(No Model.)

C. K. BRYANT.

DENTAL DRILL.

No. 453,254. Patented June 2, 1891.

Fig.1

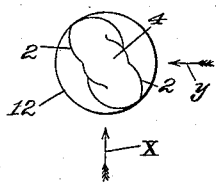


Fig.2

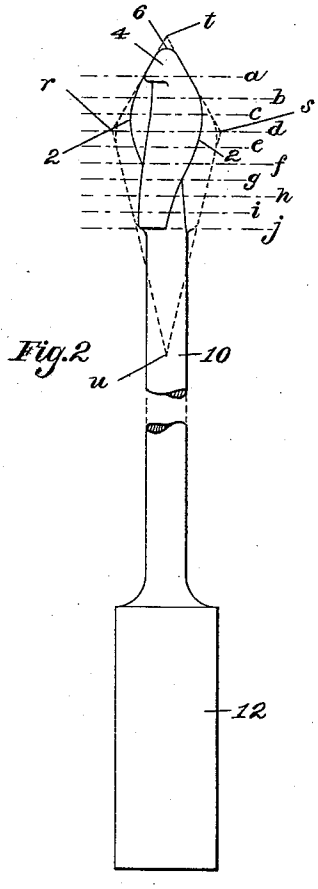


Fig.5

Fig.6

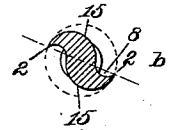


Fig.7

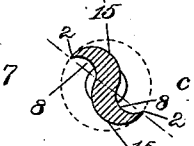


Fig.8

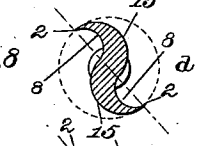


Fig.9

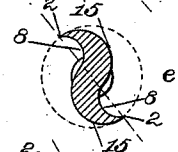


Fig.10

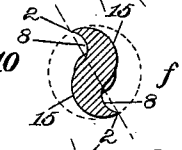


Fig.11

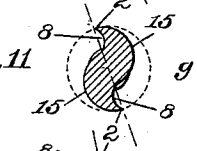


Fig.12

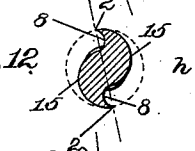


Fig.13

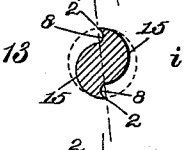


Fig.14

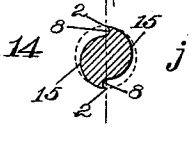


Fig.3

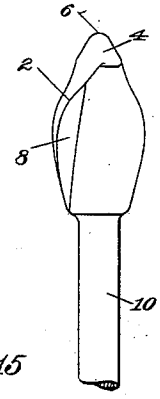


Fig.15

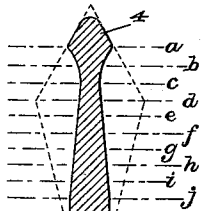
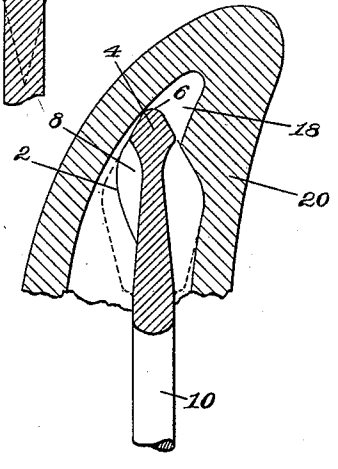


Fig.4



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Inventor:

C. K. Bryant.

By his Attorney,

F. W. Richards

UNITED STATES PATENT OFFICE.

CHARLES K. BRYANT, OF HARTFORD, CONNECTICUT.

DENTAL DRILL.

SPECIFICATION forming part of Letters Patent No. 453,254, dated June 2, 1891.

Application filed April 8, 1891. Serial No. 388,152. (No model.)

To all whom it may concern:

Be it known that I, CHARLES K. BRYANT, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Dental Drills, of which the following is a specification.

This invention relates to dental drills, the object being to provide a drill-head especially adapted for safely and properly enlarging devious canals. To this end the invention consists in the improved drill-head hereinafter set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is an end view of the head of a dental drill embodying my present invention. Fig. 2 is a side view of the drill shown in Fig. 1, as seen in the direction of the arrow *x*, Fig. 1. Fig. 3 is a side elevation of the drill-head, as seen in the direction of the arrow *y*, Fig. 1. Fig. 4 is a sectional view of the drill-head viewed in the same direction as in Fig. 2, and illustrating the use of the instrument. Figs. 5 to 14, inclusive, are a series of sectional views in lines *a* to *j*, inclusive, Fig. 2, for more particularly illustrating the peculiar features of the instrument. Fig. 15 is a diagrammatic view illustrating the normal conformation of the drill-stem separately from the cutting-lips of the drill.

