F. A. LIGOWSKY.

MEDICAL ELECTRICAL DEVICE FOR MEDICAL AND THERAPEUTICAL PURPOSES.

APPLICATION FILED FEB. 24, 1908.

910,930. Patented Jan. 26, 1909

Fig. 2.

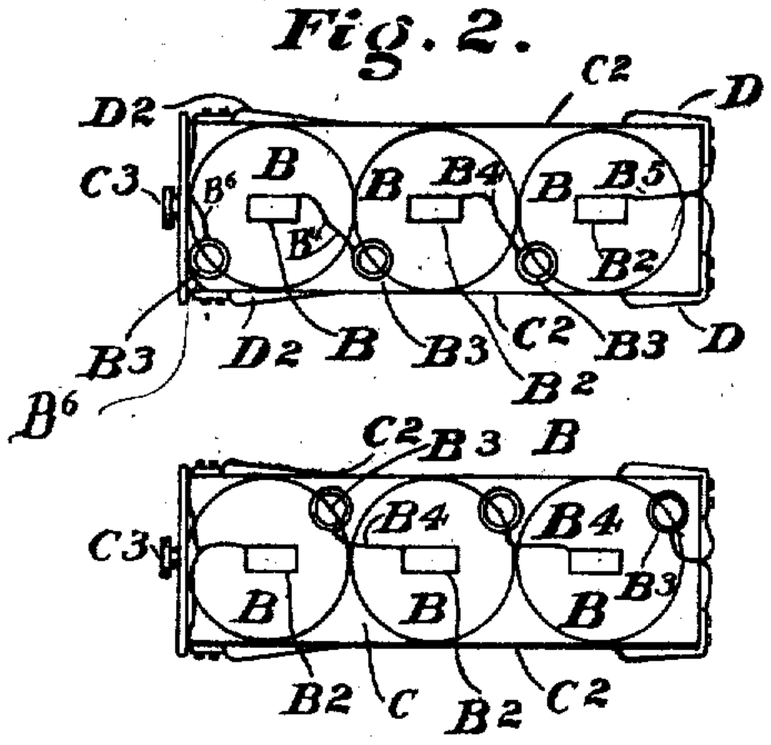


Fig. 1.

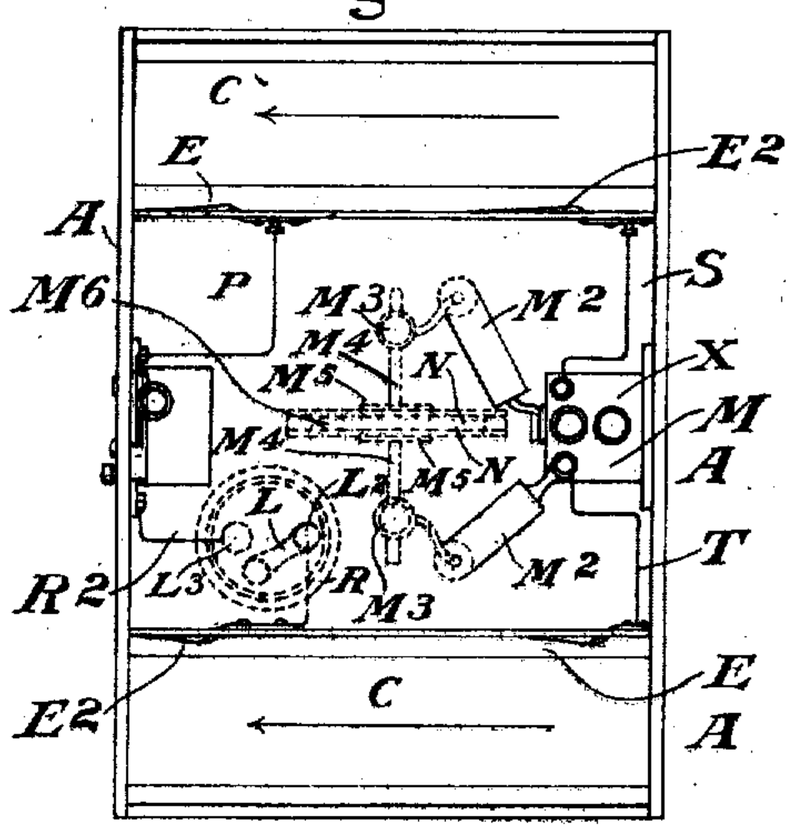


Fig. 3.

