

No. 654,861.

Patented July 31, 1900.

J. J. TYNAN.
BORING TOOL.

(Application filed Aug. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

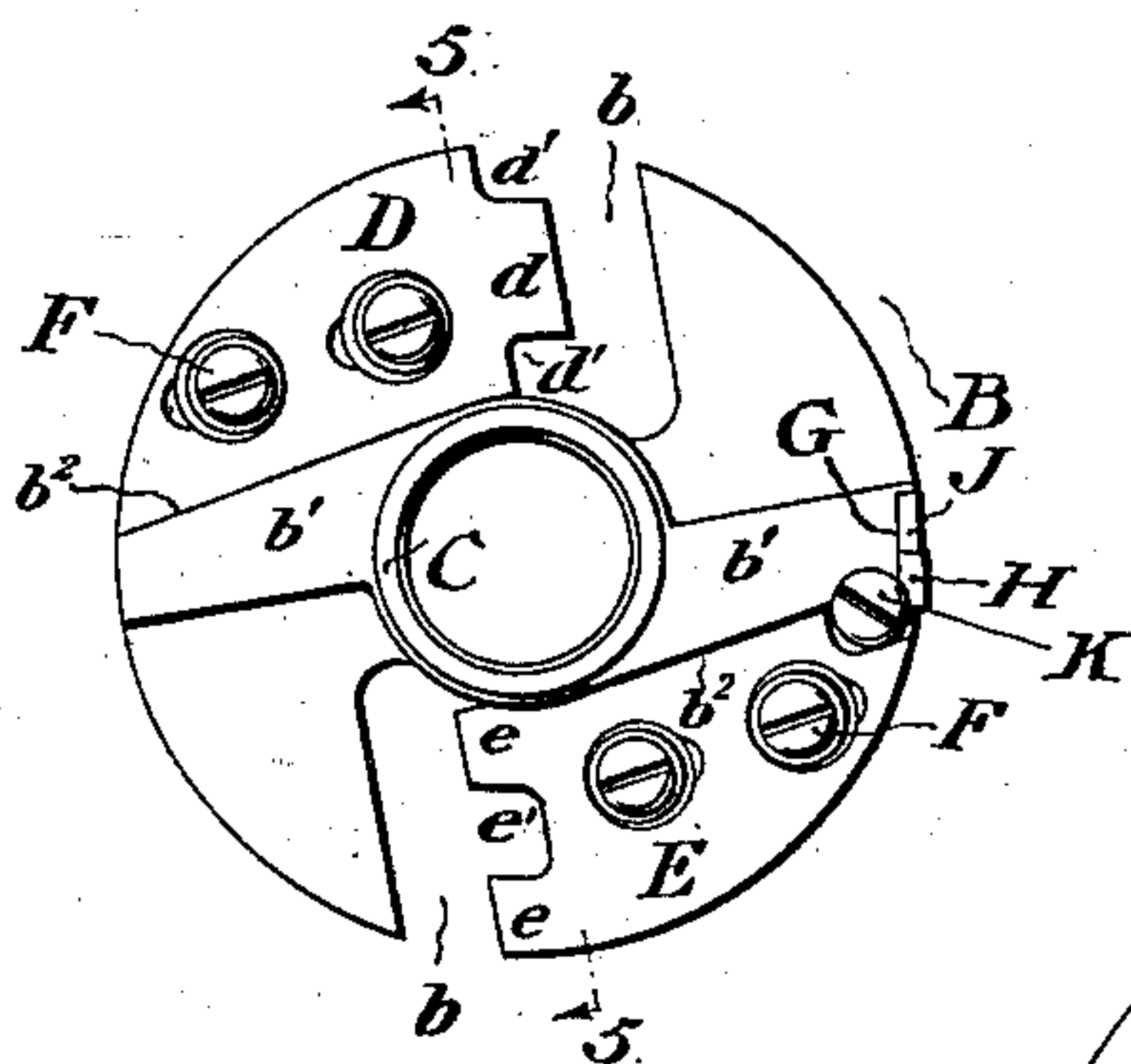


FIG. 2.

