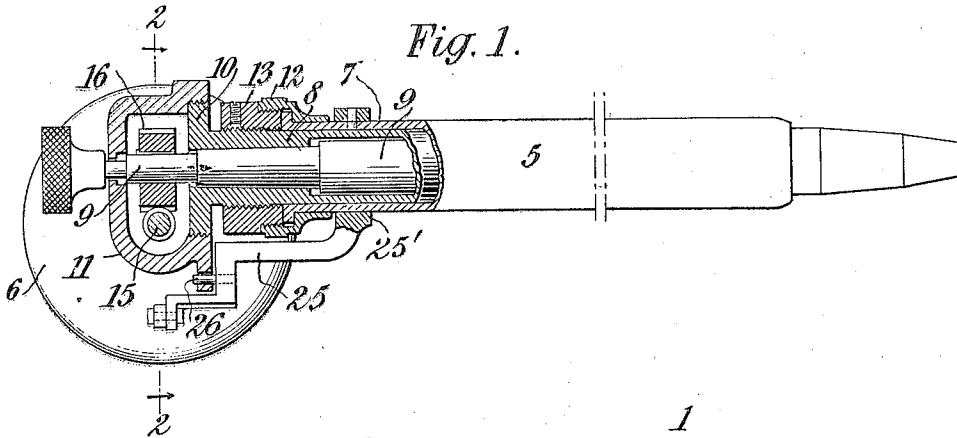
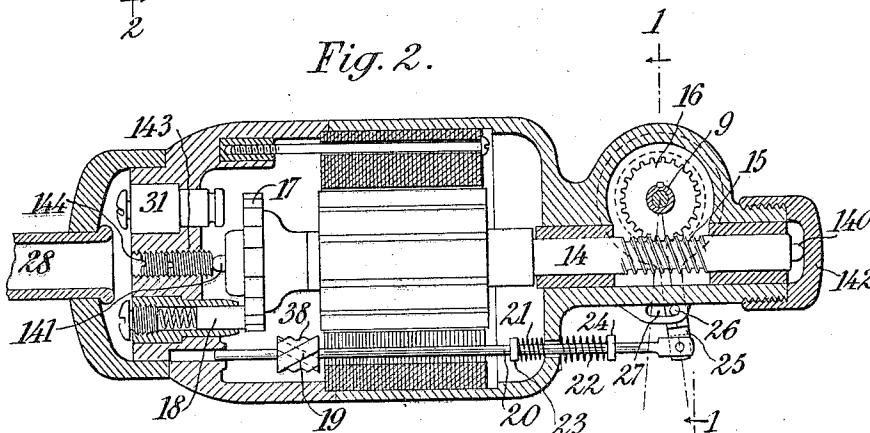
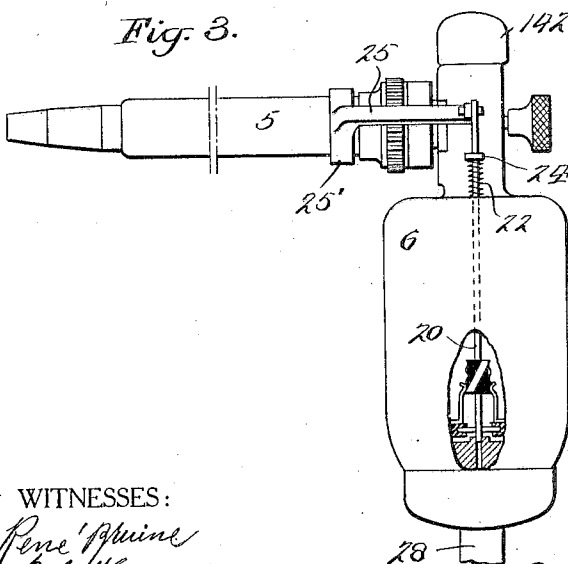
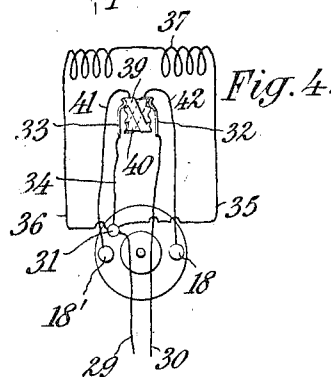


W. G. SHELTON.
DENTAL ENGINE HAND TOOL.
APPLICATION FILED OCT. 6, 1917.

1,384,975.

Patented July 19, 1921.



WITNESSES:

Rene J. Quinn
J. Wallace

INVENTOR
William Gentry Shelton

By Attorneys,
Draper, Dunk & Myers

UNITED STATES PATENT OFFICE.