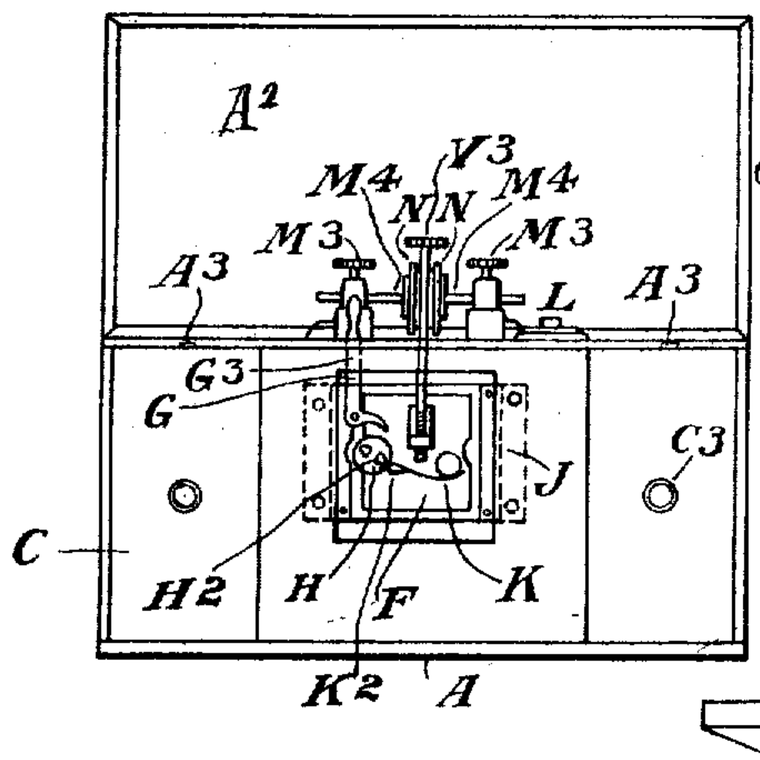


Fig. 5

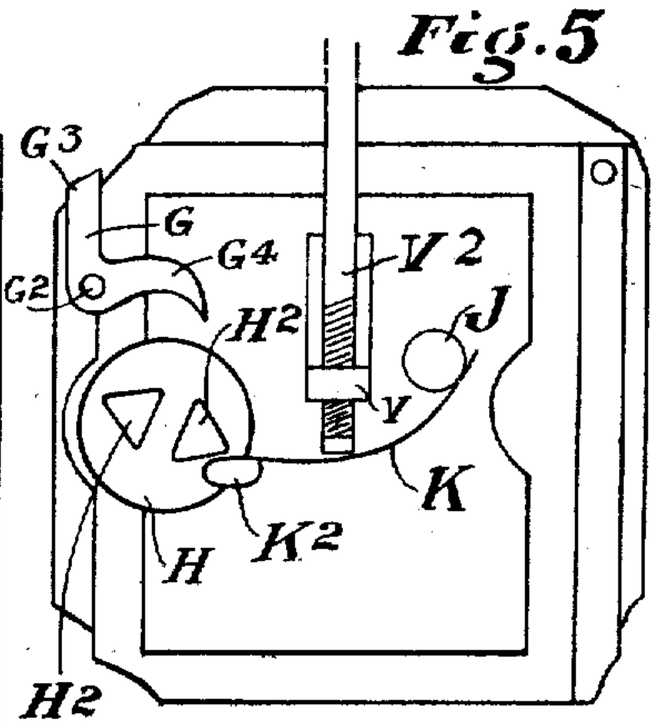


Fig 6.