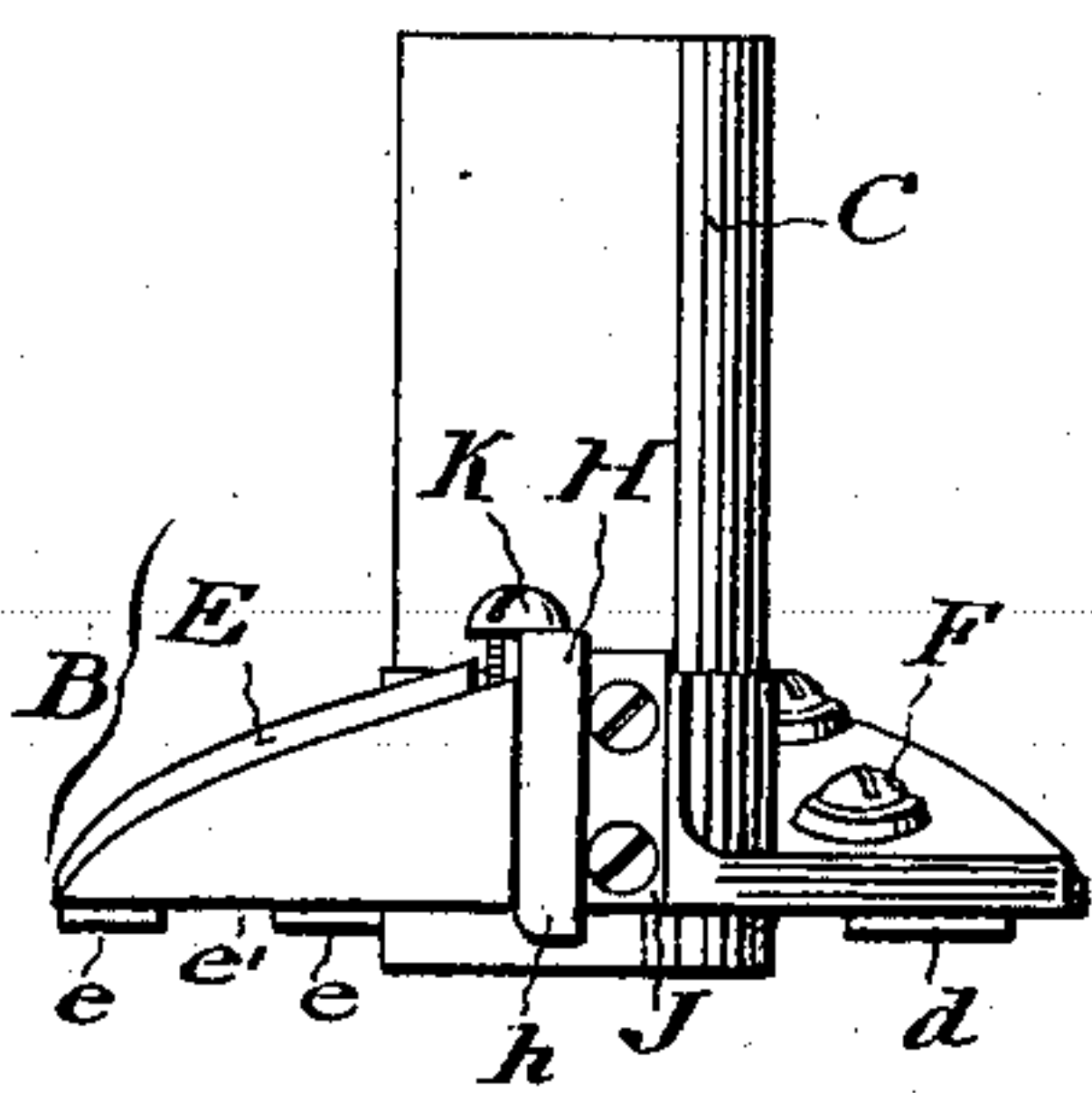


FIG. 4.