WILLIAM GENTRY SHELTON, OF NEW YORK, N. Y.

DENTAL-ENGINE HAND-TOOL.

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Specification of Letters Patent.

Patented July 19, 1921.

Application filed October 6, 1917. Serial No. 195,028.

To all whom it may concern:

Be it known that I, WILLIAM G. SHELTON, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Dental-Engine Hand-Tools, of which the following is a specification.

The object of this invention is to provide in a hand tool a self-contained dental engine and hand piece wherein the motor is at all times under the control of the operator by a simple movement of the position of the hand, irrespective of the position of the fingers of the hand holding the hand piece. By control of the motor in the present instance is particularly meant the starting, stopping and reversing of the motor, as occasion may demand. The illustrated form of the invention shows the motor switch controlled by a slight rotary movement of the hand piece upon its axis and upon the axis of rotation of the tool mounted therein when the tool is mounted in the prolongation of the axis of the hand piece. The various structural details of the invention are developed in their proper order in the description.

In the drawings accompanying this application, one practicable embodiment of the invention is illustrated, in which drawings, Figure 1, is a top view partly in horizontal section, of one form of my improved device.

Fig. 2, is a vertical section taken on a plan at about the line 2-2, of Fig. 1, the cross-sectional line of Fig. 1, being illustrated in this view by the line 1-1.

Fig. 3, is an elevation of the device shown in Figs. 1 and 2, but on a smaller scale. In this view, the outer casing is shown broken away, for the purpose of showing the switch, and

Fig. 4, is a detailed view of the wiring which is found convenient in this device.

In these drawings, Fig. 3, shows the device full size and Figs. 1 and 2, are on a scale of two to one approximately.

When the hand piece 5 of the instrument is grasped by the fingers of the operator in the usual manner of holding a dental hand piece, the motor casing 6 is dependent therefrom at the side of the hand. This present invention, particularly relates to the control of the motive power by means of a rotary movement of the hand piece relative

to the motor casing, this being rendered possible by the manner of connection between these two parts. The hand piece is shown provided with an outer shell, or sleeve 7, which is mounted for rotation upon a tubular bracket 8, fast to the upper portion of the motor casing. The tool carrying spindle 9, is located at the back end, within this tubular bracket 8. Of course, it is to be assumed that it is provided at its forward end with a sufficient or proper tool holding chuck. The bracket 8, is shown having a screw threaded plate 10, at the back end, having a screw threaded connection with the upper portion of the motor casing, this plate constituting a closure for the gear housing 11. The sleeve 7, is held in its longitudinal position by a ring 12, engaging a flange on the sleeve and drawing this up against a screw threaded nut 13, mounted on an exterior screw thread on the bracket 8.

The spindle 9, is shown disposed transversely of the motor shaft 14, and the driving connection between these is preferably a reduction transmission, there being a worm 15 on the armature shaft 14 and a worm wheel 16, fast upon this spindle 9, the gears being mounted in the housing portion 11. According to the present showing, this is a ten to one reduction.

The motor illustrated is supposed to have a shunt wound field, having at the lower side, or the side opposite the transmission mechanism a commutator 17, which coacts with brushes, one of which is illustrated at 18, mounted parallel with the axis of the rotation of the armature and engaging the rear face to the commutator. A reversing switch is illustrated at 19, which switch is shown carried by a reciprocatory bar 20, which is disposed substantially parallel with the axis of rotation of the armature. Compression springs 21, 22, are shown mounted upon the bar 20 and located between heads 23 and 24 on the bar and the wall of the motor casing. These springs normally hold the switch in the neutral, or circuit open position.

The switch illustrated is actuated upon the rotation of sleeve 7, relative to the motor casing by means of an arm 25 fast with such sleeve. In the present illustration the arm is shown provided with an integral collar 25' embracing and secured to the sleeve. This arm is articulated to the outer, or upper end of the bar 20. The arm 25 is shown

provided with a pin 26, transversing a slot 27 formed upon the motor casing.

The motor is preferably wound for operation from an ordinary electric light fixture and is provided with an opening 28 at the lower end for the entrance of the wires, which are indicated in the circuit diagram 4, by reference characters 29—30. One of the wires 29, is shown lead to a binding post 31, the other wire 30, being lead directly to one of the fingers, or switch blades 32, the other blade 33 being connected by a wire 34 to the binding post 31. The terminals 35—36 of the field 37 are shown connected to this binding post 31. The switch illustrated comprises a block 38 of insulating material, provided on each edge with three notches and upon respective side with diagonally disposed plates 39—40. Plate 39 having a contact in Fig. 4 at the upper left hand portion of the block and at the lower right hand portion and connected by means of a wire 41, with the brush 18'. The plate 40 has a contact at the upper right hand portion and at the upper left hand portion and is connected by a wire 42, with brush 18. In Fig. 4, the switch block is in the extreme opposite position of that shown in Fig. 2, and the position intermediate to these two, brings the fingers 32—33 in the intermediate notches, and out of contact with either of the plates, which is the normal, or off circuit position and the idle position of the engine, and which position is automatically assumed by the parts, due to the action of the springs 21—22, when the operator releases his hold upon the sleeve 7.

