

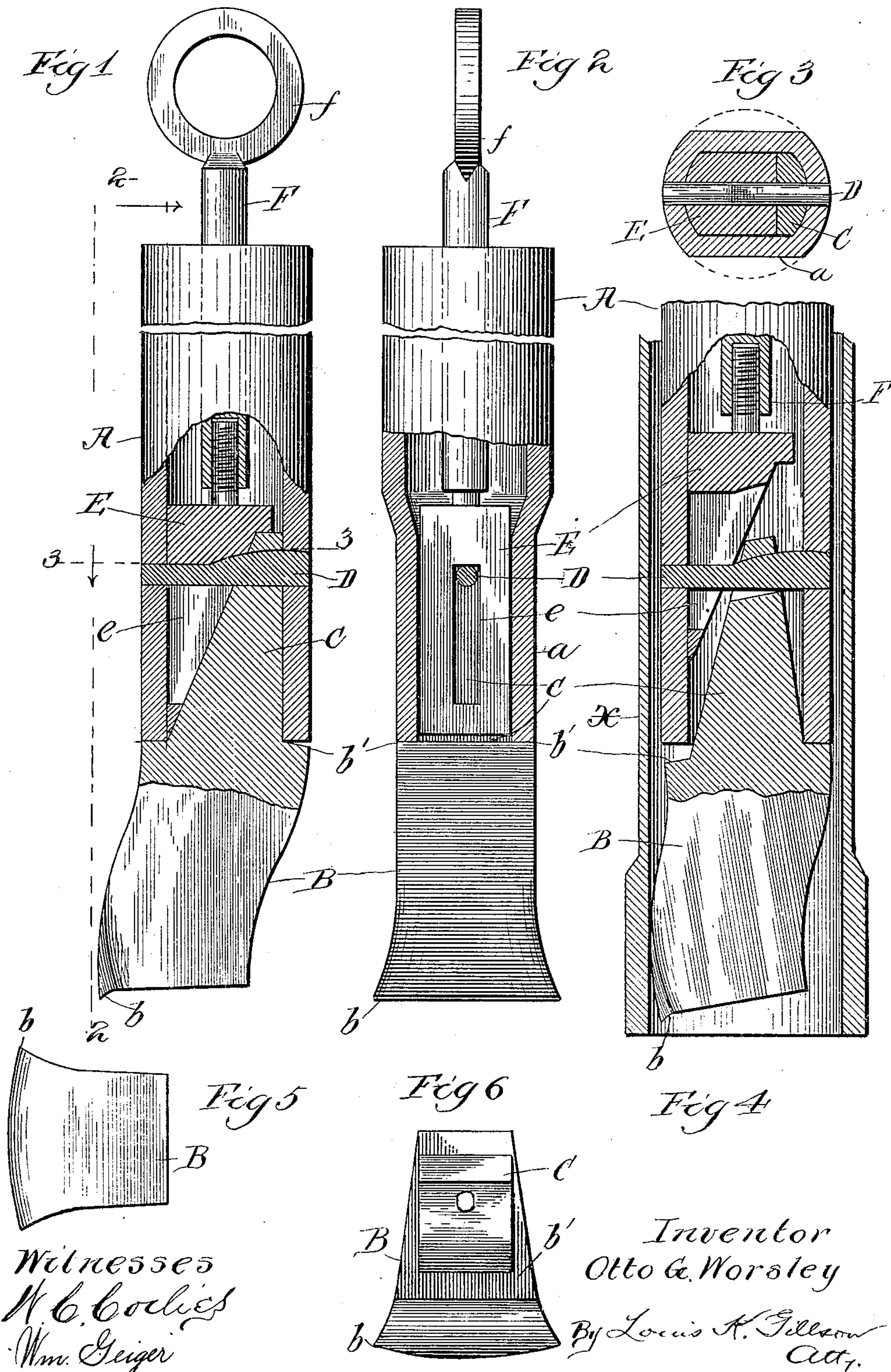
No. 631,517.

Patented Aug. 22, 1899.

O. G. WORSLEY.
EXPANSION ROCK REAMER.

(Application filed Oct. 6, 1898.)

(No Model.)



UNITED STATES PATENT OFFICE.

OTTO G. WORSLEY, OF NEWARK, ILLINOIS.

EXPANSION ROCK-REAMER.

SPECIFICATION forming part of Letters Patent No. 631,517, dated August 22, 1899.

Application filed October 6, 1898. Serial No. 692,790. (No model.)

To all whom it may concern:

Be it known that I, OTTO G. WORSLEY, a citizen of the United States of America, and a resident of Newark, county of Kendall, and State of Illinois, have invented certain new and useful Improvements in Expansion Rock-reamers, of which the following is a specification, and which are fully illustrated in the accompanying drawings, forming a part thereof, in which—

Figure 1 is a detail side elevation of the reamer, partly in section. Fig. 2 is a similar view taken on the line 2 2 of Fig. 1. Fig. 3 is a transverse section on the line 3 3 of Fig. 1. Fig. 4 is a detail longitudinal section, partly in elevation, showing the tool as being withdrawn from or inserted into the casing. Fig. 5 is a bottom plan view of a cutter, and Fig. 6 is a plan view of the same.

