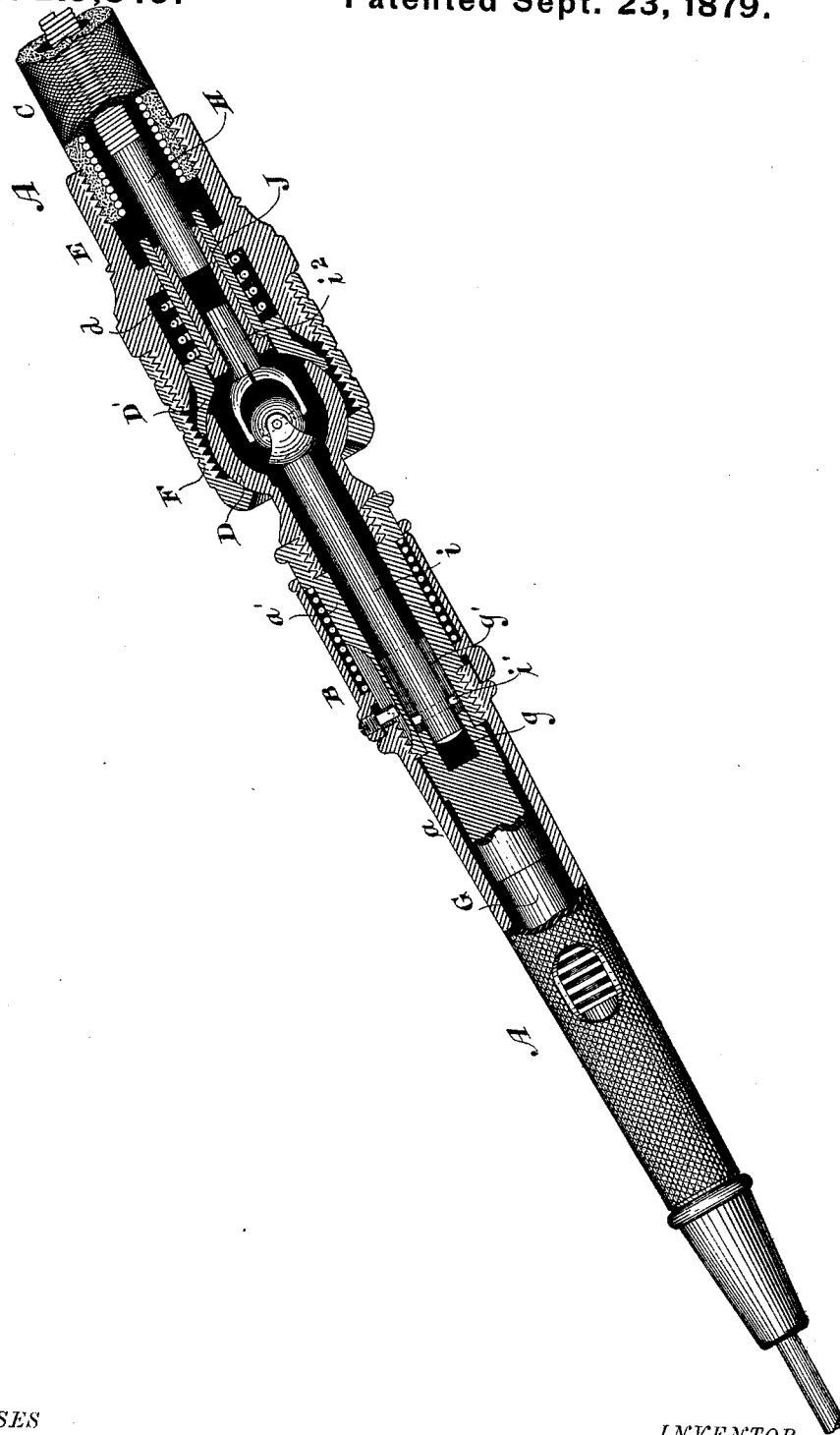


G. H. CUSHING.
Dental-Engine Hand-Piece.

No. 219,849.

Patented Sept. 23, 1879.



WITNESSES

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GEORGE H. CUSHING, OF CHICAGO, ILLINOIS, ASSIGNOR TO SAMUEL S. WHITE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN DENTAL-ENGINE HAND-PIECES.