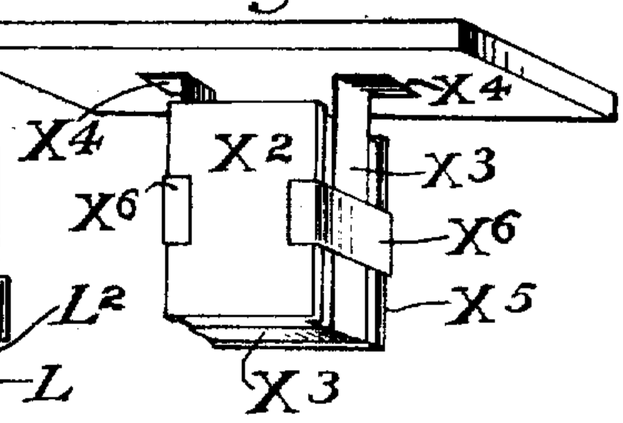
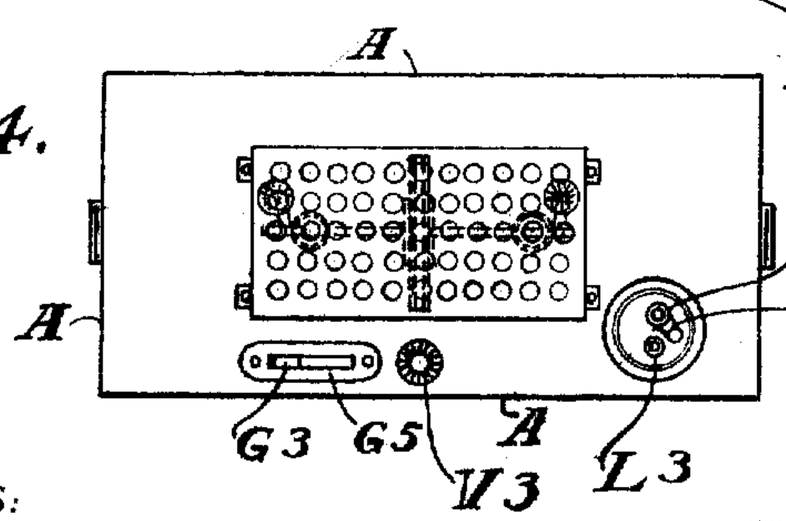


Fig. 4.



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MEDICAL ELECTRICAL DEVICE FOR MEDICAL AND THERAPEUTICAL PURPOSES.

No. 910,930. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed February 24, 1908. Serial No. 417,464.

To all whom it may concern:

Be it known that I, FREDERICK A. LIGOWSKY, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Medical Electrical Device for Medical and Therapeutical Purposes, of which the following is a specification.

One object of my invention is the efficient and rapid and economical generation of ozone, by novel and economical means.

Another object of my invention is the generation of ozone at stated and desired intervals.

Other objects of my invention will be hereinafter apparent.

The several features of my invention and the various functions of the same when used conjointly or otherwise will be apparent from the following description and claims.

In the accompanying drawings making a part of this specification, and in which similar letters of reference indicate corresponding parts,—Figure 1 indicates a plan view of the apparatus, it being understood that those portions of the upper floor which are not occupied with mechanism are removed, and thereby certain parts of the mechanism below the floor are presented for examination. Fig. 2 shows plan views of the batteries of the ozonizer, and the movable receptacles which contain said batteries, and the preferred means for enabling the electric currents of said batteries to be put in circuit with other portions of the mechanism. Fig. 3 is a side plan and elevation showing a diagrammatic view of clockwork, and certain electrical portions of the apparatus in connection with the clockwork, and also a device for controlling the said clock in timing the electrical exposures or connections for the generation of ozone at stated intervals; also the device for controlling the starting and the stopping of the clock in the said ozonizer. Fig. 4 is a top view of the ozonizer, and which shows the position of the timing screw, the stopping and starting lever, and the electrical switch device aforementioned to control the starting and the stopping of the clock. Fig. 5 is an enlarged view of the wheel and contact spring and regulating screw shown on a small scale in Fig. 3. Fig. 6 is a perspective view of the induction coil when suspended and illustrating one mode of suspending the bandage.

I will now proceed to describe my invention in detail. The entire mechanism is supported and held by a suitable framework, and a useful and convenient kind of such framework consists of a box A, and this box is also preferably provided with a cover A^2 hinged at A^3, A^3, to the box A. This cover A^2 when brought down covers those portions of the mechanism located on and above the top of the box A.

Batteries B of proper strength are present, and when my apparatus is portable, the box A is adapted to carry such batteries. And in the illustrated construction, each end portion of the box is provided with a recess or pocket P. One of these pockets P receives one set of batteries, and the other of these pockets P receives the other set of batteries. Inasmuch as the batteries B will require to be renewed at intervals, I locate one set of these batteries in a drawer C, which is received into one of the pockets P, and another set of these batteries in a similar drawer C, which is received into the other of these pockets P. A knob C^3 on the end of each drawer enables the latter to be more readily withdrawn from its pocket P for the inspection of the batteries, for their renewal or replacement, and for the repair of their immediate electrical connecting portions.

