

No. 734,515.

PATENTED JULY 28, 1903.

H. COLLINS.
ROCK DRILL BIT.

APPLICATION FILED JULY 26, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

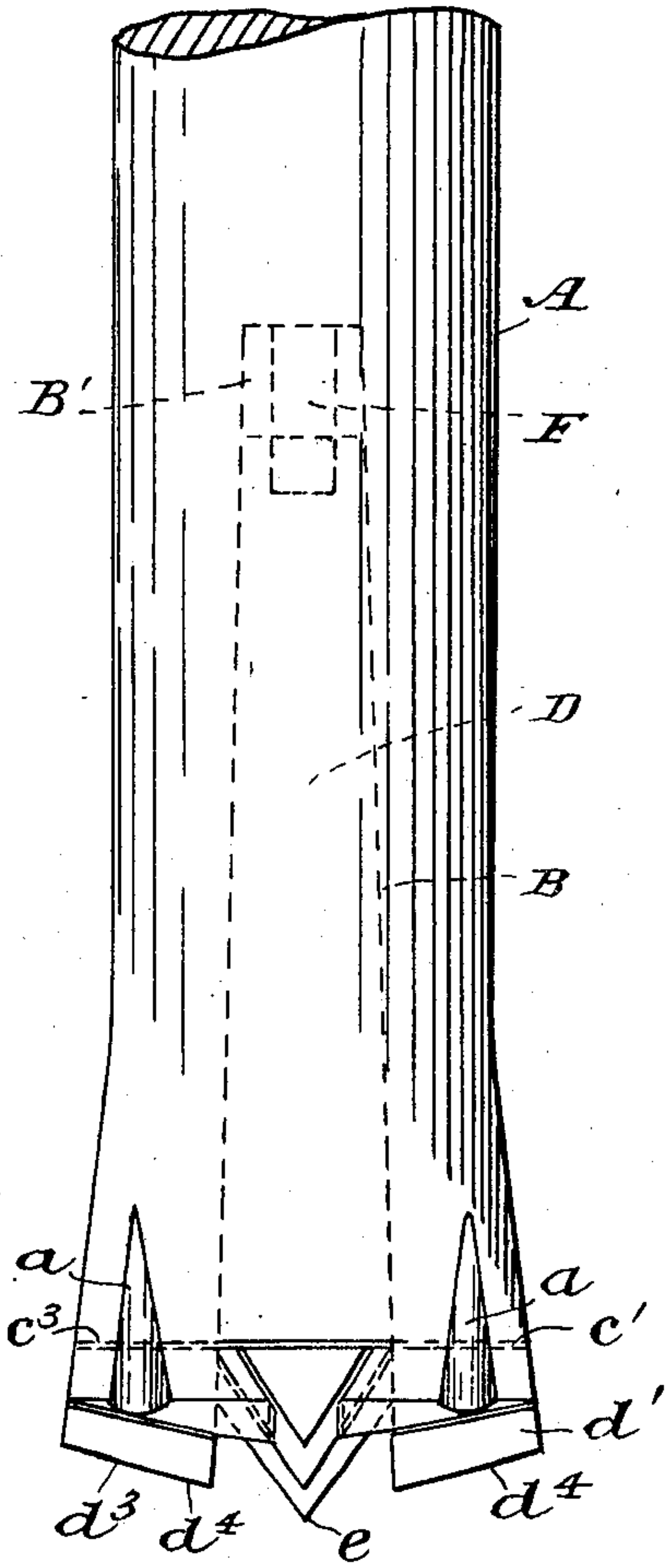


Fig. 7.

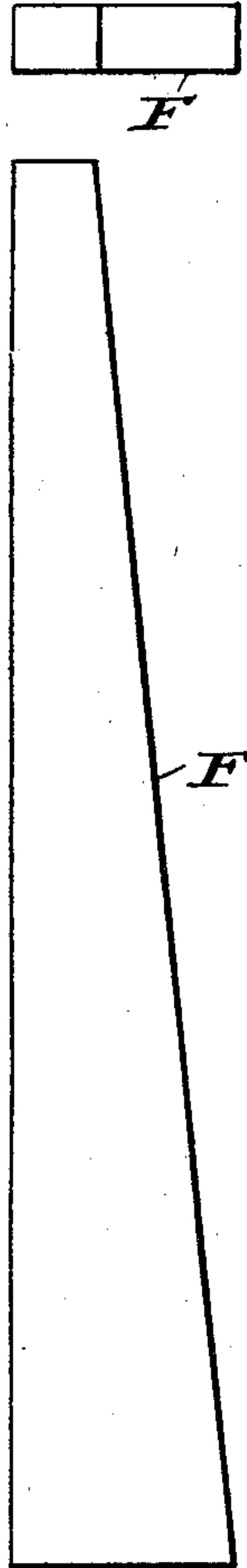


Fig. 2.

