

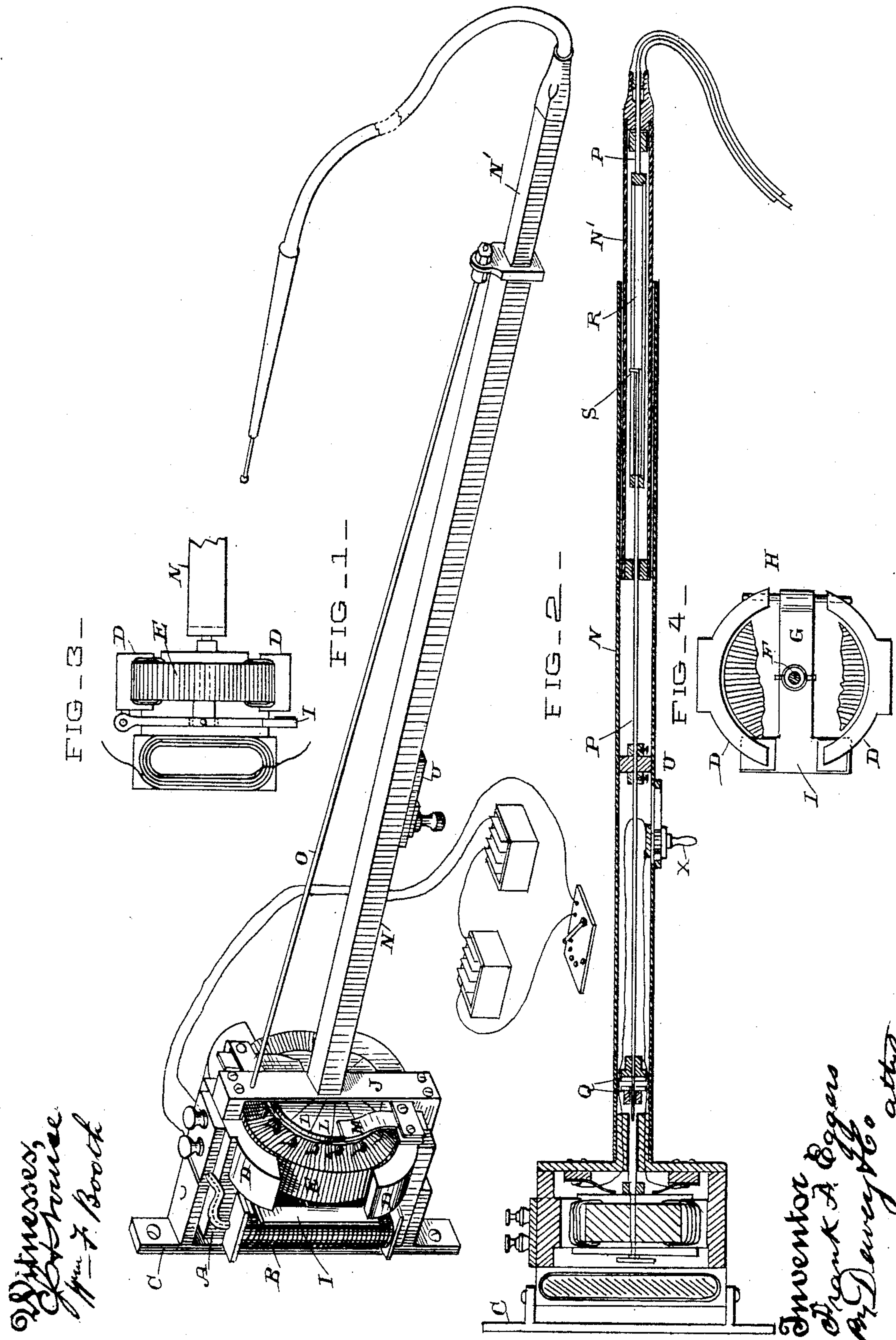
(No Model.)

2 Sheets—Sheet 1.

F. F. EGGERS.
ELECTRICAL DENTAL ENGINE.

No. 449,847.

Patented Apr. 7, 1891.