Where I use batteries of more than one cell, as I usually do, these batteries are electrically connected, and in the illustrative drawing I have shown the batteries connected in series. Thus the carbon B^2 of one battery is connected to the zinc B^3 of the next, by a wire B^4. Provision is made for electrically connecting these batteries with the circuit wires. Thus the wire B^5 from the carbon B^2 of the last battery at one end of a series, connects with a metal spring or springs D elastically standing out from the side or sides C^2 of the drawer, and the wire B^6 from the zinc B^3 of the last battery at the other end of this series connects with a metal spring or springs D^2 elastically standing out from the side or sides C^2 of the drawer.

That side of each receptacle P which is nearest the central mechanism of the ozonizer is provided with elastic contacts E and E^2. When a drawer C is inserted in the receptacle P, an elastic spring D makes con-

tact with thd contact E, and an elastic spring D^2 makes contact with the contact E^2. One advantage of having the elastic springs D and D^2 on one side C^3 of the drawer, and a similar set of elastic springs D and D^2 on the other side of the drawer is that it matters not whether the drawer is put into the machine at the right or the left hand of the central portion, because with the provision of double contacts noted, its batteries will always make respectively electrical connections with the respective contacts E and E^2. Therefore either drawer C can be put in either pocket P. Another advantage of the presence of such spring contacts D and D^2 on both sides C^2, C^2, of the drawer is that those of said springs which are on that side of the drawer which is away from the contacts E and E^2 will press against that side of the pocket P adjacent to them, and will press the drawer over toward the contacts E and E^2 and will the better make certain that the spring metal contacts D and D^2 on the side of the drawer next to the contacts E and E^2 shall respectively make contact with the same.

In the machine is a clockwork F which consists of a series of wheels, a spring which can be wound up, means for winding the spring, an escapement, and the like, in other words this clockwork has the usual parts adapted to enable the clock to tick off the customary seconds of time. Inasmuch as the construction of such clockwork F is well known, and is in common use in time keepers, the clockwork is shown conventionally and not in detail.

A device for starting and stopping the clock is shown and consists of a lever G, fulcrumed at G^2 to a stationary part of the frame, and having a handle arm G^3 and a hooked arm G^4, adapted when the handle G^3 is moved toward the right, see Figs. 3 and 5, to engage the periphery of a disk H fixed on a rotatable pivot of the clockwork, and stop this disk H from further rotation, and thereby stop the motion of the clockwork. When this handle arm G^3 is moved toward the left, the hooked arm G^4 is thrown out of engagement with this disk H, and the latter and the clockwork impelled by the wound-up spring is free to go on moving, and to operate the device for directly generating ozone. Preferably a slotted guide G^5, stationary in the frame, is present, and in the slot of this guide the upper part of the handle arm G^3 of this lever G is located. The handle arm is free to move to the right or left as before indicated, but cannot move laterally and thus go out of its correct line of movement.

Located on a stationary part of the machine is the metal stud J, and this carries a spring arm K whose free end K^2 extends over to the disk H. On this disk H are one or more studs or posts H^2, H^2. These posts are preferably of a triangular shape for the better performance of the functions for which they are designed. The electrical current passes through the stud J and the spring arm K and its free end K^2, and when any one of the studs or posts H^2 on the disk H comes in contact with the end K^2 of the spring arm K, the electrical current passes on and is established and passes through the devices directly included in the generation of the ozone. But when by the revolution of the disk H, the stud is out of contact with the spring arm K, then the current of electricity is broken and no longer acts in the work of generating ozone.

The electric wires of the circuit are provided with a switch whereby the electric current may be imparted to the machine or cut off therefrom at will. In the present illustrative instance, I have located the switch L as shown. This switch L is pivoted at one contact L^2 and is adapted when swung to have its other (free) end moved over and into contact with the contact L^3. When thus moved, the electrical circuit is established in the machine. The switch contact L^2 is connected to the one pole of the batteries, and the switch contact L^3 is connected to the other pole of the batteries, it being understood that the electric circuit with contact L^3 does pass from the battery through the clockwork, viz.: disk H, stud H^2, and spring arm K, and stud J, subject to the interruptions at the disk H and stud H^2 as aforementioned, before reaching the said switch contact L^3. But the switch L might be pivoted at contact L^3 and move over onto and off from contact L^2 and be equally effective.