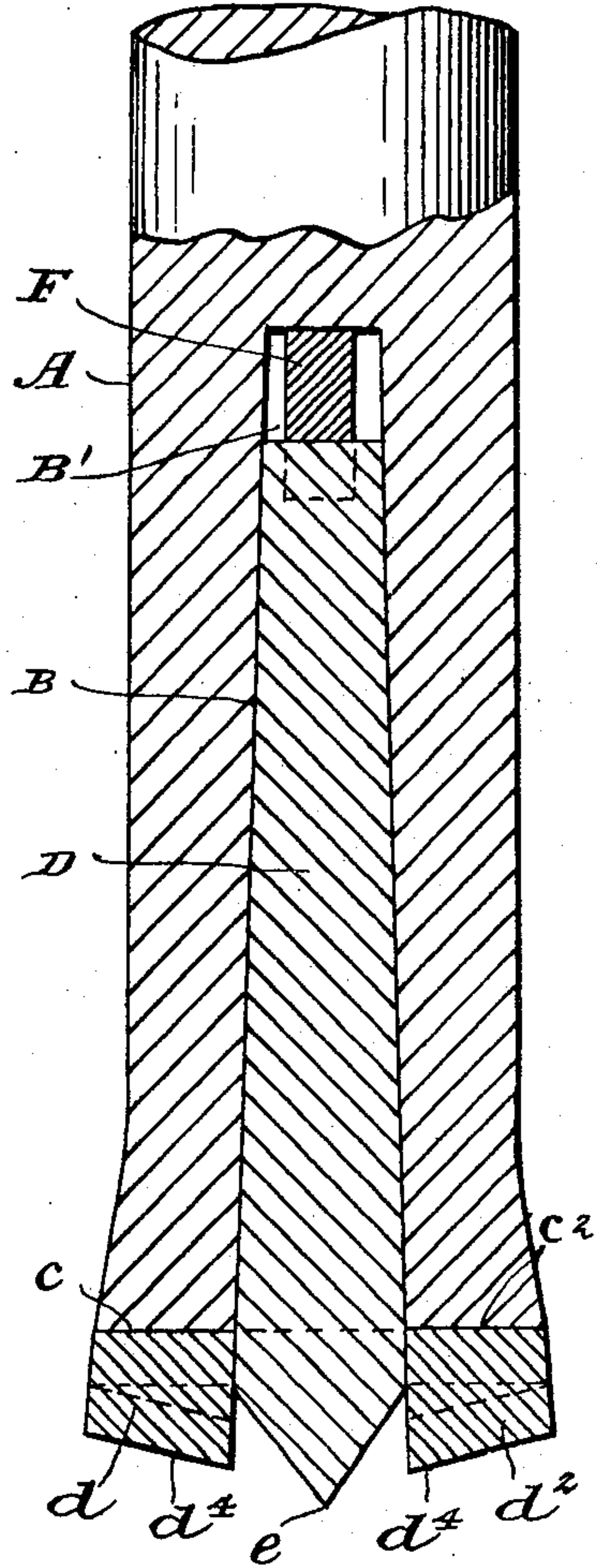


Fig. 5.