The motor shaft 14 is shown provided at its opposite ends with spherical bearing surfaces 140—141. At the upper end 140 is shown engaging a properly prepared bearing face on the screw cap 142 and that of the lower end 141 engaging a properly formed socket in the end of an adjustable bearing, shown in the form of a set screw 143, held in position by means of a lock set screw 144.

It is to be noted that the motor portion of the device is normally dependent from the dental hand piece and that the center of gravity of the motor portion is well below the portion of such hand piece gripped by the fingers of the operator, and that there is a rotary motion of the sleeve 7 relative to the tool spindle 9 within it and relative to the motor casing 6, and the armature shaft 14. Of course, it is to be understood that if the operator wishes the entire structure to have a rigid feel in his hand, he will move the sleeve 7, and with it the actuating arm 25 to the limit of their movement, namely, until the pin 26 engages the end of its guide slot 27. As a matter of fact, in most cases, the parts will be so pro-

portioned that upon the switch fingers 32—33, coming in the end notches of the switch block 19, the pin 26 will be at the limit of its movement and positively stop in such position.

The operation of the device is substantially as follows:

The operator takes hold of the sleeve 7 of the dental hand piece in the usual, or customary manner of holding the same, and permits the motor casing 6 to depend therefrom at the back, or side of his hand. When he wishes to establish the current, he rocks his hand, or rotates the sleeve 7, as the case may be, in the predetermined direction for moving the switch 19, by means of the arm 25, to establish the current for rotating the motor in its forward, or normal direction. When he desires to stop the operation of the tool he may do so without removing it from the point of application, by a slight reverse rotation of the sleeve 7, which will then bring the switch fingers 32—33 into the intermediate position. Sometimes in dental operations, it becomes desirable to quickly reverse the tool, as for instance, when a drill gets stuck, or when some portion of the apparatus becomes entangled, as for instance with the rubber dam, in which case, the operator rotates the hand piece in the reverse direction to its full extent, causing such rotation to take place about the axis of the tool spindle 9, the switch then passes through the open circuit, or off current position before passing to the reverse position.

It is to be understood that changes in detail of construction may be made within the scope of the claims, as occasion requires, without departing from the spirit of my invention.

What I claim is:

1. In a device of the character described, the combination of a dental hand-piece adapted to carry a tool, a motor, said hand-piece and motor being formed as a portable unit, and means controlling the operation of said motor comprising a finger-actuated sleeve rotatable around said dental hand-piece.

2. In a device of the character described, the combination of a dental hand-piece, adapted to carry a tool, a motor, said hand-piece and motor being formed as a portable unit, means controlling the operation of said motor comprising a finger-actuated sleeve rotatable around said dental hand-piece, and stops limiting the turning movement of said sleeve.

3. In a device of the character described, the combination of a dental hand-piece, adapted to carry a tool, a motor, said hand-piece and motor being formed as a portable unit, and means controlling the operation of said motor comprising a finger-actuated sleeve rotatable around said dental hand-

piece, said motor having its center of gravity below the axis of said hand-piece.

4. In a device of the character described, the combination of a dental hand-piece, adapted to carry a tool, a motor, said hand-piece and motor being formed as a portable unit, and means controlling the operation of said motor comprising a finger-actuated sleeve rotatable around said dental hand-piece, said controlling means having three operative positions, two running and a "stop" position, and means normally tending to bring said controlling means to its "stop" position.

5. In a dental engine hand tool, the combination with a dental hand piece, of a motor casing dependent from the rear end of the hand piece, a motor contained in such

casing, a switch for starting, stopping and reversing the motor, the hand piece being provided with a finger gripping portion having independent rotary movement, and an operative connection between such finger gripping portion and the said switch.

6. In a device of the character specified the combination with a tool spindle and a finger grip surrounding the same, a motor casing dependent from the rear end of the spindle and having its center of gravity well below the axis of said spindle, a switch for controlling the motor, and an actuator for such switch operatively connected with the finger gripping device.

In witness whereof, I have hereunto signed my name.

WILLIAM GENTRY SHELTON.