An induction coil X is present, and it is preferably inclosed in a suitable supporting receptacle, here illustrated as a box M. This induction coil is employed to multiply said battery current to a very high electromotive force. This battery current is carried from the induction coil by secondary or high tension wires M^2, M^2, to their respective terminals M^3, M^3. From each terminal M^3, a conductor M^4 preferably in the shape of a rod, with a flat metallic terminal plate M^6, conducts this high tension current to an adjacent glass plate N. There are two of such glass plates at a requisite distance the one from the other. One terminal conductor M^4, M^6 is in contact with the nearest side of one glass plate N while the other terminal conductor M^4, M^6 is in contact with that side of the other glass plate N which is nearest to it. Thus this high tension current comes in contact with these glass plates N, N, and tends to highly electrify the said glass plates. This current produces a fluorescence across the gap or air space M^9 between the said glass plates N, N, which space N is preferably a distance of three eighths of an inch.

During this time, viz.: while the current is passing from one of these glass plates N to the other of these glass plates N, the air is not only present in said space, but owing to an increase of temperature, it moves through said space M^6. The air is there concentrated and after passing through the said space M^6 between the said glass plates N, N, becomes ozonized.

Whenever the switch L, L^1, L^3 completes the circuit, the current passes from the spring contact E of one battery receptacle, on through the circuit wire to the clock and to the disk H, and the current from the battery in the other battery receptacle, passes through contact E^2 and wire R and through the said switch and the wire R^2 to the said spring contact K, F. At the same time, the current from the first named receptacle is established between the contact E^3 and through the line S to the induction coil X, and the current is established from the contact E of the second battery (in the second receptacle) by the line T to the induction coil X. Thus the entire circuit between the batteries and the said induction coil and the disk H on the one hand, and the spring contact on the other hand is completed, but the current is not continuous and in action, except when as the disk H revolves one of the posts H^2 thereon comes into contact with the spring contact K, K^1. When one of these posts H^2, as the disk H revolves by the clockwork, reaches the spring contact K, the entire circuit is established and the electrical current passes across the air space M^6 from the glass plate N to the opposite glass plate N, and generates ozone. This ozone is steadily manufactured until by the onward rotatory movement of the disk H, that post H^2 which is in contact with the spring contact K has left this spring K. Then the current is broken until the next post H^2 reaches this spring contact K, and then the electrical circuit is again established and the ozone will be generated until this second post H^2 passes out of contact with the spring contact K. This generation of ozone at stated intervals is continued so long as desired. Then the switch L is moved and the electrical circuit is broken.

The length of time the current is in action and ozone is generated is determined by the length of time each post H^2 is in contact with the contact spring K. In my machine, I have made this length of time changeable by a suitable device of which the following is a preferred form. I provide a flange V which is secured to the frame. This flange has an opening that is screw threaded. A vertical rod V^2, screw threaded, extends through this opening in the flange V and its screw thread engages the screw thread of the said opening. Thus by rotating this rod V^2 in one direction, it is screwed upward, and by rotating it in the other direction, it is screwed downward. A hand wheel V^3 on the rod enables the operator to readily rotate the said rod. When it is desired to diminish the length of time that the electrical action in generating ozone shall continue, the operator screws downward the rod V^2 until it touches the spring contact K. He then screws the rod farther down, and the distance he screws down the rod V^2 after it has reached the spring contact K, determines the diminished length of electrical action of the machine. When the spring contact K is free to move and is not depressed by the rod V^2, it stays longest in contact with the adjacent moving post H^2. When the spring contact K is pushed down by the rod V^2, it is not reached as soon by the post H^2 and will not remain as long in contact with the post H^2 as when it is free from contact with the vertical rod V^2. The farther the spring contact K is depressed by the rod V^2, the shorter is the length of time in which the post H^2 is in contact with the spring contact K, and the shorter is the length of time during which the electrical action does continue.

