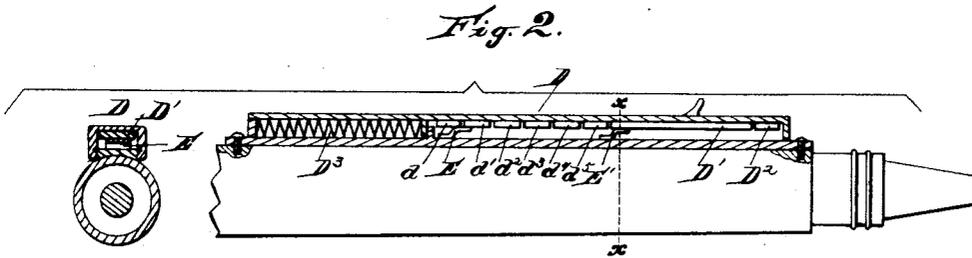
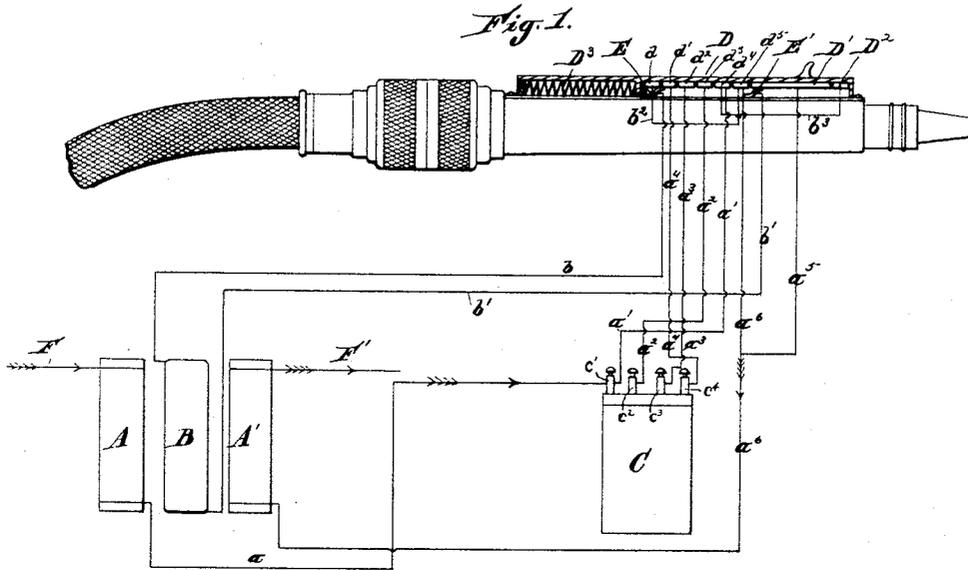


H. H. BLADES.
ELECTRIC DENTAL MOTOR.

No. 447,291.

Patented Mar. 3, 1891.



WITNESSES

John E. Wiles.
W. B. O'Rourke.