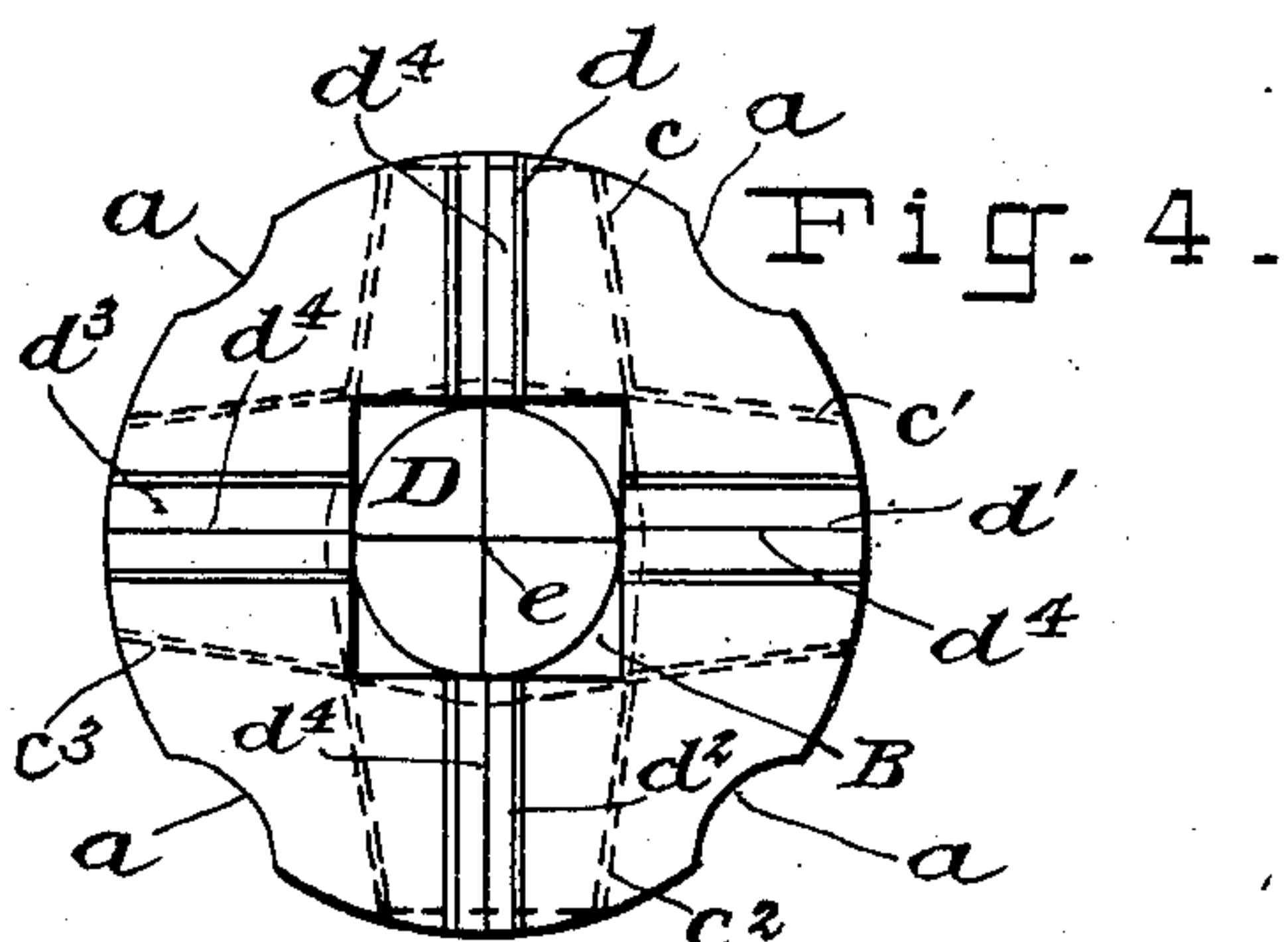
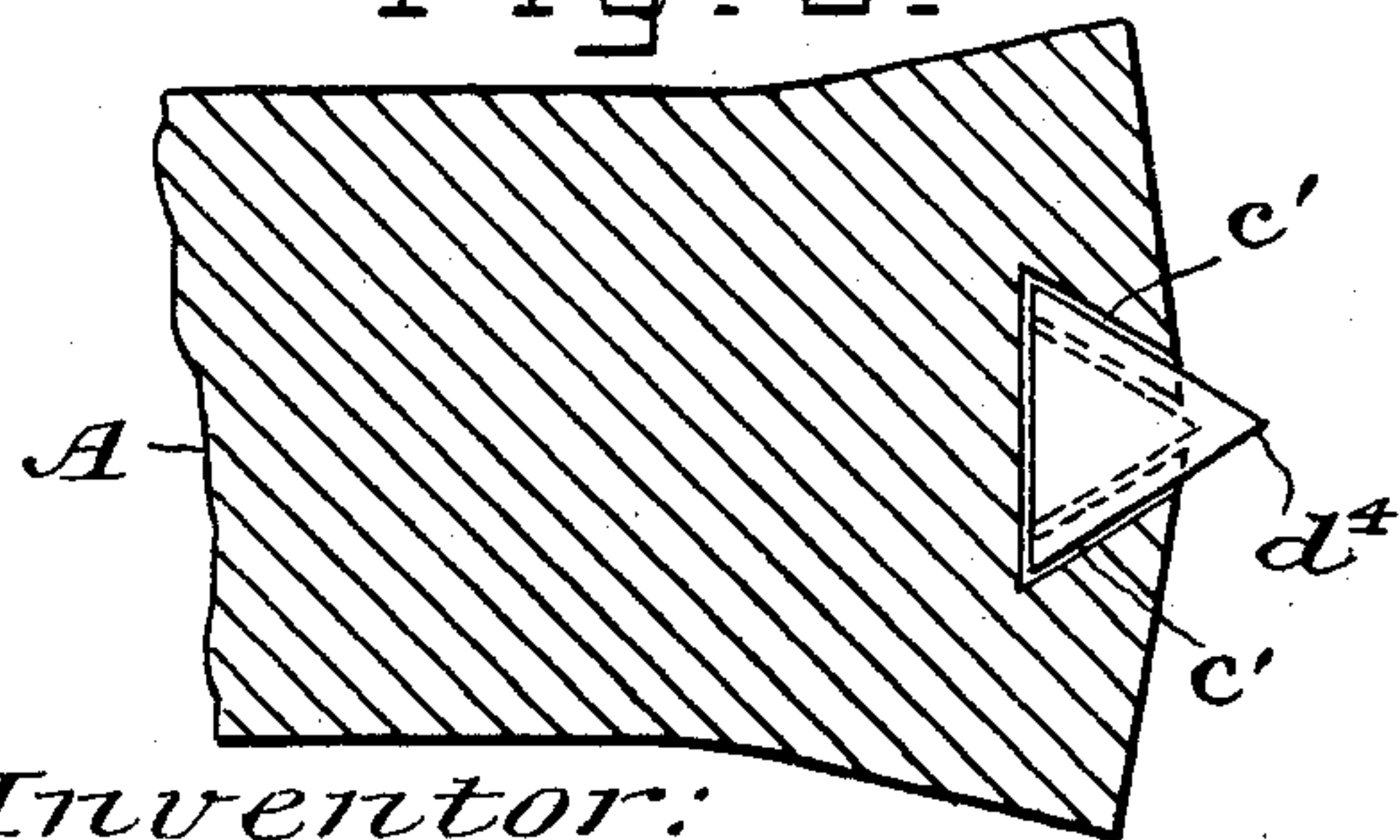