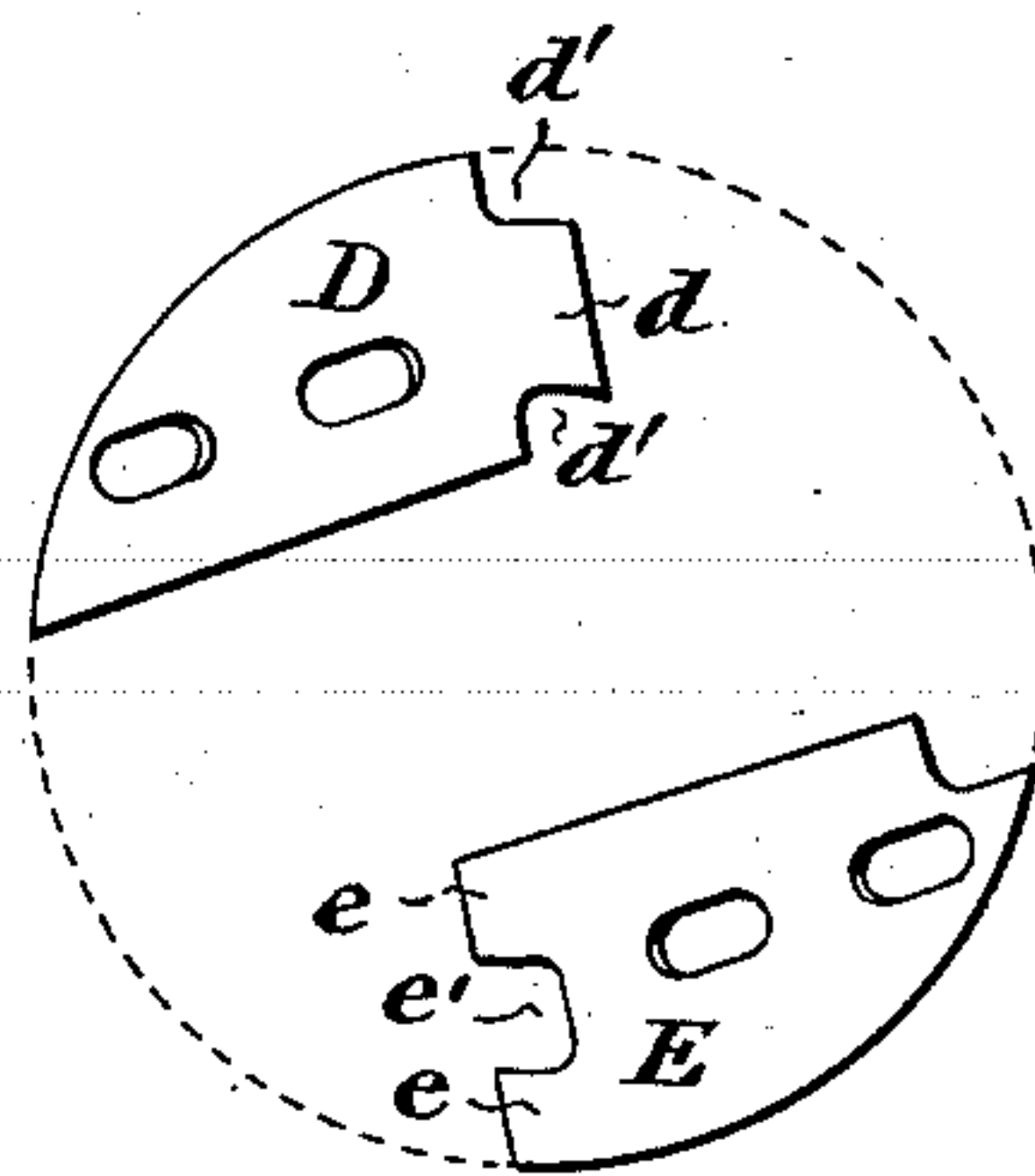


FIG. 3.

