M. KELLY.

DENTAL ENGINE.

APPLICATION FILED APR. 25, 1908.

**919,593.** Patented Apr. 27, 1909.

Fig. 1.

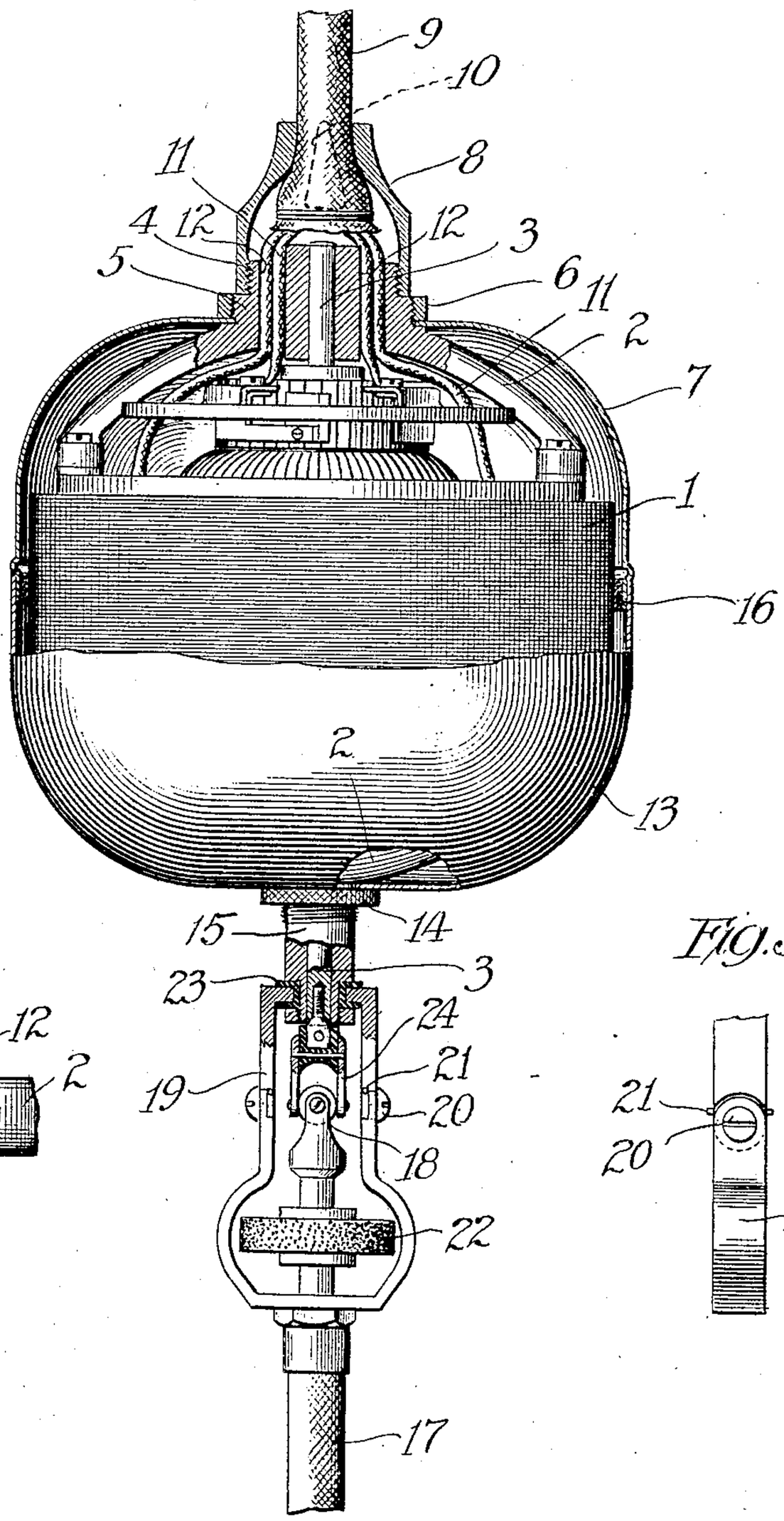


Fig. 2.

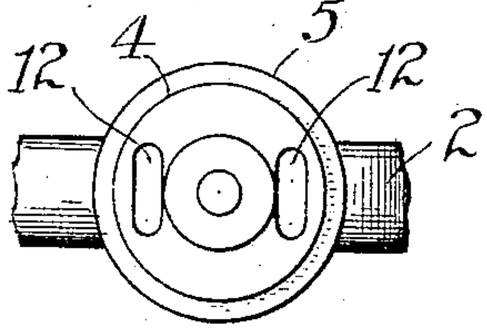


Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## DENTAL ENGINE.

No. 919,593. Specification of Letters Patent. Patented April 27, 1909.

Application filed April 25, 1908. Serial No. 429,238.

