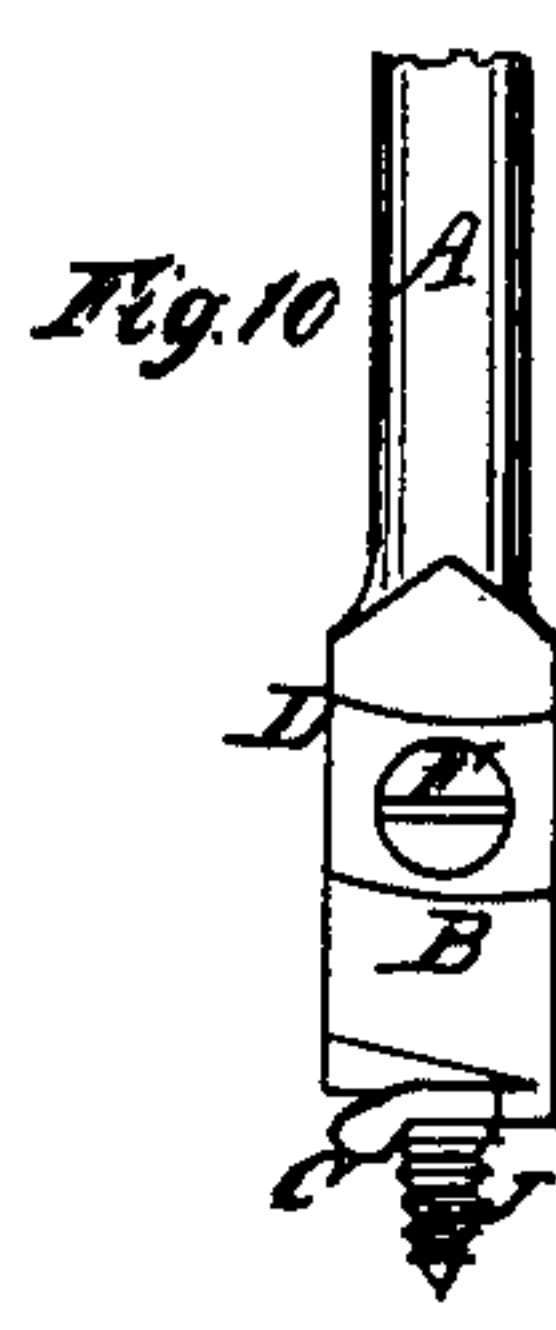
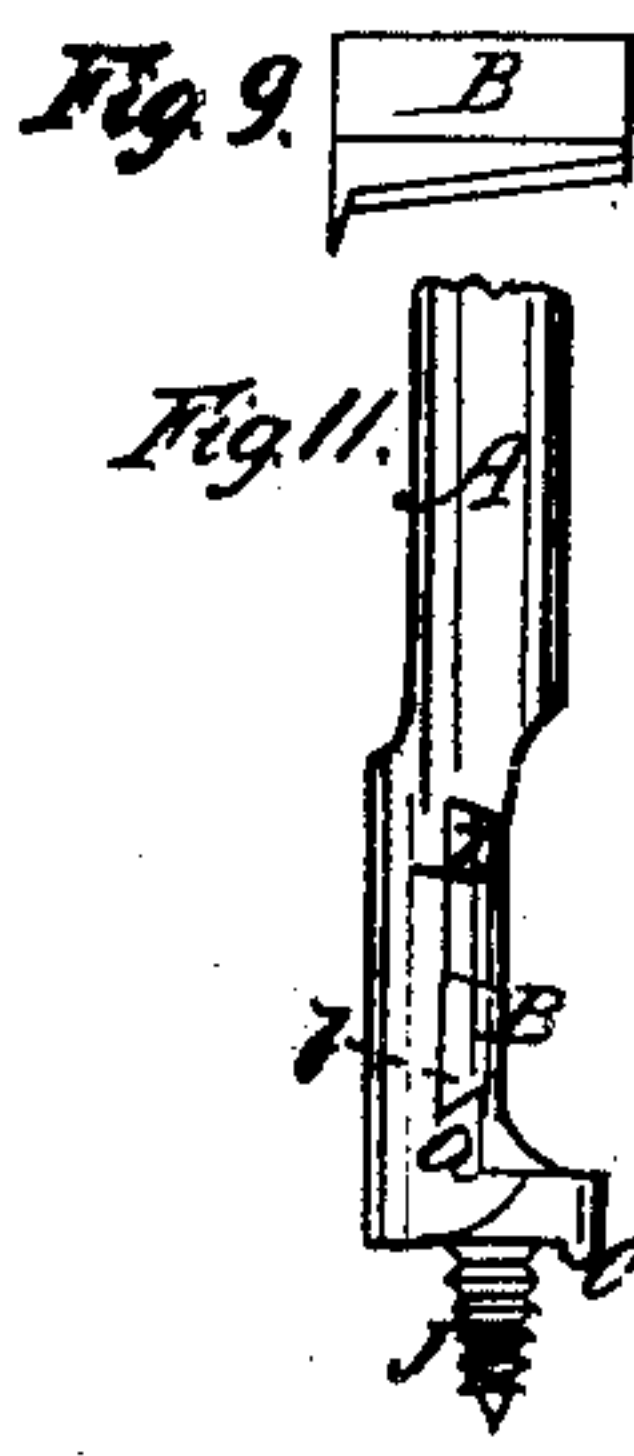
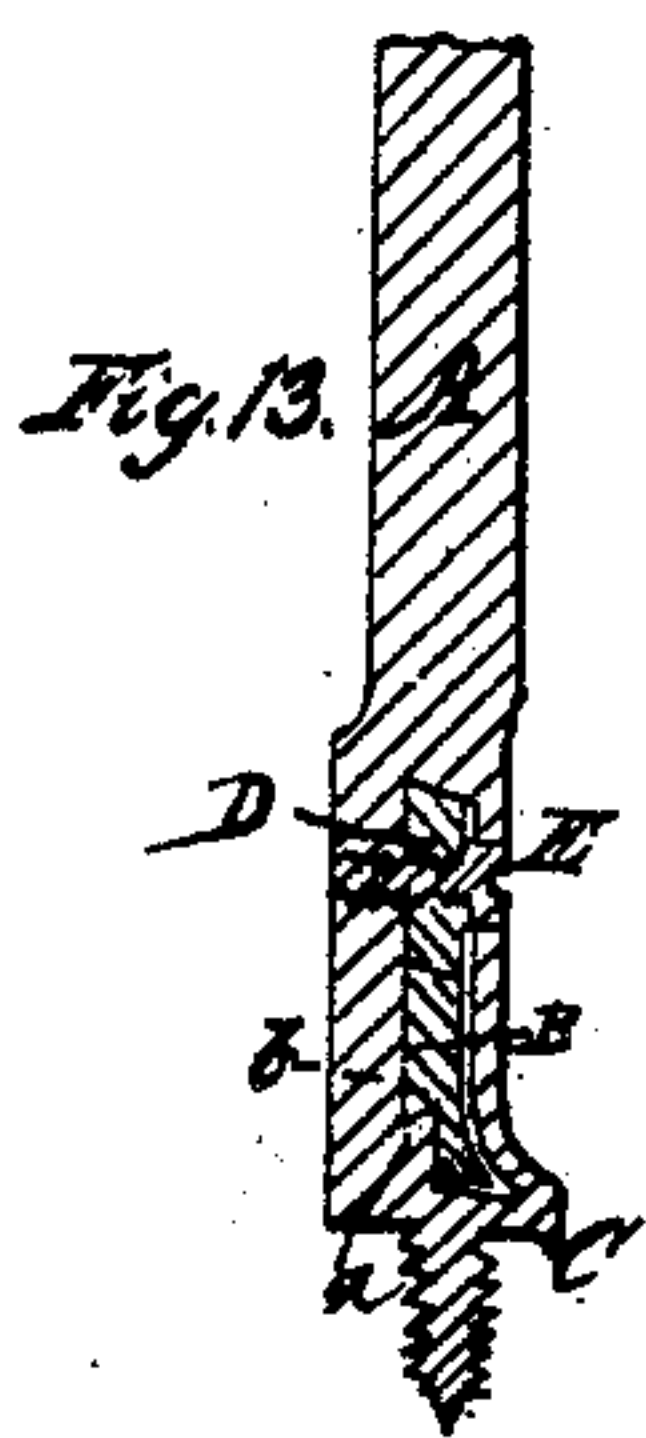