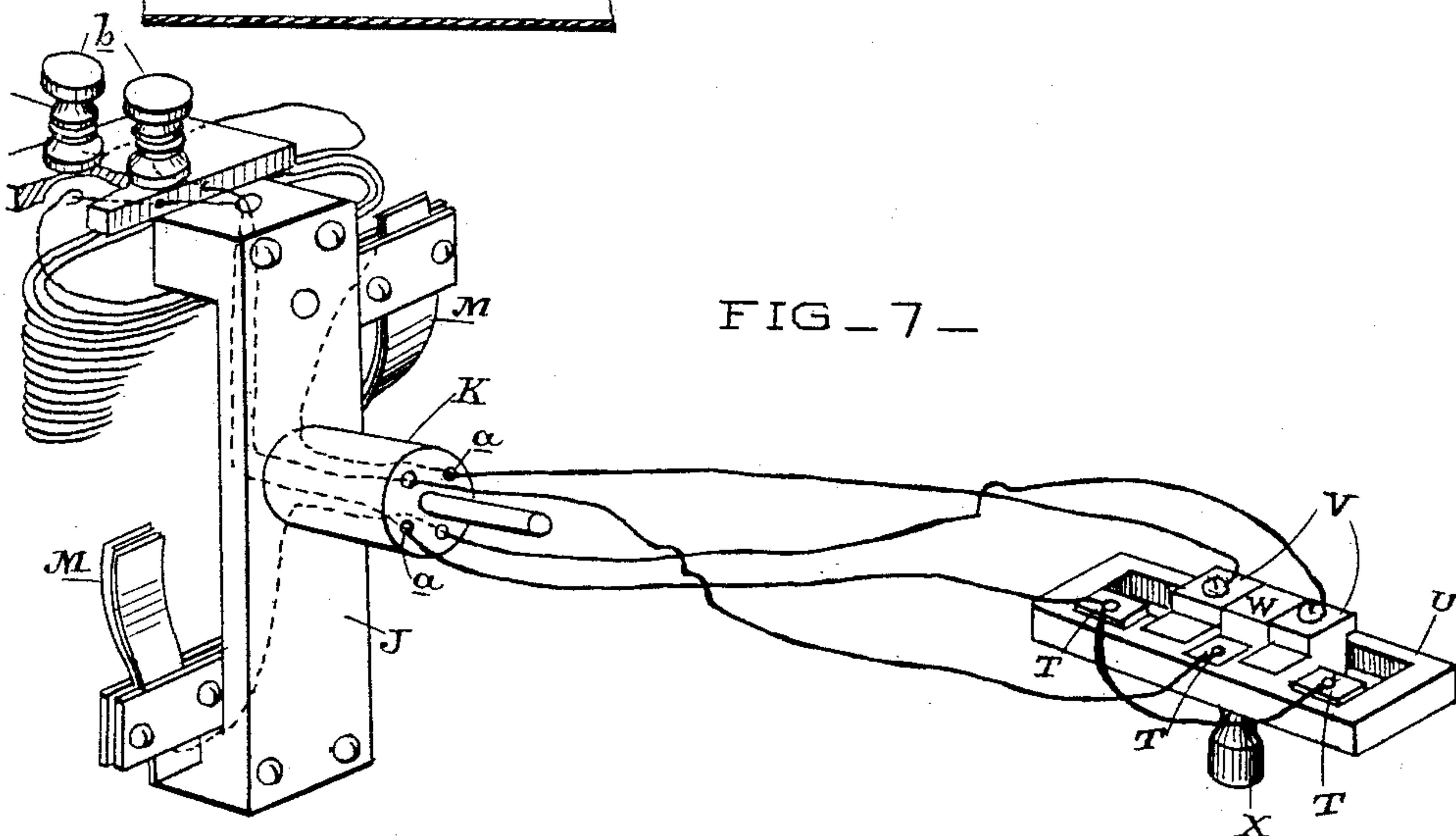
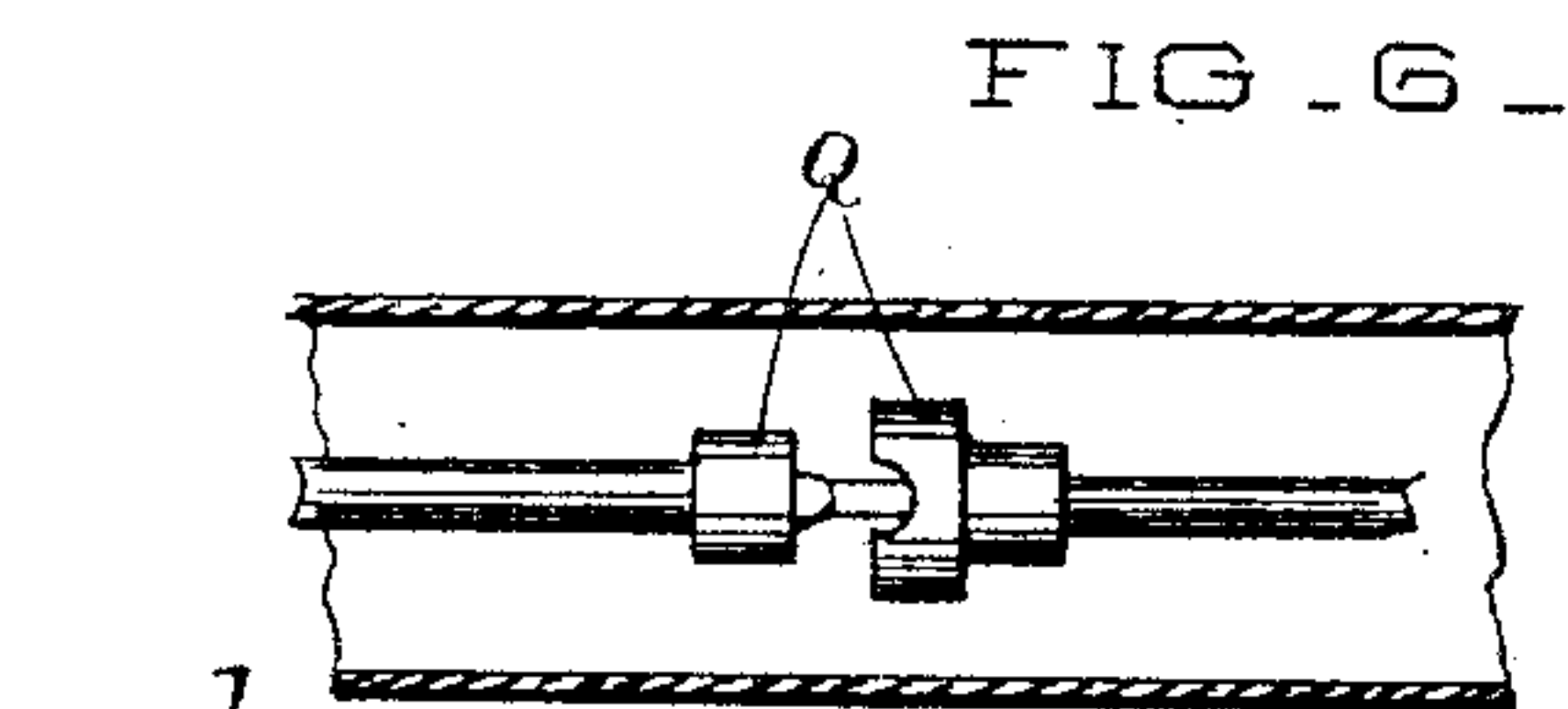
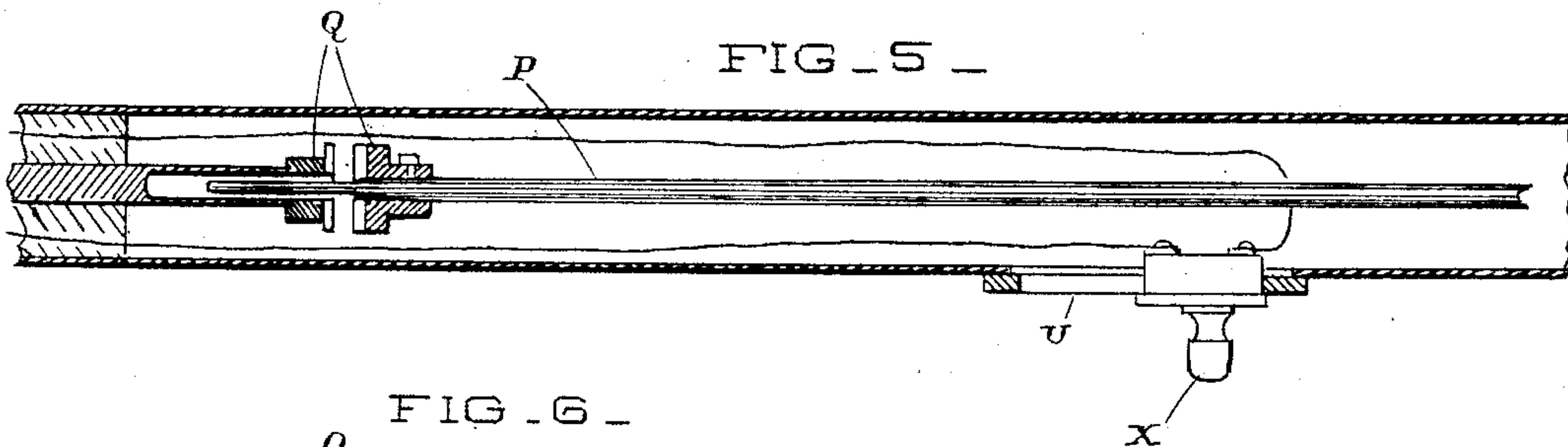
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UNITED STATES PATENT OFFICE.