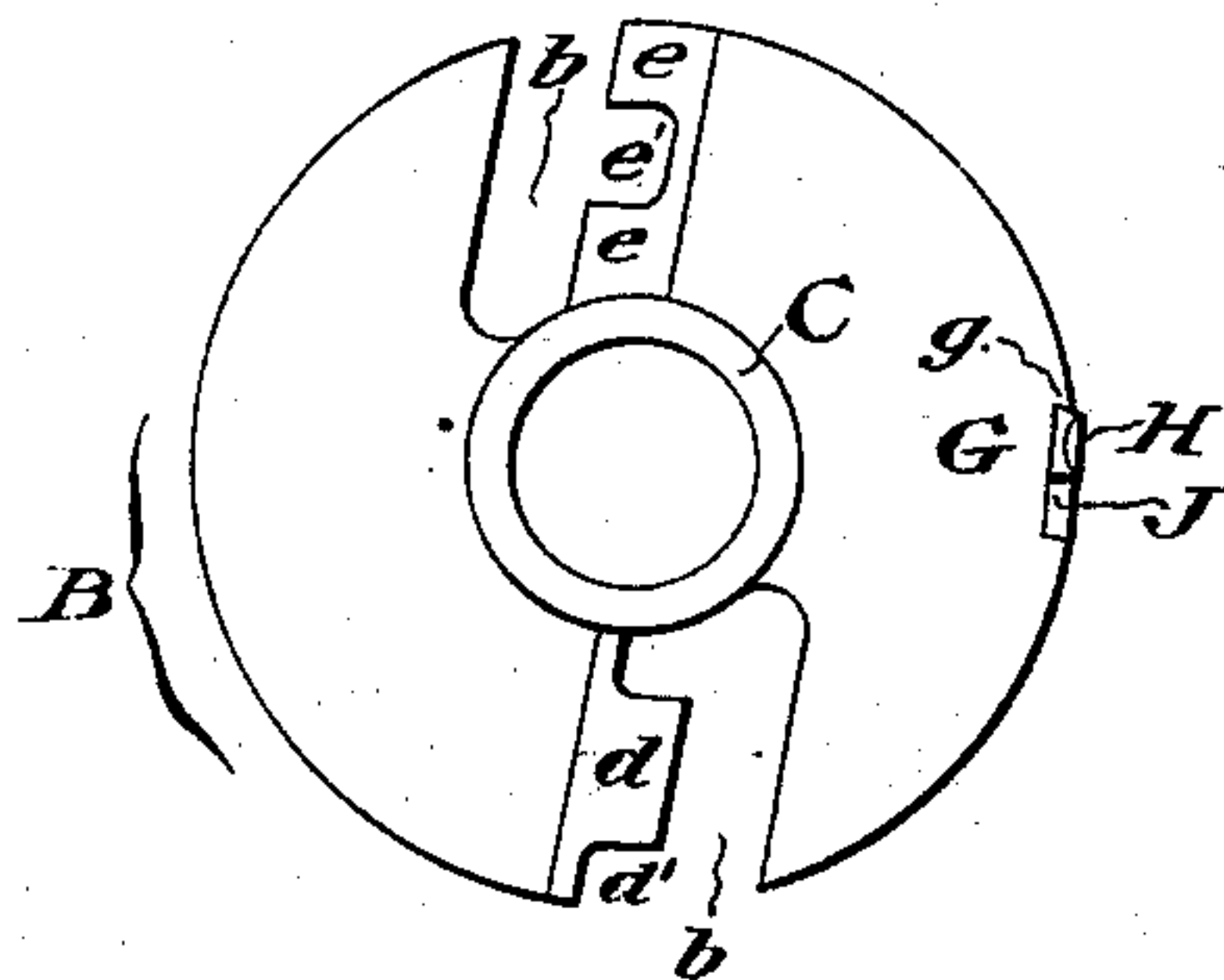
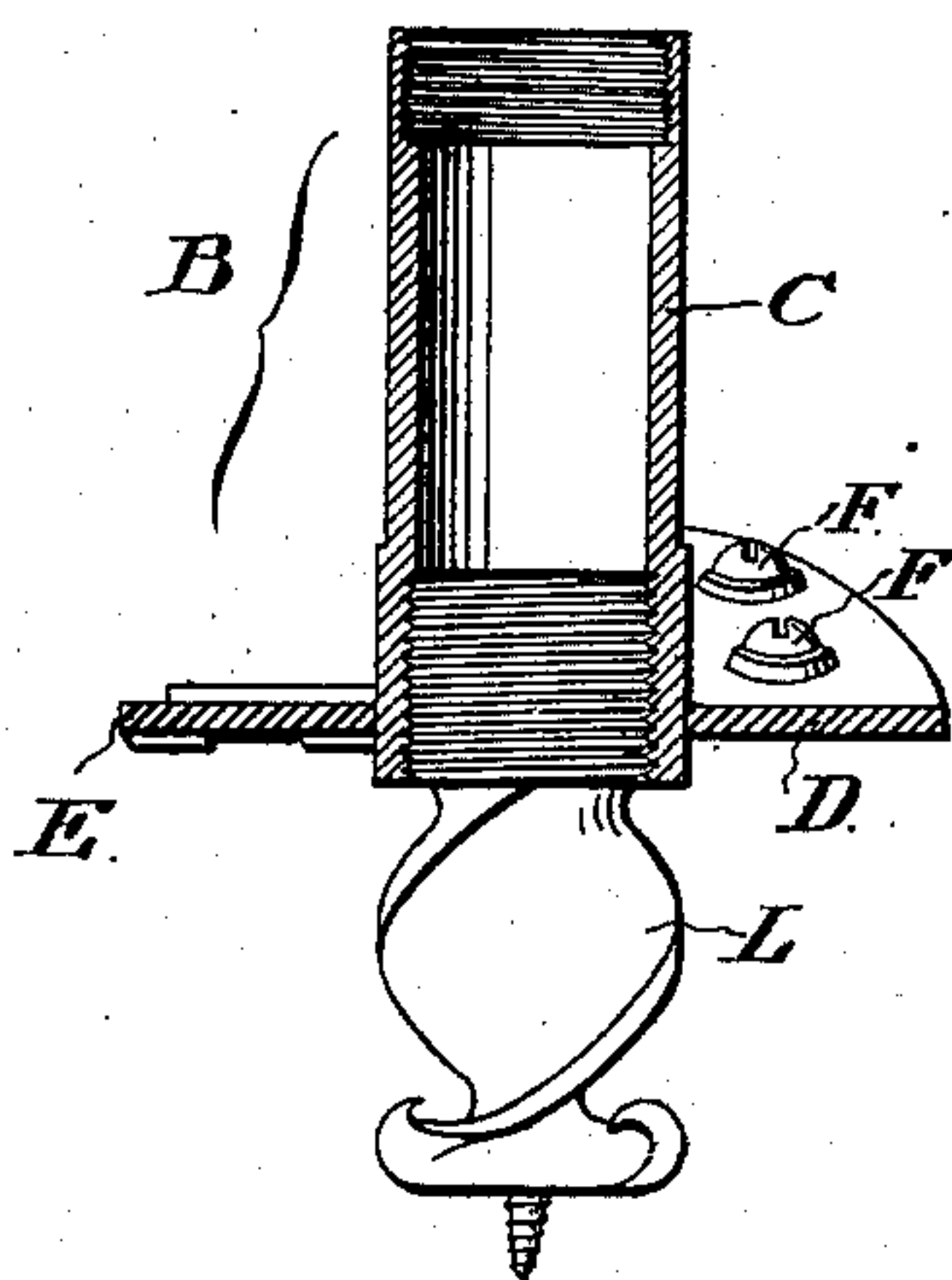