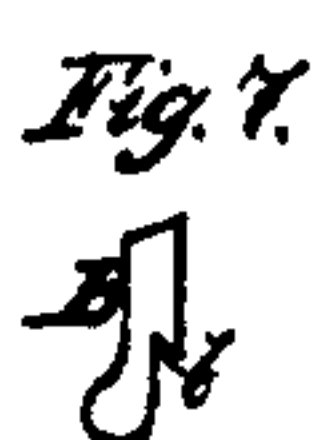
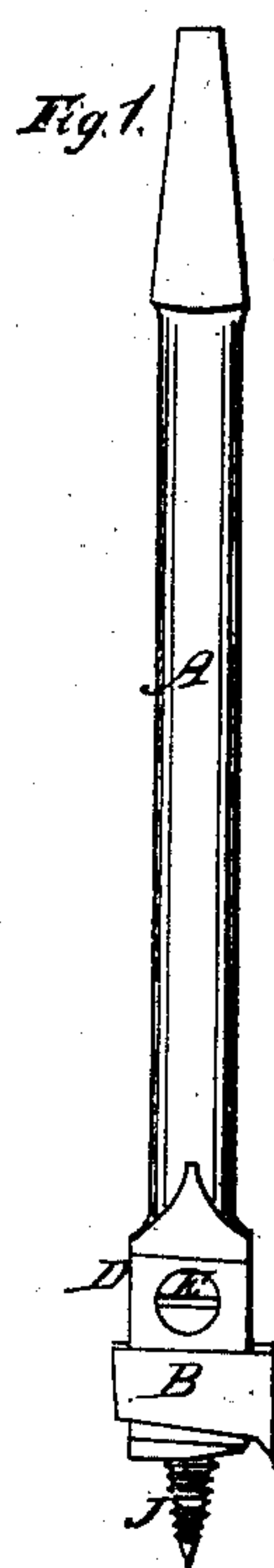