FRANK F. EGGERS, OF SAN FRANCISCO, CALIFORNIA.

ELECTRICAL DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 449,847, dated April 7, 1891.

Application filed December 10, 1890. Serial No. 374,218. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. EGGERS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Electrical Dental Engines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which I term an "electrical dental engine."

It consists of a motor journaled and rotating directly in the movable bracket of the apparatus, a means for stopping and reversing said motor, and in disengaging it from the mechanism which it drives, together with an extension for the bracket and its connections, and in certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of my apparatus. Fig. 2 is a vertical section. Fig. 3 is a plan view showing the field-magnet and rotary armature and the hinged armature. Fig. 4 is an end view showing the hinged armature and the swiveled journal-box in which the rotary armature-shaft is journaled. Figs. 5 and 6 are enlarged sections of the bracket-arm, showing the clutch mechanism and reversing-switch. Fig. 7 is an enlarged perspective view showing the upper part of a field-magnet, the inclosing frame for the rotary armature, the brushes, switch, and connecting-wires.

The object of my invention is to combine in a single mechanism an adjustable dental bracket and a motor by which the flexible shaft which carries the various tools may be driven, a means for instantaneously disengaging the motor from the shaft, so that the latter will not be driven by the momentum of the motor, an extension mechanism for the bracket, and a switch whereby the direction of rotation of the motor may be changed at will.

A is the field-magnet, and D D are the pole-pieces of the field-magnet. Pivot-holes are made at top and bottom in line with the center of the core, whereby it is journaled in the stationary frame C, which is permanently fixed to a wall or other point of support, and the bracket-arm is so fixed as to turn with the magnet and

armature about the same centers. This rotary armature is properly wound and provided with commutator-sections, and it has a shaft, one end of which is journaled in a box F, which is swiveled in a plate G, so that it will not bind on the shaft when the plate G is moved back or forward. This plate extends across in the space between the field-magnet B and the rotary armature E, and has one end supported upon the vertical pivot-shaft H. This shaft is secured to the ends of the poles D at one side, and the plate G has a horizontal swinging motion about it. At the opposite end of the plate G from the hinged shaft H is formed the transverse head or armature I, which extends upward and downward, so as to stand in line with the poles D of the field-magnet at that side. Upon the opposite side of the segments D from the field-magnet is bolted the vertical bracket or plate J, and a hub K projects from the center of this plate and has a hole through it, forming the journal-box for the opposite end of the rotary armature-shaft.