FIG. 5.



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No. 654,861.

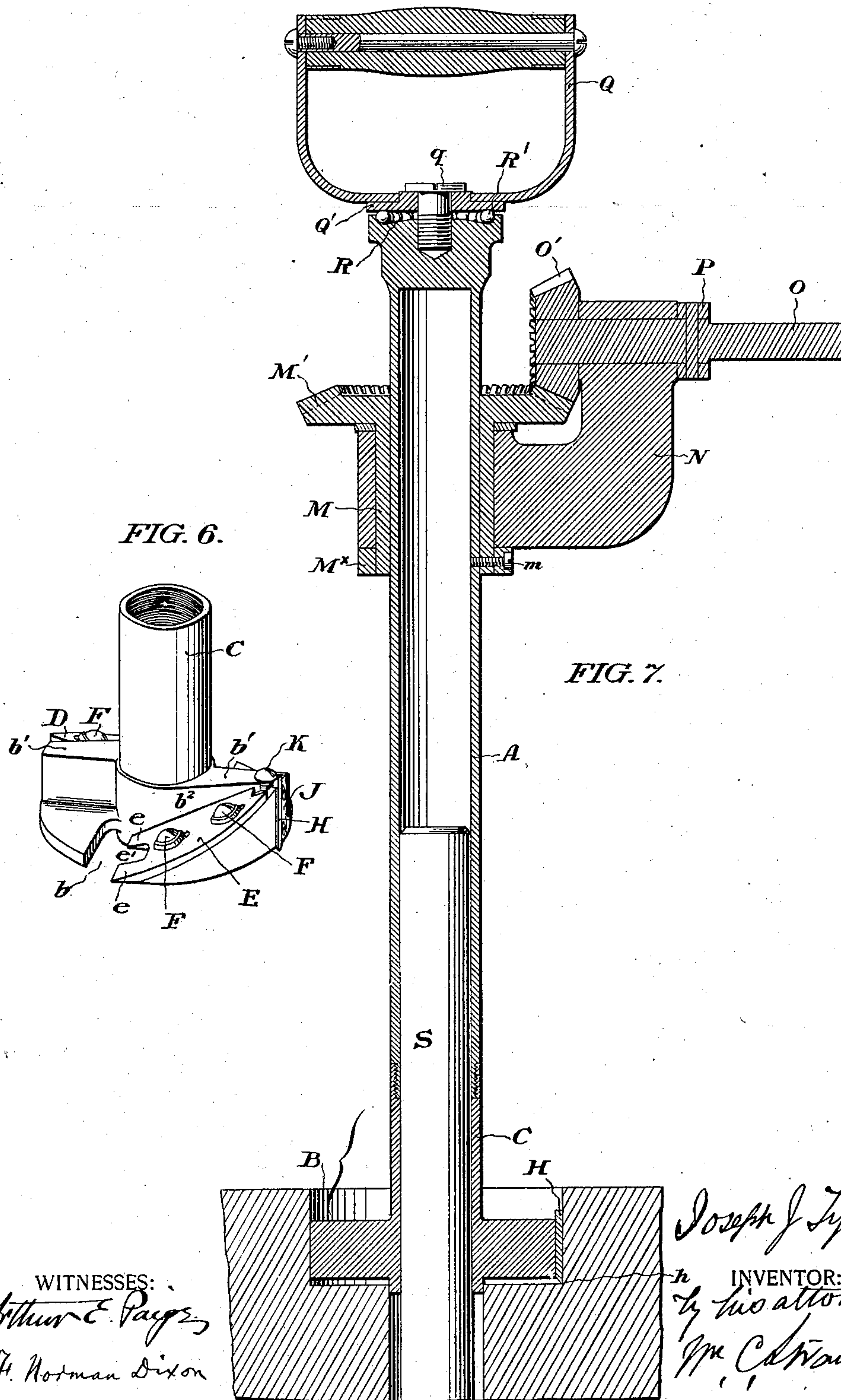
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JOSEPH J. TYNAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO THE PNEUMATIC TOOL IMPROVEMENT
COMPANY, OF SAME PLACE AND CAMDEN, NEW JERSEY.