Specification forming part of Letters Patent No. **219,849**, dated September 23, 1879; application filed March 23, 1879.

To all whom it may concern:

Be it known that I, GEORGE H. CUSHING, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

My invention relates to improvements in dental-engine hand-pieces of the class more especially intended for use in connection with a flexible power-driven shaft and a sheath or cover enveloping and protecting the shaft, as embodied, for instance, in the well-known S. S. White dental engine.

The flexure of the shaft and sheath of such engines permits of a wide range of movement of the hand-piece and operating-tool carried thereby; but in certain positions and angles in which it is desirable to place the operating-tool when performing dental operations it has been found that the shaft and sheath are not sufficiently flexible to enable the dentist to work with the required ease and delicacy, and, further, that, owing to the exertion necessarily incident in holding and guiding the instrument to its work, the hand of the operator soon becomes fatigued and consequently unable to manipulate the instrument to the best advantage.

The object of my present invention is so to connect the hand-piece casing or handle-section thereof with the enveloping-sheath and the tool chuck or holder mounted in said casing with the flexible driving-shaft that great freedom of movement is given to the hand-piece and tool in addition to that afforded by the flexure of the shaft and sheath.

My invention consists of certain novel combinations of devices pointed out at the close of this specification.

The accompanying drawing represents a view in elevation, partly in longitudinal section, of an apparatus embodying all my improvements in the best way now known to me.

The hand-piece casing A is preferably constructed in sections, as usual, the sections *a a'* being connected together by screw-threads, and prevented from accidental separation by a spring-clutch, B, as shown in E. T. Starr's Letters Patent, No. 194,850, of September 4, 1877. The inner section, *a'*, is connected to

the sheath C (which may be of any well-known construction) by means of a ball-section, D, which fits snugly in the cup or socket D', surrounded by a spiral spring, *d*, and turning freely in suitable bearings in a connecting-section, E, said section being secured in well-known ways to the outer or free end of the sheath C. The ball-and-socket-joint connection between the casing and sheath thus formed is kept in proper working position and prevented from separation by the cap F, screwed upon the connecting-section E.

The spiral spring *d*, it will be observed, allows the socket-section D' of the joint to yield to accommodate the universal movements of the hand-piece; and it will also be obvious that the handle-section of the casing possesses the capacity of turning freely, or of swiveling, to accommodate the turning movements of the hand of the operator, inasmuch as the ball-and-socket connection permits such movement.

The chuck or tool-holder G is of well-known construction, having suitable journals fitting tubular bearings in the casing, preferably in front and rear, and its rear end is provided with an axial bore or opening, *g*, and a longitudinal slot, *g'*, passing centrally and transversely through the chuck from side to side. The chuck is connected to the driving-shaft H (which is preferably a flexible wire-coil shaft) by means of a universal joint of well-known construction lying within the ball-and-socket joint, that connects the hand-piece casing and section E, one arm, *i*, of the universal-joint connection being inserted in the bore *g* of the chuck and locked therewith, as against rotary motion, so as to compel the two to turn together, by (in this instance) a pin, *i'*, in the arm *i*, which enters the longitudinal slot *g'* in the chuck.

The opposite arm, *i*², of the universal-joint connection is shown as consisting of a split or spring arm forced into the front end of the tubular journal or sleeve J, in the rear end of which the driving-shaft is inserted and secured in any suitable well-known way.

The front end of the chuck or tool-holder is provided with a socket, as usual, for the reception of the driving ends of the operating-

tools, which may be locked therein in usual well-known ways.

I contemplate, in some instances, employing my improvements in connection with a driving-shaft unprovided with a sheath or cover, modifying the construction of the section E accordingly.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of the hand-piece casing, the connecting-section provided with a socket to receive the sheath of the engine when the two are to be connected, the ball-and-socket joint between the casing and connecting-section, and the spring acting upon the joint to accommodate its movement.

2. The combination, substantially as hereinbefore set forth, of the casing, the ball-and-socket joint, the connecting-section between which and the casing said joint is interposed, the sheath to which said connecting-section is secured, and the spring acting upon the joint to accommodate its movements.

In testimony whereof I have hereunto subscribed my name.

GEORGE H. CUSHING.

Witnesses:

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