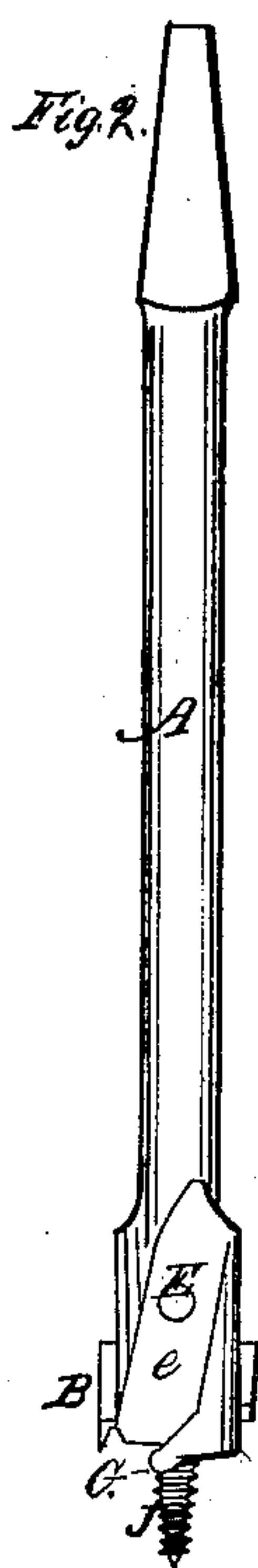
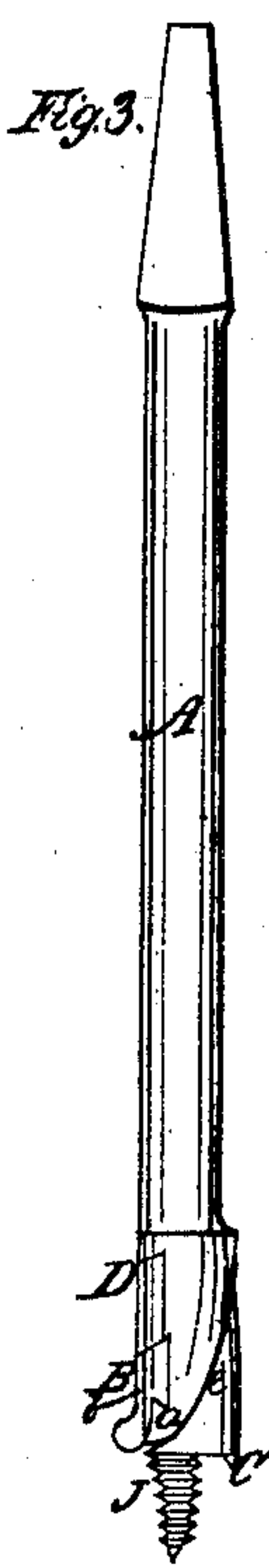
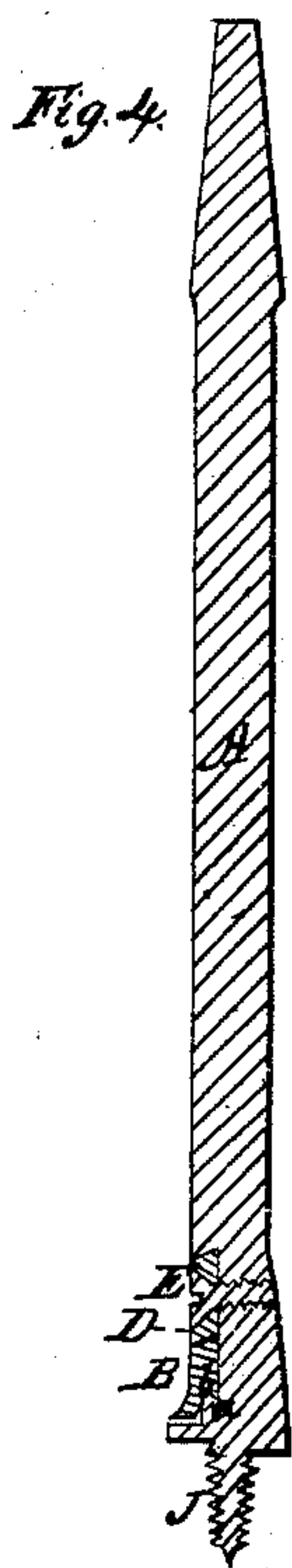


