S. S. WHITE.

Electro-Magnetic Dental-Engine.

No. 202,497. Patented April 16, 1878.

Fig 2.

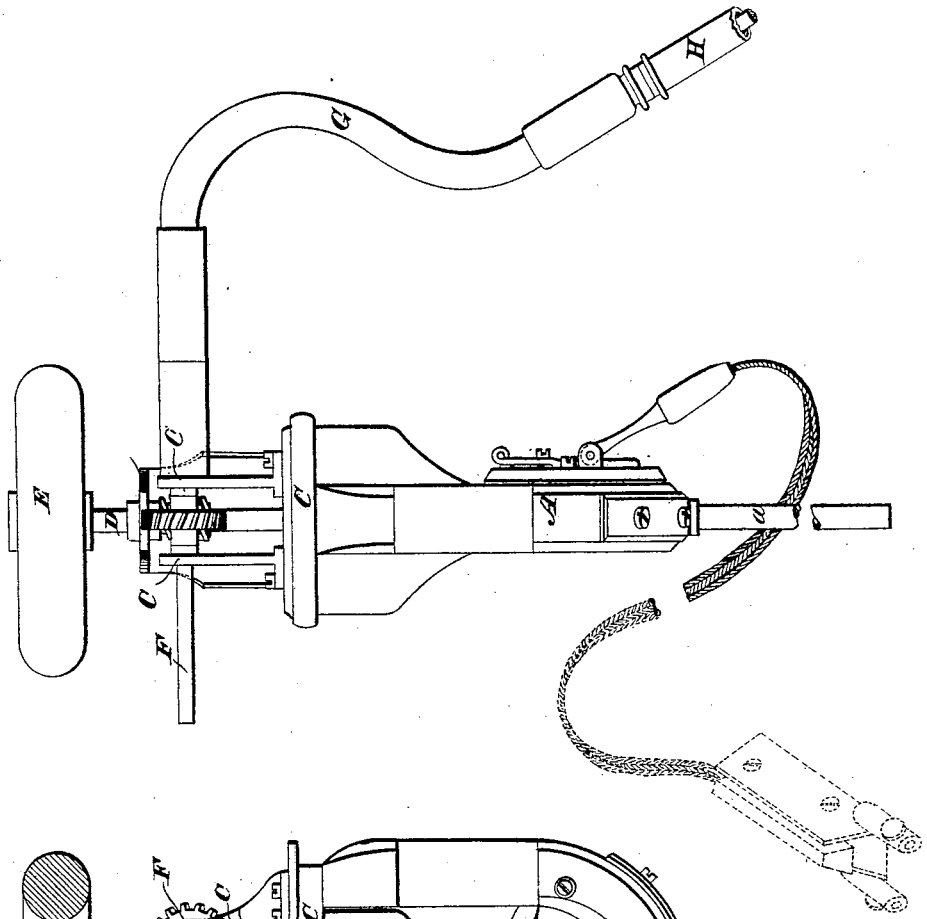
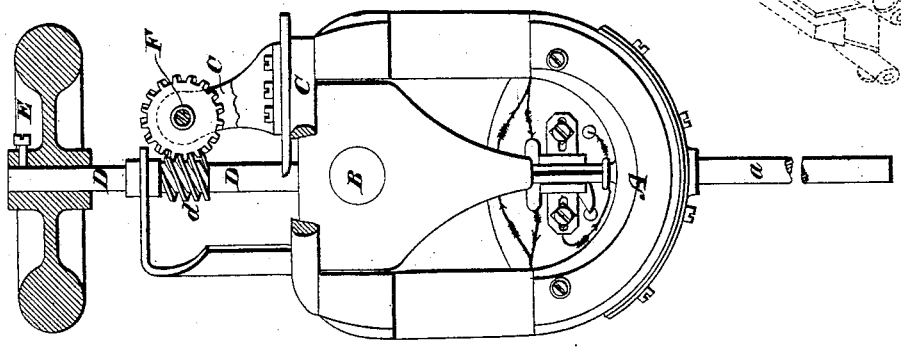


Fig 1



WITNESSES

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Baldwin, Hopkins & Peyton

2 Sheets—Sheet 2

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Fig 5

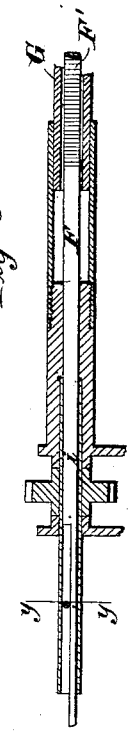


Fig 6.

Fig 4.