BORING-TOOL.

SPECIFICATION forming part of Letters Patent No. 654,861, dated July 31, 1900.

Application filed August 7, 1899. Serial No. 726,405. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. TYNAN, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Boring-Tools, of which the following is a specification.

My invention relates to a class of implements employed to cut bolt holes and similar apertures, usually of considerable depth, into or through masses of wood, especially such as compose parts of the inner skins, decks, and girders of vessels.

It is the object of my invention to provide a simple and compact yet very efficient implement of this character capable of doing better and quicker work than such devices as have heretofore been employed for the purpose.

In the accompanying drawings I show and herein I describe, a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings, Figure 1 is a top plan view of a cutter head embodying my improvements.

Figure 2 is a view in side elevation of the cutter head, sight being taken toward the right hand side of Figure 1.

Figure 3 is an under plan view of the cutter head shown in Figure 1.

Figure 4 is a view in top plan of the cutter, the head being diagrammatically indicated.

Figure 5 is a central, vertical, sectional, elevation of the device, section being supposed on the line 5 5 of Figure 1.

Figure 6 is a view in perspective of my improved cutter head.

Figure 7 is a view in vertical, sectional, elevation of the cutter head, the cutter shaft, a handle, and a supporting and guiding mechanism employed in connection with the cutter shaft.

Similar letters of reference indicate corresponding parts.

In the drawings,

A is the cutter shaft upon the threaded outer extremity of which is mounted a shank C of the cutter head B.

The head B consists conveniently of a disk like body carried by and conveniently integral with respect to the shank C, said head being provided with a pair of cutter slots *b* extending respectively from opposing edges of the head tangentially inward for such distance as may be necessary according to the breadth of the cutters employed.

The upper face of the cutter head is fashioned to provide inclines or bit seats, which respectively extend each from an edge of a cutter slot upward for any desired distance, and, preferably as shown in the drawings, to the edge of the disk like body of the head, the inner edge of each incline being defined by a vertical wall or rib *b'*, the body of which from top to bottom is conveniently of the full normal thickness or vertical dimensions of the disk, and the plane of the guide edge, *b²*, of which is tangentially disposed with respect to the shank C.

The inclines are, therefore, in plan, semi-segmental, so to speak.

D E are cutters, bits or knives, each approximately of semi-segmental outline corresponding to the plan of the inclines, and each mounted upon an incline with its cutting edge protruding through the adjacent slot and below the plane of the lower face of the body of the head.

When in this position the inner edges of the cutters abut against the guide edges *b²*, and the curved edges of said cutters approximately coincide with the curved outer face of the cutter head.