Fig. 3.



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Inventor:
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By *Richardson*
his Attorneys.

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2 SHEETS—SHEET 2.

Fig. 9.

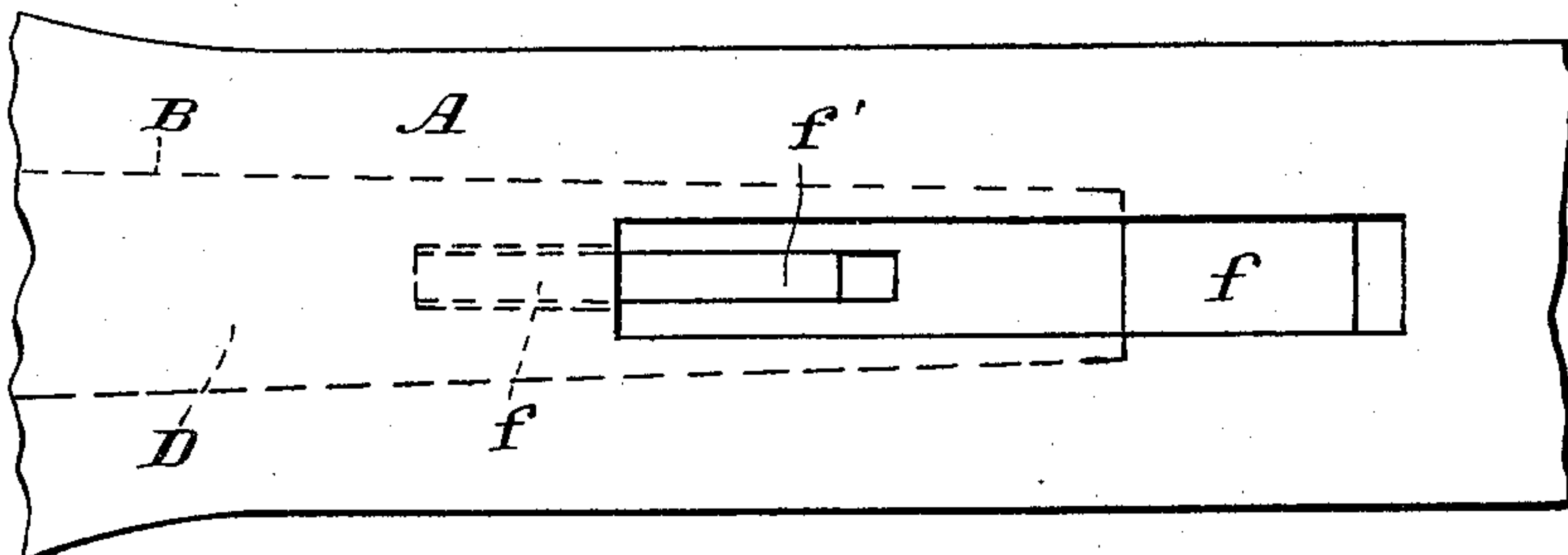


Fig. 8.