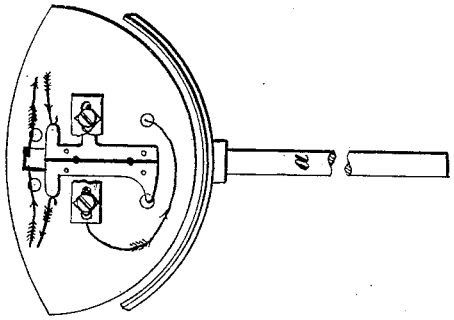
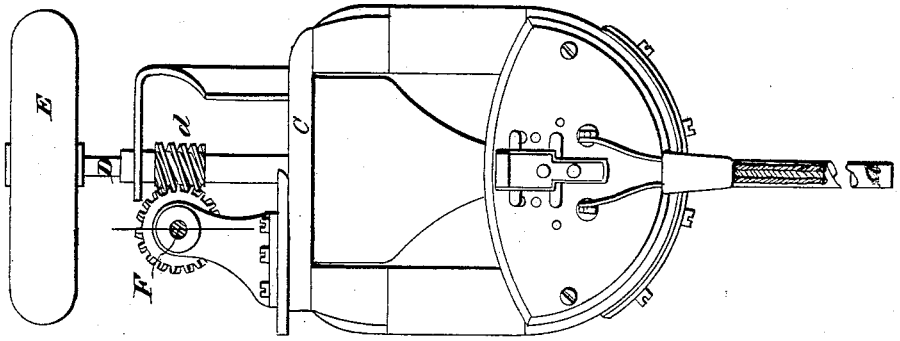


Fig 3.



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UNITED STATES PATENT OFFICE.

SAMUEL S. WHITE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ELECTRO-MAGNETIC DENTAL ENGINES.

Specification forming part of Letters Patent No. **202,497**, dated April 16, 1878; application filed October 24, 1876.

To all whom it may concern:

Be it known that I, SAMUEL S. WHITE, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Electro-Magnetic Dental Engines, of which the following is a specification:

My invention constitutes an improvement upon a class of engines secured to me as assignee by Letters Patent No. 159,028, granted January 26, 1875, upon the application of George F. Green, and No. 166,843, granted August 17, 1875, upon the application of Joaquin Bishop.

The object of my invention is to render the operating tool or instrument capable of a wide range of movement in various directions, which ends I attain by combining with such an engine a flexible shaft—such, for instance, as that used in the well-known S. S. White dental engine—and adapting the engine to be supported upon a flexing support.

The accompanying drawings illustrate the best way now known to me of carrying out the objects of my invention. Obviously, however, the details of construction of the engine may be changed within certain limits, and some of the devices therein shown and herein described may be used without the others.

Figure 1 represents a view, in elevation, of my improved engine, partly in section; Fig. 2, an edge view thereof; Fig. 3, a front elevation; Fig. 4, a view in detail, showing a rear elevation of the connection between the lower part of the magnet with the bearing-arms or clamps which act upon the spindle of the electro-magnet. Fig. 5 is a central longitudinal section through the supporting-bracket, flexible shaft-connection therewith, and the driving-gear of said shaft; and Fig. 6, a transverse section on the line *y y* of Fig. 5.

It is deemed unnecessary to describe in detail the construction of all the parts shown in the drawing, as their main portions are fully described in the patents of Green and of Bishop, before mentioned, and such details form no part of the subject-matter herein claimed.

A stud or pin, *a*, projecting from the electro-magnet A, may be inserted in the rocking post or standard of an ordinary dental engine, or in a swinging bracket, or in or upon any other suitable support which will allow it to flex freely and turn upon said pin as a pivot.

An armature, B, revolves in bearings in this magnet and in the frame C, secured thereon, as fully described in the Letters Patent aforesaid, the circuit being opened and closed to impart rotary motion to said armature in well-known ways. The armature may be rotated in either direction desired by changing its battery-connections, as explained in the Bishop patent aforesaid, or in any other manner.

The axis of the armature is prolonged, so as to form a driving spindle or shaft, D, which carries a balance-wheel, E, at its upper end, and a worm-wheel, *d*, meshing into a corresponding wheel on a shaft, F, revolving in suitable bearings on the frame.

A flexible shaft, F′, is secured to the shaft F in any suitable way, and is driven thereby. I prefer to inclose this flexible shaft in a flexible sheath, G, carrying on its free end a hand-piece, H, in which the shaft turns to impart motion to the operating-tool inserted therein. The construction of the flexible shaft, sheath, and hand-piece shown is similar to that employed in my dental engine aforesaid; but any other flexible shaft may be used.

In the drawings I have shown worm-gearing for driving the shaft; but other forms of gearing or connections may be employed, if preferred.

From the foregoing description of my invention it will be obvious that the operating tool or instrument is free to be moved in all directions, which increases the efficiency and usefulness of this class of engines to a great degree.

I claim as of my own invention—

1. An electro-magnetic dental engine adapted to be mounted and turn upon a flexing support, substantially as described.

2. The combination, substantially as hereinbefore set forth, of an electro-motor adapted for application to a flexing support, mechanism mounted upon and driven by said motor, a flexible shaft driven by said mechanism, and a flexible sheath and hand-piece enveloping the shaft, whereby a tool inserted in said hand-piece is free to be turned in all directions without interruption to the driving-power.

In testimony whereof I have hereunto subscribed my name.

SAMUEL S. WHITE.

Witnesses:

JAS. B. WILLIAMS,

S. T. JONES.