F F are screws which pass through suitable slots in the cutters and down into the substance of the cutter head, and which serve to secure the cutters in different positions of adjustment.

The cutter D and the cutter E, in the revolution of the head, together cut or operate upon a circular zone or space equal in breadth to the breadth of one of said cutters, said cutters being provided with apportioned cutting edges, so that one cutter operates upon one portion and the other upon the remaining portion of the circular space or zone to be cut.

With such object in view the cutting end of the cutter E is provided with the two cutting portions *e* at the respective side portions

of its front end between which is formed a blank portion or recess e' , while the cutter D is provided with a cutting edge d at the central portion of its front end and with blank spaces or recesses d' at the side portions of its front end, the arrangement being such that the cutting edge or edges of each cutter operate in the revolution of the head upon that portion of the underlying surface which is passed over by the blank space or spaces of the other cutter.

The cutters are of such form and arrangement that vertical planes coinciding with their cutting edges are tangential to the shank of the cutter head, with the result that as said cutters are swept around the circle they describe in the operation of the implement, they present an inclined edge, so to speak, to the masses of wood or material they encounter, so that they effect a drawing cut upon the wood or material, the operation of the apparatus being thereby rendered proportionately easier.

G is a recess or slot formed in the outer edge of the head in the region b' , said slot having an undercut wall g , (Figure 3.)

H is a knife haft having a pair of inclined side edges, which haft is seated within said recess with one of its inclined edges extending beneath the edge g , said haft terminating at its lower end in a knife h (Figure 2) which projects below the plane of the lower face of the head.

J is a holding block with an inclined edge, mounted in the recess G, and extending across the remaining space thereof from the edge of the haft to the edge of the recess, the edge of said block overhanging the adjacent edge of the haft.

Screws secure said holding block in position, and, through said holding block firmly lock the knife and knife haft against lateral displacement.

K is a screw entered in a suitably tapped opening in the upper face of the cutter head and so located that the head of said screw presents against the upper end of the knife haft, the arrangement being such that by the adjustment of said screw in its tapped opening said knife may be set at any desired position, of vertical adjustment.

In the operation of cutter heads of this general character where the cutter blades operate at an angle of only about forty-five degrees from the horizon, against a surface which is itself approximately horizontal, and particularly when operating upon a fibrous material such as wood, the tendency is to form a hole the side of which will, owing to the tearing of the fibers, be pitted or uneven.

As will be understood, however, by the provision of the auxiliary knife H, located at the outer edge of the cutter head, and with its cutting edge disposed vertically with respect to the plane of the surface operated upon by the cutters D E, not only will the hole cut by the instrument be rendered smooth but

the operation of the knife will be rendered the more easy.

The cutters D E exercise what may be called an excavating effect, cutting both downwardly into the wood and forwardly through it, the cut splinters passing up over the upper faces of the cutters; there is no provision ordinarily in the use of cutters of this general type for the separation of the masses of wood excavated by the inclined cutters from the block operated upon along a line coinciding with the boundary of the hole formed, so that the material excavated by the inclined cutters is merely torn, so to speak by the outer ends of the cutting edges from the body of the material acted upon.

The auxiliary knife H, however, cutting through the material operated upon, upon a line coinciding with the outline of the cutter head, separates the material to be cut into and excavated by the cutters D E, from the body of the timber operated upon, and thereby, by the substitution of the cutting action of said auxiliary knife for the tearing action which must take place in the absence of said knife, renders more easy the operation of the tool and occasions the formation of a smooth hole instead of a ragged one.

The vertically disposed knife mounted on the periphery of the cutting head is of special utility in connection with the arrangement of cutters hereinbefore described, inasmuch as one of said cutters has a blank space or recess at the outer portion of its cutting edge, and therefore there is a greater tendency on the part of the inclined cutters, (in the absence of the vertically disposed knife) to fail, by reason of such recess, to form a smooth and cleanly cut hole.

Manifestly the arrangement of inclined cutters disclosed, having alternate cutting portions or recesses and blank spaces the cutting portions of one blade acting upon portions passed over by the blank spaces of the other blade, constitutes an improvement upon cutter blades as heretofore formed and arranged.

In cutters of this general character as heretofore arranged one blade is apt to project below the other and do all the cutting, the other simply following in its path and remaining idle, the strain coming therefore on one part of the tool, at one side of its axis of rotation.