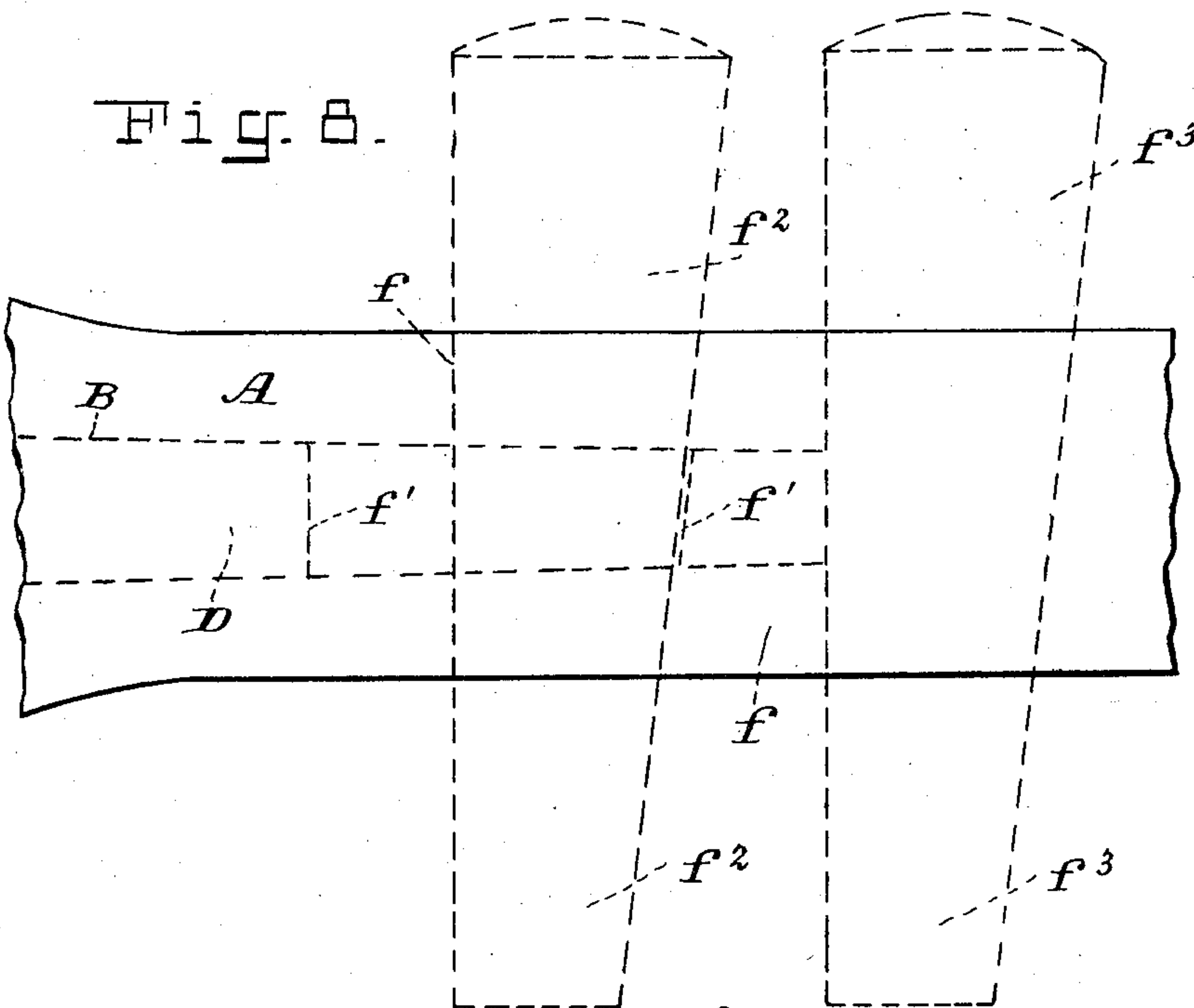