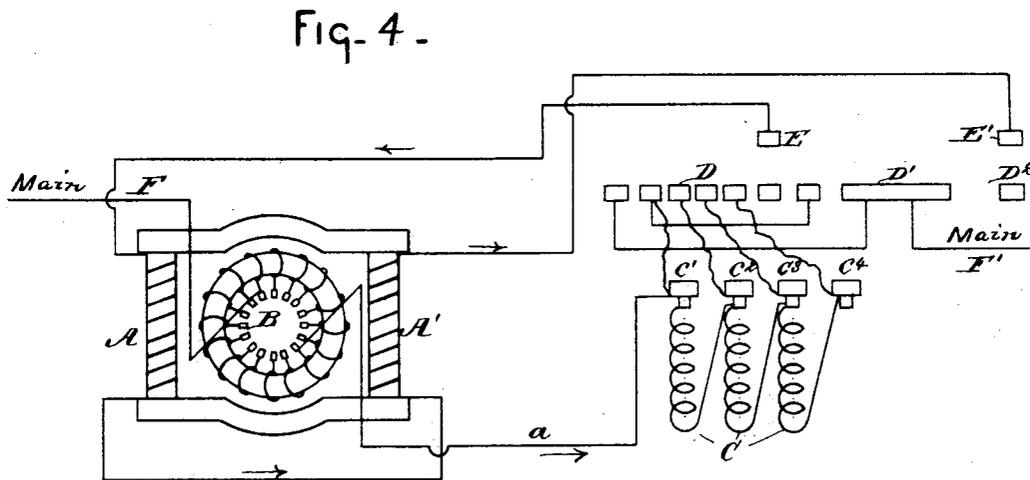
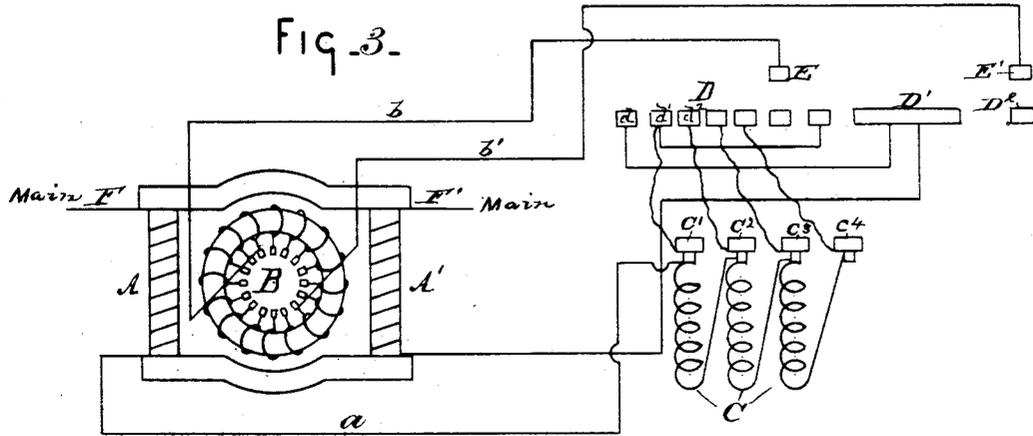
INVENTOR

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WITNESSES.

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UNITED STATES PATENT OFFICE.

HARRY H. BLADES, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT MOTOR COMPANY, OF SAME PLACE.

ELECTRIC DENTAL MOTOR.

SPECIFICATION forming part of Letters Patent No. 447,291, dated March 3, 1891.

Application filed March 23, 1888. Serial No. 268,224. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. BLADES, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Electric Dental Motors; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

In the drawings, Figure 1 is a partial diagrammatic view illustrating my invention. Fig. 2 is a separate view illustrating more particularly the mechanism at the hand-hold. Fig. 3 is a diagrammatic view showing more clearly the motor and resistance-coils in circuit. Fig. 4 is also a diagrammatic view illustrating a modification of the circuits.

This invention relates more particularly to means for governing the operation of the motor—that is to say, means for manipulating the current by mechanism located at the hand-hold at the end of the flexible shaft.

It is well known, especially in dentists' work, that the operator is usually, and in fact almost invariably, obliged to use his left hand while he is holding and manipulating the tool at the end of the flexible shaft of his motor. It becomes, therefore, of importance that he shall be able to manipulate the current whereby his motor is propelled, and that he should do this with the same hand whereby he manipulates his tool. This I accomplish by providing at the handle or hand-hold a switch mechanism provided with conductors leading therefrom to the necessary resistance-regulator or other appliances for governing the current, and I would have it understood that this switch mechanism may either be arranged to govern the turning on or turning off of the current, and also the regulation of the amount that may pass through the motor, or it may simply be arranged to govern the resistance-regulator, or the terminals may be arranged so that the switch may accomplish other desirable objects. In the example illustrated there is provided a switch adapted to govern the amount of re-

sistance, and in connection therewith adapted to short-circuit the armature, and also adapted to reverse the current through the armature. These three conditions enable the operator to hold his motor inert while the current is still passing through the fields. This he accomplishes by short-circuiting his armature. So, also, he is enabled to admit more or less current through the motor through the medium of his contacts for governing the resistance-regulator. He is also enabled to reverse the motion of his motor and tool if it should be desirable. He is also enabled to quickly stop his motor when in rapid motion by first reversing the current, and then as the motor comes to rest throwing the switch into the position to short-circuit the armature.