*To all whom it may concern:*

Be it known that I, MICHAEL KELLY, a citizen of the United States of America, and a resident of Hammond, county of Lake, State of Indiana, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

The main objects of this invention are to provide improved means for attaching an electric dental engine to a suspending cable, and to provide improved means for connecting the tool with the motor, whereby greatly increased freedom of movement of the tool is obtained. These objects are accomplished by the device shown in the accompanying drawings, in which—

Figure 1 is an elevation, partly in section and partly broken away, of an electric dental engine constructed according to this invention. Fig. 2 is a top plan detail of the middle part of the spider to which the suspending cable is attached. Fig. 3 is a detail of the hinge joint of the yoke which connects the flexible shaft with the motor frame.

In the construction shown, the motor frame comprises the stator or field frame 1 and a pair of spiders or brackets 2 which carry the bearings for the armature or rotor shaft 3. The top of the upper bracket 2 is of stepped formation, being provided with a pair of concentric annular bosses 4 and 5. Both of these bosses are preferably threaded, the lower boss 5 being provided with a nut or collar 6 having a knurled periphery and adapted to clamp the upper casing section 7 to the yoke 2.

A socket member 8 has threaded engagement with the boss 4, and has a contracted opening through its top for receiving the supporting cable 9. This cable is expanded by means of a wedge 10 or otherwise, so as to prevent it from pulling out of the socket member 8. The cable comprises the insulated conductors 11, which are respectively connected to the brushes of the rotor and the windings of the stator of the motor. The conductors 11 are led downward through apertures 12 in the yoke 2, which are arranged around the bearing of the shaft 3 in such manner that the conductors 11 will be entirely inclosed by the socket member 8 and the casing 7. The largest part of the periphery of the socket member 8 is of smaller diameter than the internal diameter of the collar 6 and the central opening in the casing section 7. This permits the casing section 7 to be raised so as to permit access to the brushes and connections without disturbing the connection between the cable 9 and the spider 2.

The lower casing section 13 is secured to the lower spider 2 by means of a collar 14 which is threaded to the boss 15 of said lower spider. The adjacent edges of the casing sections 7 and 13 telescope with each other and are separated from the motor frame by a washer 16 which may be of felt cemented or otherwise secured to the casing section 7.

The dental engine is provided with the usual covered flexible shaft 17 which carries the tool chuck at its free end. The flexible shaft 17 is connected with the shaft 3 by means of a universal joint 18. This universal joint is inclosed within the frame or yoke 19 which has a hinge joint 20 provided with stops 21 for guiding and limiting the movement of the universal joint so as to prevent the joint from bending beyond the maximum angle at which it will operate freely. The lower part of the yoke 19 is spread out so as to provide a space for a brush wheel 22. The casing of the shaft 17 is attached to the yoke 19, as shown.

In order to prevent electricity from reaching the tool and shocking the patient, the yoke 19 is insulated at 23 from the boss 15, and the upper member 24 of the universal joint is provided with a section of insulation which is interposed in such manner as to insulate the universal joint from the shaft 3. The member 24 consists of two metal parts, each riveted to a piece of insulating material in such manner as to be electrically insulated from each other.

The tool at the end of the shaft 17 normally hangs downward, but when it is lifted to operating position, the greater part of the movement is taken up at the universal joint. This relieves the shaft 17 of so much bending that its resistance to the manipulation of the tool is slight. To get access to the brushes, it is merely necessary to unscrew the nut 6 and slide the casing section 7 upward along the cable.

The words "rotor" and "stator", as herein used, are intended to mean respectively the rotary and stationary parts of the motor, without implying any specific type of motor.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The combination of a motor, a bracket forming part of the frame of said motor and having therein a bearing for the rotor shaft and a passage for conductors, a pair of substantially concentric bosses on said spider, a casing section fitting over said spider, a collar detachably connected with the larger boss and adapted to secure said casing section, and a socket member having threaded connection with the smaller boss and having a contracted opening at its outer end, a suspending cable extending through the contracted opening in said socket member, being secured within said socket member and comprising a plurality of conductors connected with the motor windings.

2. The combination of a motor frame, a spider mounted thereon and having therein a bearing for the rotor shaft, a boss on said bearing arranged concentrically of the shaft, a socket member having threaded engagement with said boss and having a contracted aperture at its upper end in alinement with the motor axis, said yoke having therein a plurality of apertures arranged around said bearing and inward of the outer edges of said boss, a suspending cable extending through said contracted aperture and secured within said socket member and comprising conductors extending through said apertures.

3. The combination of a motor frame, a rotor shaft journaled therein, a flexible shaft, a universal joint connecting said flexible shaft with said rotor shaft, and a yoke adjacent to said universal joint and arranged to guide and limit the movement of said universal joint.

4. The combination of a motor frame, a rotor shaft journaled therein, a flexible shaft, a universal joint connecting said flexible shaft with said rotor shaft, and a yoke adjacent to said universal joint and having therein a hinge joint provided with stops and adapted to control and limit the movement of said universal joint.

Signed at Chicago this 14th day of March, 1908.

MICHAEL KELLY.

Witnesses:
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MARY M. DILLMAN.