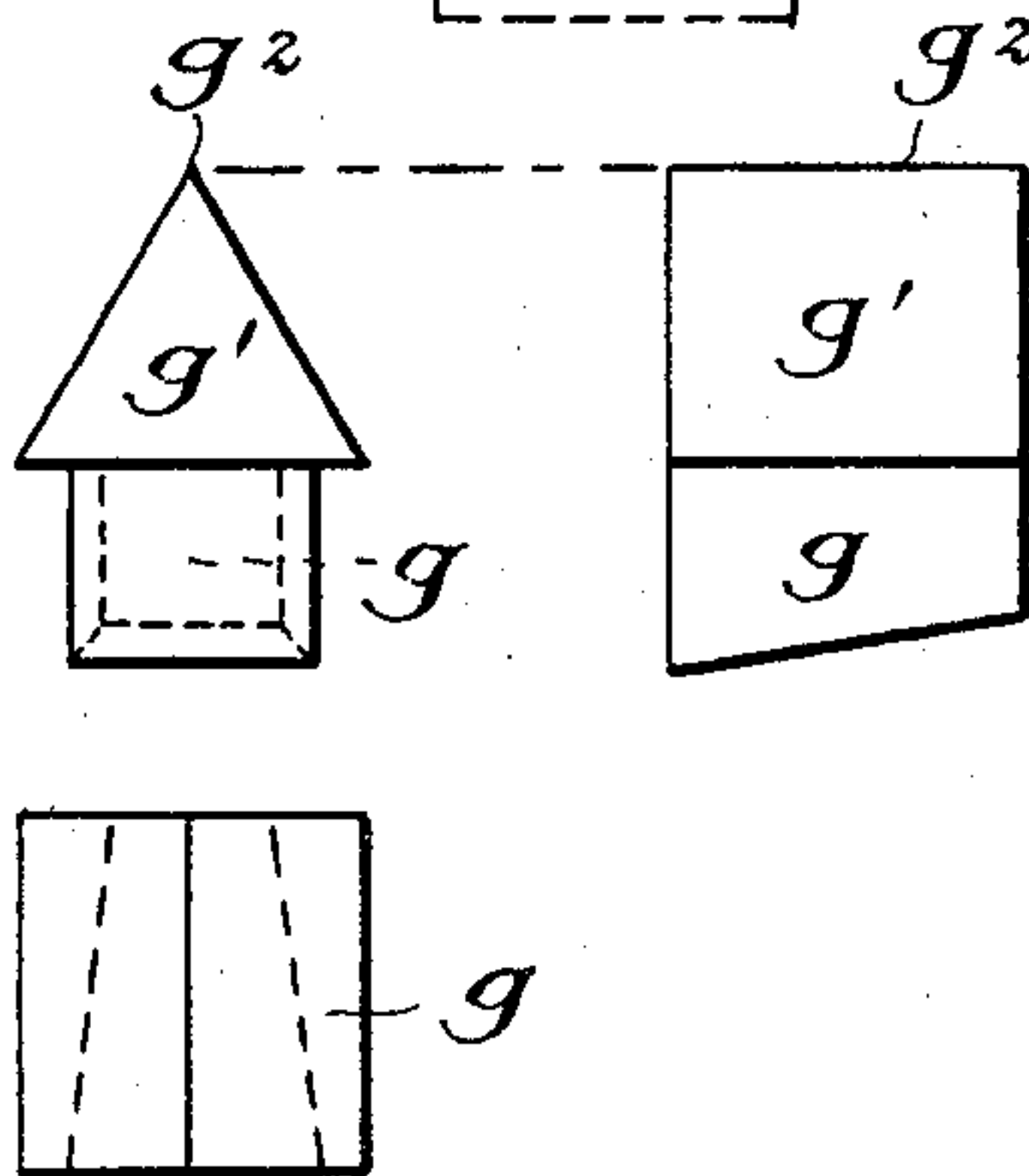