In carrying out my invention, A A' represent the fields, and B the armature, of a dental motor.

C represents a resistance-regulator provided with terminals $c^1 c^2 c^3 c^4$, &c.

D represents a switch. It is provided with terminals $d d' d^2 d^3 d^4$, &c.; also, with the terminals D' D².

E and E' are fixed contacts over which the switch-terminals may slide.

F F' represent the main circuit leading to and from the motor.

$a a^1 a^2 a^3 a^4$ represent the circuits from one of the fields through the resistance-regulator to the terminals of the switch.

$b b'$ represent circuits connecting the armature with the fixed contacts E E'.

b^2 and b^3 represent circuits, connected as shown, and employed, as will be hereinafter described, for short-circuiting the armature or reversing its motion.

a^5 and a^6 represent the circuits which return to the other field before passing off on the main line.

The operation of this device will now be understood. When the switch is in the position shown in the drawings, the current, entering on the main line, will pass through the field A, thence through a and through the resistance-regulator, taking in all the resistances, thence off through a^4 to the terminal d' . The fixed contact E rests upon both the terminals d and d' . The current therefore passing through this fixed contact to the terminal

d might thence pass down through b and through the armature, but this would afford resistance which it may avoid by taking the short circuit through b^3 to the terminal d^3 ,
 5 thence by a^6 through the other field a' and off on the line, leaving the armature short-circuited, and consequently leaving the motor inert, although the current is maintained through the fields. Now when the operator
 10 desires to start his motor slowly or with a small amount of current, he slides the switch D slightly backward with his finger. This brings the terminal d' fully onto the fixed contact E and off from the contact d , the cur-
 15 rent entering from the main line through a , and all the resistance now passes through a^4 to the terminal d' , then through E and b to the armature, thence back along b' to the fixed contact E', thence through D' and off
 20 along a^5 and a^6 through the other field A' and off on the line. In the same way he may throw out successively one or more of the resistances by bringing his switch back so that the fixed contact E' may rest
 25 upon the corresponding contact d^2 , d^3 , or d^4 . It is apparent that when the terminal d^4 is brought onto the contact E the machine will take all of the current, for the current pass-
 30 ing through the field A and along a to the resistance - regulator will pass off directly through a' to the terminal d^4 , thence off through the fixed contact E through b , the armature B b' , the fixed contact E, the terminal D', and thence through a^5 and a^6 and the
 35 other field A' off on the line. Now suppose the operator desires to reverse the direction of his current in the armature, either to stop the machine or to reverse the direction of his tool. He brings the switch D so that the terminal
 40 d^5 shall rest on the fixed contact E and the terminal D² shall rest on the fixed contact E'. The current then from the main line passing through a a' to the contact d^4 will

pass thence through b^3 to the terminal D². The current will then pass through E' down
 45 through b' and through the armature B in the reverse direction, thence through b to the fixed contact E and terminal d^5 , thence down through a^6 and A' off on the line. If the oper-
 50 ator has thus reversed the current so that it shall serve as a brake to quickly stop his motor, he maintains the switch in the position last described until the motion ceases. He
 55 then simply releases the switch D, and the spring D³ then instantly throws the switch forward to its first position, leaving the parts in the position shown in the drawings. This,
 as before explained, short-circuits the arma-
 60 ture and the motor stands at rest. Of course the reversal of the current through the fields, as shown in Fig. 4, would accomplish the same purpose as reversing the current through
 the armature, and would require but a slight
 65 and obvious readjustment of the circuits, and I would have it understood that my invention contemplates such a change without depart-
 ing therefrom.

What I claim is—

In an electric dental motor, the combina-
 70 tion of the hand-hold, a longitudinally-sliding switch D, located on said hand-hold, a series of terminals carried by said switch, the fixed contacts E E', a regulator C, comprising
 a series of resistances, circuit-connections, substantially as described, whereby the mo-
 75 tor is adapted to be variably energized or reversed at will, and a spring for normally throwing the switch into position to short-
 circuit the current, substantially as specified.

In testimony whereof I sign this specifica-
 80 tion in the presence of two witnesses.

HARRY H. BLADES.

Witnesses:

M. B. O'DOHERTY,
 SAMUEL E. THOMAS.