The objects of the invention are to provide a simple, cheap, and efficient reamer for use in smoothing the walls of a shaft sunk through rock, the tool being adapted to be inserted through the permanent casing of the shaft and expanded after emerging from the lower end of this casing, so as to act upon the wall of the shaft, cut at a greater diameter than the casing. These ends are attained by means of a tubular stock, to the lower end of which a cutting-blade is applied, so that when in position for action its cutting edge projects laterally a sufficient distance to act upon the wall of the shaft, the bore of which is sufficient to receive the permanent casing; the blade being held in its operative position by means of a removable wedge, which may be withdrawn or advanced from the top of the shaft, so as to allow the cutting edge of the blade to swing inwardly to permit the tool to be withdrawn through the casing or to throw such edge outwardly to its operative position.

The tubular stock is shown at A and will of course be of such length as may be required by the depth of the shaft, and it may be made in sections or joints in the usual manner of constructing tools of this class. The lower end of the stock is preferably flattened on one of its diameters, as indicated at a. The blade B is fitted to the end of the stock and in order to be of sufficient strength is made quite massive. The form of its body is not material. As shown, it is substantially

oblong, rectangular in cross-section, the cutting edge being at its end and across one side thereof, which is somewhat extended in the form of wings, as shown. The side face of the blade, which terminates in the cutting edge, is inclined outwardly. The blade is provided with a wedge-shaped shank C, adapted to extend into the chamber of the stock and being transversely apertured for the reception of a pin D, set across the stock for holding the blade in place. The upper end of the body of the blade is provided with a continuous shoulder b', adapted to abut against the end of the stock. One face of the shank C is substantially parallel with the axis of the blade, and the opposite face is beveled.

A wedge-block E coöperates with the beveled face of the shank C and by its advance throws the straight side of the shank against the inner wall of the stock, bringing the shoulder b' to a continuous bearing against the end of the stock and extending the cutting edge b of the blade laterally beyond the line of the outer surface of the stock and of the casing X, through which it is inserted. The block E has an oblong aperture e, through which the pin D extends, this aperture being of sufficient length to allow of the withdrawal of the wedge-block, so as to permit the upper end of the shank C to swing toward the axis of the stock and permit the cutting edge of the blade to be withdrawn, so that it may pass through the casing X. In order to permit the blade to be brought to this position, as shown in Fig. 4, the pin D is made tapering in form or so constructed or placed that its upper face is oblique to the axis of the stock, and that portion of the shoulder b' which is at the base of the straight face of the shank C is inclined outwardly, as shown in Fig. 1. The wedge-block E is controlled by means of a rod F, preferably in screw-threaded engagement with a stem projecting from the block and having at its upper end a loop f.

This tool is intended to be used after a rock-drill. The drill is apt to leave the wall of the shaft uneven or ribbed, and the reamer is used to smooth this surface. It is often desirable in practice to insert a permanent casing into the shaft as the latter is sunk, and in order to do so it is essential that the cutting-tool be capable of lateral extension and

contraction to the end that it may be inserted into and withdrawn from this casing, while being capable of cutting a shaft of sufficient bore to receive the casing.

- 5 The tool forming the subject of this application is inserted through the casing in its collapsed form, as shown in Fig. 4, and after its blade emerges from the lower end of the casing the wedge-block E is advanced so as
10 to throw the shank C against the wall of the stock and extend the cutting edge to the position shown in Fig. 1. This brings the shoulder *b'* snugly against the end of the stock, which receives the entire force of the blow
15 and entirely relieves the pin D from strain. The tool is withdrawn by first withdrawing the wedge sufficiently to allow the blade to swing inwardly.

While I have shown the means for laterally
20 moving the blade to comprise a wedge-formed shank and a wedge-block cooperating with this shank, it is obvious that I may employ a simple cam action, and I therefore do not desire to be limited to the particular form of cam
25 shown and described, as any means for positively throwing the shank to the side of the socket of the stock will come within the scope of the invention.

I claim as my invention—

- 30 1. In a rock-reamer, the combination with a stock having an end socket, and a blade having a shank for entering the socket, and an annular shoulder adapted to abut against the end of the stock and a cutting edge projecting laterally beyond the periphery of the
35 stock when the shoulder is adjusted to the stock end, of flexible connection between the blade and stock, whereby the blade may swing inwardly and away from the stock end,
40 and means for extending the blade laterally.

2. In a rock-reamer, the combination with

a stock having an end socket, of a blade adjusted to the socket and having an annular shoulder adapted to bear against the end of the stock, and a cutting edge projecting laterally beyond the periphery of the stock when
45 such shoulder is adjusted to the stock end, a pivotal support for the blade permitting it to swing inwardly, and means for extending the blade laterally.

3. In a rock-reamer, the combination with
50 a socketed stock, a blade having a wedge-shaped shank adapted to enter the socket, and a wedge-block for cooperating with the shank to move it laterally, of a cross-bar within the socket for engaging the shank to prevent the withdrawal of the blade, such bar
55 having its inner face oblique to the axis of the stock.

4. In a rock-reamer, the combination with
60 a socketed stock, of a blade having a wedge-shaped shank adapted to enter the socket, and a shoulder for bearing against the end of the stock, a wedge-block cooperating with the shank to move it laterally, and an inclined
65 cross-bar within the socket and in engagement with the shank.

5. In a rock-reamer, the combination with
70 a socketed stock, a blade having a transversely-apertured wedge-shaped shank for entering the socket and a shoulder for bearing against the end of the stock, and a cross-bar obliquely crossing the socket and passing through the aperture of the shank, of a wedge-block cooperating with the shank to move it
75 laterally, and a rod leading from such block through the rear end of the stock whereby the block may be controlled.

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Witnesses:

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