Fig. 6.

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UNITED STATES PATENT OFFICE.

HORATIO COLLINS, OF WITWATERSRAND GOLD FIELDS, TRANSVAAL,
SOUTH AFRICA.

ROCK-DRILL BIT.

SPECIFICATION forming part of Letters Patent No. 734,515, dated July 28, 1903.

Application filed July 26, 1902. Serial No. 117,159. (No model.)

To all whom it may concern:

Be it known that I, HORATIO COLLINS, a citizen of the United States, residing on the property of the Paarl Central Gold Mining Company, Limited, Witwatersrand Gold Fields, Transvaal, South Africa, have invented certain new and useful Improvements in Rock-Drill Bits, of which the following is a specification.

The present improvements are applicable either to hand rock-drills or to rock-drill bits employed in rock-drilling machines for boring holes in mining or analogous operations.

The invention relates more particularly to that class of drill-bit which is provided with removable or detachable cutting teeth or bits fitted on and secured to the cutting extremity of the drill. It is designed to provide an efficient and simple method of fastening the cutting-teeth on the end of the drill, to simplify and improve the general construction and arrangement of such drills or bits, and to produce a practicable drill of the particular kind or class referred to.

The essential feature of my invention lies in the construction or formation of the bases of the removable cutting-teeth with a taper in the direction of their lengths and in fitting said teeth in corresponding taper slots or grooves formed on the end of the drill or bit, so that they are fastened or locked in position from the center of the drill.

The invention will be particularly described by aid of the accompanying drawings, wherein a drill is illustrated constructed in accordance therewith.

In the drawings, Figure 1 is a side elevation of the drill; Fig. 2, a longitudinal section through the center of the drill; Fig. 3, a sectional view of the drill looking on the inner and larger end of one of the cutting-teeth. Fig. 4 is a plan view of the end of the drill, showing the cutting-teeth locked in position thereon; Fig. 5, a view of one of the cutting-teeth detached viewed from the outer and smaller end. Fig. 6 shows several views of a modified form of cutting-tooth. Fig. 7 represents the cotter for displacing or removing the center key, which locks the removable cutting-teeth in position. Fig. 8 shows in elevation an arrangement for fastening or

loosening the locking-key to fix or remove the cutting-teeth, and Fig. 9 is a plan of Fig. 8.

The drill is indicated in the drawings by the reference-letter A. It is made slightly larger in diameter at the bit end or cutting extremity, as shown, so as to afford clearance for the shank as the boring proceeds.

a represents grooves formed in the drill end between the outer extremities of the several cutting-teeth to allow the disintegrated or powdered rock to pass away from the cutting-face of the drill.

The end of the drill in which the cutting-teeth are arranged and fastened is beveled off from the center to the edge or made slightly convex, as shown more particularly in Figs. 1, 2, and 3, for a purpose to be hereinafter explained.

In the center of the drill a longitudinal taper hole B is formed for a suitable portion of its length, and intersecting the hole B is a transverse cotter-hole B'.

Across the convex or beveled end or face of the drill are cut four horizontal and equidistant radial slots *c c' c² c³* of angular section. These slots are made taper from the center to the edge of the drill, as is clearly illustrated by the dotted lines in Fig. 4. In the several horizontal slots *c c' c² c³* are fitted removable or detachable cutting-teeth *d d' d² d³*, one edge *d⁴* of which projects beyond the slot in the face of the drill and constitutes the cutting edge. In the construction shown in Figs. 1 to 5 of the drawings those teeth are of triangular section. They are made with a taper in the direction of their length to correspond to the slots in which they fit. This formation of the teeth causes the cutting edge to assume an upwardly-inclined direction from the edge to the drill center when they are arranged in the horizontal slots.

The convexity of the end of the drill provides a deeper setting for the several teeth *d d' d² d³* at their inner ends or toward the center of the drill.

In the case of the cutting-teeth shown in Fig. 5 it is to be noted that when one edge is worn away they may be turned to present another edge on the face of the drill. The several teeth are placed in the angular slots from

the center of the drill, and when arranged therein they cannot be removed without being again drawn toward the center of the drill to disengage the slots. A piece of metal shaped to fit between the cutting-teeth and the angular slots may be employed as a removable setting to protect the angular slots in the drill end. In the central taper hole B is fitted a taper key D, which is driven in to fix or secure the several cutting-teeth in the horizontal angular slots. The key D bears against or engages the inner ends of all the cutting-teeth and operates to force them tightly into the angular slots and to lock or retain them in that position. It is shown formed with a point or conical outer extremity e between the teeth. The locking taper key D may be driven from the outer end or by the arrangement hereinafter described. To displace or remove the key D, the transverse hole B' is formed through the drill-shank so as to intersect the hole B beyond the key D when it is in its locking position. The key may be driven out to permit of the removal of the cutting-teeth as may be desired by means of the cotter F. (Shown in Fig. 7.)

In the arrangement illustrated in Figs. 8 and 9 for fastening or loosening the locking-key D the shank of the drill is formed with a longitudinal hole f and the key D with a hole f' , which partly registers or coincides with the hole f in the drill-shank when the key is in its locking position. To draw the key D inward to fasten the cutting-teeth, a cotter f^2 is driven in the holes f and f' and bearing against the front end of the hole f forces the key inward. To remove the key D to detach the cutting-teeth, a cotter f^3 is inserted between the end of the key and the rear end of the hole f and driven inward, which displaces the key.