L L are the metallic insulated sections of the rotary armature forming the commutator, and M are the brushes by which the currents are collected. In the present case I have shown these brushes as made of thin elastic leaves of conducting metal, and these brushes press against the face of the commutator L, collecting the current in the usual manner when the armature is in rotation and acting as springs against the face of the commutator to press it backward when the current ceases. By the pressure of these springs the hinged plate G, with its swiveled box F, is caused to swing about the vertical hinged pins H when the electrical current ceases, and this allows the rotary armature and its shaft to move backward toward the field-magnet. When the current again passes through the magnets, its action upon the plate or armature I will cause the latter to be drawn toward the poles D D of the field-magnet, and this will force the rotary armature and its shaft forward again. The armature I is prevented from sticking to the field-magnet poles by a facing of non-conducting material.

N is the bracket-arm, which projects from

the center of the plate J to any desired length, and O is a stay or brace connecting the outer end of the bracket with the top of the plate J, so as to hold it in position and prevent its sagging.

N' is the section of the bracket adapted to telescope inside the portion N, and serves as an extension by which the bracket may be lengthened at will.

Within the bracket-arm N is journaled the rotary shaft P, which is connected with the outer end of the armature-shaft by a clutch Q. This clutch may be of any suitable or desirable form. In the present case I have shown it consisting of one head fixed to the armature-shaft and having a projecting lug or lugs, and the other head fixed to the shaft P and having corresponding sockets or depressions to receive these lugs so that when the two are brought into contact by the action of the armature I, which moves the rotary armature E forward when the current is passing, as before described, it locks these parts of the clutch together, and thus the rotation of the armature will drive the shaft. As soon as the current is cut off and the elastic brushes M act to force the armature E back the clutches will be disengaged, so that, although by reason of its weight the armature E may continue to rotate for several revolutions, the shaft P will be instantly stopped. The shaft has collars upon each side of the inner journal-box to prevent end motion of the shaft, as this would interfere with the action of the clutch.

The outer portion of the shaft P is journaled in the telescopic extension N', and the two parts of the shaft are connected together by a tubular sleeve R, which is fixed to one portion, (in the present case the outer portion of the shaft P,) while the end of the inner portion of the shaft extends loosely into this tubular sleeve R.

Upon that portion of the shaft P which extends into the sleeve R is fixed a projecting stud S, and the sleeve R has a slot upon one side through which this stud projects and by which it engages with the sleeve. It will be evident from this construction that the sleeve may be slipped backward and forward upon the inner portion of the shaft P to correspond with the telescopic movement of the extension N' of the bracket, and that whatever movement takes place in these parts will not interrupt the continuous rotation of the shaft when power is applied to it.

The outer end of the shaft P connects with the usual flexible shaft P², employed in dental work, which shaft serves to carry the various tools which are driven by it; and by the movement of the brackets swiveling around the support at its interior end, the lengthening and shortening caused by the telescopic construction, and the flexibility of the exterior shaft which carries the tools, the various positions necessary for doing the work are easily attained, while the motor by which

the power is applied, being journaled directly in the bracket, partakes of the same movement.

Whenever it is desired to reverse the motion of the rotary armature and the shafts and tools carried thereby, it is done by means of a switch consisting of three stationary plates T, mounted at equal intervals upon the fixed supporting insulating-piece U; and two plates V, mounted upon an insulating-slide W.

The frame U is secured at any convenient point upon the bracket N, and the slide has a handle X extending out through the side or bottom, by which it may be moved so as to make contact between the plates V and either pair of the plates T. The wires from these various plates lead through holes a, which are made longitudinally through the hub K, and thence to the brushes M and to the binding-posts b, these connections being readily understood by any expert without further explanation.

This apparatus may be operated by a current from a battery, dynamo, or other source of power. In the present case I have shown a storage-battery d with conducting-wires e and a switch or cut-off mechanism f, by which the current may be turned on or off. This switch may be operated by hand, but is preferably provided with a pedal to be operated by the foot, as shown, so that the hands are left free for other work.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a dental bracket and a driving-shaft journaled within it, of an electric motor journaled within the bracket-frame and connected directly with the driving-shaft, substantially as herein described.