W. A. Clark.

Expansion Bit.

N^o 20,192.

Patented May 11, 1858.



UNITED STATES PATENT OFFICE.

W. A. CLARK, OF BETHANY, CONNECTICUT.

METHOD OF SEATING THE MOVABLE CUTTER IN EXPANSIVE BITS.

Specification forming part of Letters Patent No. 20,192, dated May 11, 1858; Reissued June 22, 1869, No. 3,516.

To all whom it may concern:

Be it known that I, WILLIAM A. CLARK, of Bethany, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Expansive Bits, the construction and operation of which I have described in the following specification and illustrated in the accompanying drawings with sufficient clearness to enable competent and skilful workmen in the arts to which it pertains or is most nearly allied to make and use my invention.

My said invention consists in the mode hereinafter described, of constructing the movable cutter and the recess in which it is secured, by which the edge of this cutter is relieved from pressure, and effectually secured from vibration in the stock while operating, as hereinafter more fully set forth.

In the accompanying drawings Figure 1 is a side elevation of my improved bit. Fig. 2 is also an elevation showing the side opposite to that shown in Fig. 1. Fig. 3 is an elevation, its plane of projection being transverse to Figs. 1 and 2. Fig. 4 is a sectional elevation, its plane of projection being parallel to that in Fig. 3; but transverse to that of Figs. 1 and 2. Fig. 5 is a side elevation of the movable cutter. Fig. 6 is a reverse view of it. Fig. 7 is an end elevation. Fig. 8 is an inverted plan, or in other words an under side view. Fig. 9 is a back side elevation of a cutter so made as to always keep the movable cutter at just the same distance behind the point of the bit while at the same time the depth of wood left to support the central portion of the bit is varied by the adjustment of said cutter. Fig. 10 is a side elevation of a bit embodying the same novel features as represented in the previous figures but the stationary cutting lip is formed in such a position upon the bit as to throw its chips in front of the movable cutter, which arrangement avoids the necessity of filing away the backside of the bit to allow the chips to pass. Fig. 11 is an elevation transverse to Fig. 10. Fig. 12 is a back side elevation of the same bit. Fig. 13 is a vertical section showing the same movable cutter secured in the same way in a mortise instead of in a recess in the body of the bit.

Bits with movable cutters secured in a mortise in the shank or stock have been long

known; but the modes which have been adopted for securing these cutters have been more or less objectionable, so much so as to interfere with their general use. One objection is that the bit, or more properly the movable cutter, being secured by being keyed down upon the bottom of the mortise, the cutting edge of this movable cutter rests upon the middle of the stock, which not only destroys the cutting edge of wood boring tools but also precludes such an arrangement as would allow a greater depth of wood to be left contiguous to the central cutter or stock to support it, when a larger cutter is put in, or a larger hole bored which requires such support for the stock.

My improvement forms a groove in the movable cutter back of its cutting edge, and supports this groove upon a V shaped ledge in the stock, while at the same time it is so keyed at the top as to effectually keep the cutter from vibrating in the stock.