Similar characters designate like parts in all the figures.

The drill-head is formed on the point of the stem 10, which is provided with the usual shank 12, whereby to hold the drill for using the same. The head of the drill is bounded by two cones, designated in Fig. 2 by *r*, *s*, and *t*, and *r*, *s*, and *u*, respectively. The first cone *r s t* is the cone of formation of the forward or advancing edges of the cutting-lips of the drill. The other cone *r s u* is the cone of formation of the rearward or following edges of the cutting-lips. These cones, it will be observed, are set base to base, the cutting-lips being slightly rounded at the line *d* of the bases of the cones. The point of the leading cone 4 is preferably rounded, as at 6, Figs. 2, 3, and 4, so as to prevent said cone from impinging into the side walls of a devious or flattened canal.

The forward cutting-edges 2 of the cutting-lips join the non-cutting conical point 4 in substantial coincidence with the surface thereof, the cone of said forward edges being a continuation of the cone of said non-cutting point. By this means the enlargement of a canal may be carried to the farthest point to which the non-cutting point can pass. Back of the point of its greatest diameter (indicated by the line *d*) the drill-head decreases in diameter, the cutting-lips, however, being continued to the rearward end of the drill-head. The forward faces of the cutting-lips are conically formed throughout the length thereof.

For the purpose of increasing the cutting efficiency of the cutting-edges 2, and also for withdrawing the cuttings more freely, the forward surfaces or faces of the cutting-lips are concaved throughout the length thereof, and the backward sides of said lips are convexly formed, so that in cross-section, as shown in the several sectional views, Figs. 6 to 14, inclusive, the cutting-lips are hook-shaped. The concavely-formed faces 8 of the spiral lips constitute spiral grooves for leading away the accumulation of cuttings. The convexly-formed backward faces 15 furnish a safe means for guiding the drill when it becomes necessary to reverse the rotation thereof for removing it from canals choked with adhesive cuttings; also for sharpening the drill by suitably grinding said convex surfaces without distorting the cross-sectional outlines thereof.

The grooves 8 in the forward faces of the cutting-lips being not merely undercut, but concavely formed, as set forth, retain, as against outward movement radially thereof, the cuttings while permitting the free passage thereof backward from the point of the drill-head, thus having a distinctive advantage over the old forms of undercut lips of dental drills. The advance cutting-edges of the drill-lips being coincident with the cone formation of the non-cutting drill-point enlarge the canal up to the extreme advanced position of said point.

As will be understood from Figs. 4 and 5, the stem 10 is, in a sense, continued through the drill-head to the non-cutting conical point 4, which point is, in fact, the termination of the drill-stem. Said stem from the base-line *j* of the drill-head is of a decreas-

ing diameter or thickness forwardly to the line *c* forward of a line *d*, which coincides with the bases of the aforesaid cones of formation. The cutting-lips 2 2 are built or formed upon this tapered portion of the drill-stem, said lips being of increasing width (and also of decreasing thickness at their juncture with the stem) from the base-line *j* forward to the said line *d*. From the latter point the cutting-lips are reversely formed, having a decreasing width from the line *d* forward to their juncture with the non-cutting drill-point.

In using this instrument in the ordinary devious canals, as 18, Fig. 4, the non-cutting point follows the said canal 18 of the root 20, and serves as a wedge to force sidewise the cutting end of the drill. This action is illustrated in Fig. 4, showing the drill in sectional view and the figure of rotation by dotted lines, this figure being bounded by two cones, as hereinbefore set forth. The forward cone, terminating in the non-cutting point, represents in this case the cutting-line of the instrument. The rearward cone conforms on one side thereof to the inclination of the canal, and serves to bring out the cuttings, while itself not cutting, except in occasional instances.

While my improved dental drill is especially designed and constructed for enlarging devious canals, it is equally effective for enlarging straight canals.

Having thus described my invention, I claim—

A drill-head having a non-cutting conical point and two spiral cutting-lips concavely grooved on the forward side thereof, the cutting-edges of said lips conforming, as described, to two truncated cones set base to base and the forward ends of said edges joining the cone of said non-cutting point in lines substantially coincident with the conical surface thereof, substantially as described.

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