In the modified construction of the cutting-tooth (shown in Fig. 6) it is formed with a base portion g , which is made taper in the direction of its length and fits into the angular slot in the end of the drill, and with a triangular upper portion g' , which rests at the sides on the convex face of the drill, on which is formed the cutting edge g^2 .

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In a hand rock-drill or rock-drill bit the combination with the drill or bit formed with angular grooves or slots across the end thereof of made tapering from the center to the edge of the drill, of removable cutting-teeth having their bases made with a corresponding taper in the direction of their lengths and adapted to be fitted into the tapering angular grooves in the drill end and means, located in the center of the drill, engaging the inner ends of the teeth to lock them in position.

2. In combination, in a hand rock-drill or rock-drill bit, the shank of the drill formed with a longitudinal hole in the cutting end, horizontal slots or grooves formed in the end of the drill tapering from the center to the

edge, removable tapered cutting-teeth arranged in said slots and a key located in the longitudinal hole in the drill engaging the inner ends of the several cutting-teeth to lock them in position in the taper slots.

3. In combination in a hand rock-drill or rock-drill bit, the horizontal angular grooves or slots formed across the end of the drill tapering from the center to the edge thereof, cutting-teeth of triangular section arranged in said taper slots, tapered in the direction of their length to correspond to the taper slots, and with one edge projecting beyond the face of the drill which constitutes the cutting edge, and means for fastening the teeth in position in the slots from the center of the drill.

4. A hand rock-drill or rock-drill bit constructed with removable cutting-teeth having their bases made with a taper in the direction of their lengths arranged or fitted into corresponding slots or grooves formed in the face or end of the drill, correspondingly tapered from the center to the edge of the drill-face, for the purpose of fastening the teeth in the slots from the center of the drill, and means for fastening the cutting-teeth in position.

5. In a hand rock-drill or rock-drill bit, in combination, the drill-shank formed with slots or grooves on the end or face thereof tapering from the center to the edge of the drill, removable correspondingly-tapered cutting-teeth located in said slots and a removable setting interposed between the slots and the teeth to protect the slots, and means for locking the cutting-teeth in the slots from the center of the drill.

6. In a hand rock-drill or rock-drill bit, in combination the drill-shank constructed with horizontal angular grooves or slots in the bit end thereof formed with a taper from the center to the edge of the drill, removable cutting-teeth formed with angular bases made taper in the direction of their lengths arranged in said angular grooves or slots, for the purpose of fastening the teeth in the slots from the center of the drill, a longitudinal taper hole in the end of the drill and a taper key arranged therein engaging the inner ends of the several cutting-teeth to lock them in position in the angular slots, substantially as described.

7. In a hand rock-drill or rock-drill bit, in combination, the drill-shank formed with horizontal angular slots in the end thereof tapered from the center to the edge and removable correspondingly-tapered cutting-teeth arranged in said horizontal slots, the end of the drill being beveled from the center to the edge or of convex form to afford a deeper setting for the teeth at their inner ends, and means for locking the cutting-teeth in the slots from the center of the drill.

8. In a hand rock-drill or rock-drill bit, in combination, the drill-shank provided with angular grooves in the end thereof made taper from the center to the edge of the drill, re-

movable cutting-teeth of corresponding taper arranged in said grooves for the purpose of fastening the teeth from the center of the drill, a longitudinal taper hole in the end of the drill and a taper key arranged therein engaging the inner ends of the several cutting-teeth for locking them in position, a transverse hole in the drill-shank intercepting the longitudinal hole in the drill-shank beyond the end of the locking-key and a cotter arranged therein for displacing locking-key to remove the cutting-teeth, substantially as described.

9. In a hand rock-drill or rock-drill bit, in combination, the drill-shank constructed with grooves in the end thereof tapered from the center to the edge of the drill, removable cutting-teeth arranged therein having their bases

correspondingly tapered, a longitudinal hole in the end of the drill and a key arranged therein for locking the cutting-teeth in the slots, a transverse hole in the drill-shank intersecting the longitudinal hole in the end thereof and a transverse hole in the end of the locking-key registering or coinciding with the transverse hole in the drill, for the insertion of a cotter or key to fasten or loosen the locking-key in the drill-shank, substantially as and for the purposes described.

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

HORATIO COLLINS.

Witnesses:

CHAS. OVENDALE,
HERMINE V. D. SCHUYT.