In the drawings, A is the shank of the bit upon which the inner or stationary cutter is formed, and in which the recess or mortise is made which receives the movable cutter B. The construction of the shank, and of the cutting lip permanently attached to it is very much the same as those of other expansive bits; but the mode of securing the movable cutter B in its place is different. In my bit a V shaped ledge *a*, rises from the bottom of the recess in which the cutter B is secured, to receive the V shaped groove *b* in said movable cutter. The form of the ledge *a*, and that of the groove *b* is shown in Figs. 3, 4, 11 and 13. The form of the groove is also shown in Fig. 7. The form of this groove *b* and of the ledge upon which it rests is such as to give a firm bearing to the cutter B and draw it snugly against the back of the recess when the pressure is applied which secures said cutter in place. The mode of securing this cutter is by means of the beveled plate or follower D driven home by a screw E in such a manner as to press the cutter B against the back side and bottom of the recess in which it is secured, said cutter being also beveled as shown, to facilitate the accomplishment of this purpose. The form and arrangement of these parts are shown in Figs. 1, 3, 4, 10, 11 and 13. In the first four figures the relative positions of the cutters are such as to de-

liver the chips from the stationary cutter C upon the back side of that part of the stock which supports the movable cutter; and this involves the necessity of cutting away the stock as shown at *e* in Figs. 2 and 3 to allow the chips to pass. This of course weakens that part of the stock, and makes it necessary to secure sufficient strength by retaining more metal on the side upon which the cutter B is attached; and as a consequence the edge of this cutter is thrown out too far from the center of the stock, and its efficiency of operation in different positions is thereby reduced. To obviate this difficulty I have conceived the plan of forming the lip C in that position upon the stock in which it is represented in Figs. 10, 11, 12, and 13; by which arrangement the chips from it are delivered upon that side of the stock which is cut away to receive the cutter B; which allows the opposite side to be left entire; and also so balances the operating parts as to relieve the screw J from a portion of the pressure which would otherwise be thrown upon it when in operation. This arrangement enables me to bring the edge of the cutter B nearly back to the center of the stock as shown in Fig. 11, and in large bits it may be brought farther back than it is there represented as being placed.

It may in some cases be considered desirable in the construction of very large bits to leave a portion of metal in front of the cutter B as shown in Fig. 13, for the more effectual support of that side of the bit. In this case the screw E should extend through this part, as shown.

The mode which I have above described of supporting and securing the cutter B supports it without its resting on the cutting edge, and in my construction space is left under the cutting edge as shown; and by thus supporting it, the edge of a large cutter may be set higher in the stock than it is necessary or best to set the edge of a small one, which allows more wood to be left near the stock to support it when a large cutter is used. The cutting edge of the cutter B is inclined so as to bring its working end lower than the other, for the two fold purpose of causing the unemployed end to clear the wood, and of leaving a portion of the wood around the central portion of the bit to support it, while at the same time the outer end of the cutter B shall cut nearly or quite as far in advance as the inner cutter. The seat upon which the movable cut-

ter rests at the bottom, has in most expansive bits an inclination corresponding with that of the edge of said cutter, and this feature is retained in my bit as represented in all the drawings except Fig. 9. When so constructed, the sliding of the movable cutter outward also carries its working end downward, so that when placed in its extreme outward position it will cut considerably deeper than when withdrawn so as to cut its minimum hole. It is desirable however that the depth it will cut shall be as nearly equal as possible and further it becomes necessary when the movable cutter is required to cut away a very large amount of wood to preserve a considerable shoulder of the wood adjacent to the stock for its support against the strain imposed upon it by the resistance against the movable cutter. For this purpose I make my longer cutters so that the edge shall stand a little higher in the stock than the edges of those which are intended to cut a smaller hole, which my mode of supporting the cutters upon a ledge or shoulder placed above the edge enables me to do; and this provision for giving the proper shoulder and depth of cut answers very satisfactorily for most purposes. Should greater nicety in these respects be desirable, it may be attained by the adoption of the cutter shown in Fig. 9, and the use of a horizontal V in the stock, as in this case the edge of the cutter is inclined with reference to the groove *b*, while in the cutters shown in the previous figures it is parallel to it. This arrangement causes the point of the movable cutter to always work at the same depth, and makes the depth of the shoulder in exact proportion to the distance at which the point of the cutter is set from the center.

The particular improvement which constitutes my said invention and which I claim as having been originally and first invented by me is,

The combination of the V shaped projection or seat *a*, or its equivalent with the corresponding groove in the movable cutter above the cutting edge by which I am enabled to vary the distance of the edge of the cutter B near the stock above that of the central cutter to any desirable extent, substantially as and for the purposes set forth.

WILLIAM A. CLARK.

Witnesses:

PENELOPE S. BAYNE,
THOS. P. HOW.