2. A dental bracket having a shaft journaled within it, a rotary armature journaled at the inner end of the bracket with its shaft in line with the bracket-shaft and movable longitudinally with relation thereto, and a clutch whereby the meeting ends of the shafts may be connected or disconnected by the movement of the armature, substantially as herein described.

3. A dental bracket having a shaft journaled therein, a rotary armature journaled at the inner end of the bracket with its shaft in line with the bracket-shaft, a clutch-coupling whereby the meeting ends of the two shafts may be engaged when the current is passed through the rotary armature, and springs whereby the armature may be forced away and the shafts disengaged when the current ceases, substantially as herein described.

4. A dental bracket having a shaft journaled therein, a rotary armature with its shaft in line with the bracket-shaft, a field-magnet the poles of which inclose the rotary armature, a movable armature which is acted upon by the poles of the field-magnet, when an electric current is passing, so as to be drawn toward these poles, a journal-box fitted into the

movable armature and supporting the inner end of the rotary armature-shaft, whereby the armature and its shaft are moved forward when the electric current passes, and springs whereby the armature and shaft are forced backward when the current is cut off and the attraction between the poles of the field-magnet and its armature ceases, substantially as herein described.

10 5. A dental bracket having a shaft journaled therein, a field-magnet fixed at the inner end of said bracket, the poles of which inclose a rotary armature which is journaled to rotate between them, an armature having
15 one end hinged to one side of the field-magnet poles, the other end swinging freely so as to be attracted toward the opposite poles of the field-magnet when an electric current is passing, a journal-box swiveled in the swinging
20 armature and carrying the inner end of the shaft of the rotary armature, a clutch by which the opposite end of the armature-shaft is connected with or disengaged from the bracket-shaft, and springs acting upon the
25 side of the rotary armature so as to force it and its shaft and the swinging armature backward when the electric current is cut off from the field-magnet, substantially as herein described.

30 6. A hinged and swinging dental bracket having a shaft journaled within it, a field-magnet and rotary armature mounted in one end of said bracket and movable therewith, a hinged swinging armature having a journal-
35 box swiveled centrally upon it to receive the inner end of the shaft of the rotary armature, a clutch-coupling by which the outer end of said shaft is engaged with the bracket-shaft when the swinging armature is drawn into
40 contact with the poles of a field-magnet, elastic brushes pressing against the commutator-sections which are formed on the side of the rotary armature, said brushes acting to collect

the currents when the rotary armature is in motion and acting as springs to force it back- 45 ward when the current is cut off and the field-magnet ceases to act upon the swinging armature, whereby the clutch is disengaged, substantially as herein described.

7. A hinged swinging dental bracket hav- 50 ing the field-magnet and rotary armature supported in and movable with the bracket, a shaft journaled within the bracket, and a clutch-coupling whereby said shaft may be engaged with or disengaged from the rotary 55 armature-shaft, a switch mechanism fixed upon the bracket, said switch being movable so as to reverse the currents and the direction of rotation of the armature and shaft, substantially as herein described. 60

8. A hinged swinging dental bracket having the field-magnet and rotary armature supported in and movable with it, a sliding telescopic extension end for the bracket, a shaft journaled within the bracket and driven from 65 the rotary armature, a sliding or extension coupling whereby the outer and inner ends of the shaft are connected and by which the shaft is extended simultaneously with the extension of the bracket, substantially as herein 70 described.

9. A hinged swinging bracket and a shaft journaled within it, an electric motor mounted upon the bracket and partaking of its movements, means for engaging and disengaging 75 the shaft of the motor and that of the bracket, a battery or source of power and connecting-wires, and a switch or pedal whereby the electric current may be supplied or interrupted, substantially as herein described. 80

In witness whereof I have hereunto set my hand.

FRANK F. EGGERS.

Witnesses:

S. H. NOURSE,
WM. F. BOOTH.