In my improved cutter each blade takes its own portion of the work, the strain is distributed equally on both sides of the instrument and the device operates more smoothly and uniformly.

In order to provide for the entrance of the tool within the substance and as a guide for its operation, I provide an auger bit L, Figure 5, which I mount in the manner shown or in any preferred manner within the mouth of the shank C.

This is my preferred expedient. If I so desire I may resort to a substitute for this expedient, such as is shown in Figure 7,

namely a fixed guide S in the center of a previously formed hole of diameter equal to the shank C, which guide extends up within the hollow interior of the cutter shaft.

5 I prefer however in some cases to employ the auger bit L shown in Figure 5 for the reason that in its use no previously formed hole is necessary.

10 The cutter shaft A is shown, as provided with a sleeve M mounted for rotation within one arm of a frame elbow N, said sleeve being secured to the shaft by a set screw m which passes through it into a key seat in the cutter shaft and also through a collar M^x 15 mounted upon the lower end of said sleeve. The upper end of said sleeve is provided with a bevel gear M'.

The bevel gear and collar confine the sleeve in place within the bore of the frame elbow. 20 O is a driving shaft in communication, through any desired means, with a source of power, which shaft extends through the other arm of the frame elbow and is equipped as to its inner end with a bevel O' in mesh with 25 the bevel gear first mentioned.

P is a collar, mounted and secured on said shaft O, which with the gear O' maintains said shaft against longitudinal movement with respect to the frame elbow.

30 By the arrangement described the frame elbow, carrying the cutter shaft and head, may be rotated with respect to the shaft O, and said cutter head carried to different positions in a plane perpendicular to said shaft O, or, said frame elbow, carrying the shaft 35 O, may be rotated upon the sleeve M to carry the outer end of the shaft O to whatever position within its range of movement, may be most convenient to connect it with a source 40 of power.

The apparatus may, therefore, be very conveniently employed in corners and places difficult of access with boring implements of ordinary construction.

45 To advance the cutter shaft and head, I provide the shaft with a handle Q connected to its outer end by a swivel consisting of a screw q the outer unthreaded portion of which passes through an unthreaded opening 50 in the handle and the inner threaded portion of which engages in a tapped opening in the end of the shaft.

The portion of the handle which presents toward the shaft is shown as formed as a flat 55 operating face Q' and the outer end of the shaft as recessed to form a ball race R within which are a series of balls R' which ease the friction between the handle and the shaft in the rapid revolution of the latter.

60 Having thus described my invention, I

claim and desire to secure by Letters Patent—

1. A cutter for boring cylindrical holes, consisting of a disk head having approximately radial slots, symmetrical bit seats formed by 65 inclines leading to said slots, each at its lower portion of the width of the circumferential path or area operated upon by the bits, cutters or bits mounted on the inclines and presenting through said slots and conforming to 70 the seats in dimensions, each bit being as to its front edge provided with a blank space and a cutting edge, the cutting edge of one bit arranged to operate upon the region passed over by the blank space of the other, and the 75 cutting edges of said bits being straight, substantially as set forth.

2. A cutter for boring cylindrical holes, consisting of a disk head having approximately radial slots, symmetrical bit seats formed by 80 inclines leading to said slots, each at its lower portion of the width of the circumferential path or area operated upon by the bits, cutters or bits mounted on the inclines and presenting through said slots and conforming to 85 the seats in dimensions, each bit being as to its front edge provided with a blank space and a cutting edge, the cutting edge of one bit arranged to operate upon the region passed over by the blank space of the other, the cutting 90 edges of said bits being straight, and a vertically disposed cutting knife mounted upon the periphery of the disk head and projecting below the lower face of the same, substantially as set forth. 95

3. A cutter for boring cylindrical holes, consisting of a disk head having approximately radial slots, symmetrical bit seats formed by inclines leading to said slots, each at its lower 100 portion of the width of the circumferential path or area operated upon by the bits, cutters or bits mounted on the inclines and presenting through said slots and conforming to the seats in dimensions, each bit being as to 105 its front edge provided with a blank space and a cutting edge, the cutting edge of one bit arranged to operate upon the region passed over by the blank space of the other, the cutting edges of said bits being straight, and a 110 vertically disposed cutting knife adjustably mounted upon the periphery of the disk head and projecting below the lower face of the same, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name 115 this 17th day of July, A. D. 1899.

JOSEPH J. TYNAN.

In presence of—

F. NORMAN DIXON,
S. CAMPBELL.