

Application filed October 12, 1899. Serial No. 733,402. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. LAWRENCE, a citizen of the United States, residing at Elmore, in the county of Faribault and State of Minnesota, have invented certain new and useful Improvements in Expansion-Drills, of which the following is a specification.

My invention relates to an expansion-drill adapted especially for drilling wells; and it consists of the combination, with a drill-stock, of expanding wings or cutters of novel construction and improved means for protecting the securing-rivets of the cutters from undue strain and damage.

It has been proposed heretofore to employ a pair of overlapping expansible wings or cutters supported within a socket by a rivet extending through straight longitudinal slots formed in the upper ends of the cutters. This construction is defective, however, for the reason that the expansion or divergence of the cutters is effected entirely by the contact of the lower inclined ends of the cutters with the material being drilled, and hence when the angle of the lower ends of the cutters is changed by wear from an obtuse angle to an approximately-straight horizontal edge no expansion of the cutters is possible. My invention aims to remedy this defect and to provide overlapping cutters which will expand freely without regard to the inclination of their lower edges, the expansion or divergence not depending upon the angle of the lower edges of the cutters.

A further object of the invention is to provide a solid surface or stop against which the upper ends of the cutters strike after said cutters have been expanded to their full limit.

The construction of the improvement will be fully described hereinafter in connection with the accompanying drawings, which form a part of this specification, and its novel features will be defined in the appended claim.

In the drawings, Figure 1 is a vertical sectional view of a drill embodying my invention, showing the cutters in contracted position. Fig. 2 is a similar view showing the cutters expanded, and Fig. 3 is a side elevation of

the drill-stock, showing an edge view of the cutters.

The reference-numeral 1 designates the drill-stock, formed at its lower end with a vertical slot 2, within which the overlapping cutters 3 and 4 are secured by parallel transverse rivets 5 and 6, passing through elongated slots 7 and 8, formed in the cutters. The elongated slots 7, formed near the upper ends of the cutters, extend vertically in the direction of the length of the cutters, and the lower slots 8 of the cutters are inclined in opposite directions, as clearly shown in Figs. 1 and 2. The upper ends 9 and 10 of the cutters 3 and 4 are inclined in opposite directions, so that when the cutters are in their expanded position their upper edges will present horizontal surfaces which abut against the horizontal upper wall 11 of the slot 2. The lower ends of the cutters are preferably inclined transversely and beveled, as shown.

The operation of the drill constructed as above described is as follows: When the lower ends of the cutters strike the material to be operated upon, the lower rivet 6, acting upon the walls of the oppositely-inclined slots 8, forces the cutters apart, and when said cutters are expanded to their full limit, as shown in Fig. 2, their upper inclined ends will present horizontal surfaces which will be struck by the horizontal wall 11 of the slot 2, which receives the thrust of the cutters, thus protecting the rivets from undue strain.

I claim—

An expansion-drill comprising a drill-stock slotted vertically at its lower end, in combination with overlapping expansible cutters formed with vertical elongated slots and oppositely-inclined elongated slots, and having their upper ends oppositely inclined: and securing-rivets one of which extends through the vertical slots of the cutters and the other through the oppositely-inclined slots thereof.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY J. LAWRENCE.

Witnesses:

E. BOBCK,

P. H. WILLIAMS.