As at present constructed, the electrical action for the generation of ozone, can be varied from one and one half seconds to two seconds, and there are two such closed circuits in a minute. A varying of the number of posts H^2 on the disk H will correspondingly vary the number of closed circuits in a given time. I have mentioned that the induction coil is preferably supported in an inclosed receptacle.

It is well known that an induction coil when in operation makes much noise. I have devised a mode for eliminating most of the noise it makes. This mode consists in suspending the coil so as to prevent the vibrations which occur in it from being conducted to the frame or other portion of the machine that would respond to these vibrations somewhat as a sounding board does in a musical instrument. My preferred means for so suspending this induction coil X are as follows:—I locate the induction coil in a box X^2 and suspend this box by means of a strap X^3 which latter goes down along one side of this box, and beneath the box and up alongside of the other side of the box. Each upper end X^4 of this strap X^3 is fastened to the frame. To prevent this strap or bandage X^3 from accidentally slipping sidewise and off from the box X^2, I provide this box with edge flanges X^5, one flange X^5 on each vertical edge of this box X^2. Between these flanges X^5 is the strap X^3, and it is thus securely held in place. As a further guard for preventing any accidental displacement of the strap X^3, in cases where the top of the box X^2 does not come close to the support where the ends X^4, X^4, of the strap are fastened, and when the box X^2, if lifted, might allow the

strap X^3 to so buckle as to let the box X^2 out from the loop of it (the strap), I provide two other straps X^6, X^6, secured at their ends to those sides of the box X^2 that are not occupied by the straps X^3. These straps X^6 respectively cross over the straps X^3 at their respective sides of the box X^2. Thus the box X^2 is not only suspended, but is securely held by its suspensory strap X^3. Thus the disagreeable humming noise proceeding from the induction coil is nearly all prevented.

The machine as a generator of ozone for nervous people and for patients affected by such kinds of noise is rendered very acceptable.

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

1. In a machine for the generation of ozone, the combination of the glass plates, induction coil batteries, circuit connections, and switch, and clockwork for interrupting and closing the circuit, and means for stopping the clockwork, substantially as and for the purposes specified.

2. In a machine for the generation of ozone, a clockwork, a rotatory disk of the clockwork, post on the disk, connected with one pole of the battery, spring contact connected to the other pole of the battery, the spring contact located so as to come into contact at intervals of time with the post on the disk, substantially as and for the purposes specified.

3. In a machine for generating ozone, by electrical action, and containing an induction coil as a part of the means for generating the requisite electricity for said machine, the combination of said induction coil and suspensory means for supporting the said induction coil and at the same time separating it from the resonant portions of the frame, substantially as and for the purposes specified.

4. In a machine for generating ozone by means of an electrical current, clockwork provided with a rotatable disk carrying at a point away from the center of the disk, and a spring contact adapted to receive the impact of the post at intervals as the disk revolves and establish the current while the post is in contact with the said spring contact, a rod screwed through a stationary eye or flange, and when advanced bearing upon said spring and forcing it as desired for the purpose of diminishing at will and to the desired degree the duration of contact between the said spring contact and the post, substantially as and for the purposes specified.

5. In a machine for generating ozone by electrical means, clockwork, provided with a disk having a triangular post located out of the center of the said disk and revolving as the disk is rotated, and a spring contact adapted to come into contact with the said post as the disk is revolved at intervals, substantially as and for the purposes specified.

6. In a machine for generating ozone by electrical means, clockwork, provided with a disk having a triangular post located out of the center of the said disk and revolving as the disk is rotated, and a spring contact adapted to come into contact with the said post as the disk is revolved at intervals, and a device for moving the spring contact more or less away from its arc of its contact with the triangular post, substantially as and for the purposes specified.

7. In an electrical machine for generating ozone, clockwork provided with a rotatable disk provided with two or more triangular posts located outside of the center of the said disk, and a spring contact adapted to successively impinge against the triangular post and establish the contact, substantially as and for the purposes specified.

8. In an electrical machine for generating ozone, clockwork provided with a rotatable disk provided with two or more triangular posts located outside of the center of the said disk, and a spring contact adapted to successively impinge against the triangular post and establish the contact, and a device for altering the position of the spring contact so as to diminish more or less the arc of its contact with the triangular post, substantially as and for the purposes specified.

9. In an electrical machine for generating ozone, clockwork provided with a peripheral surface and stop, in combination with a movable bar adapted when operated to stop the movement of the clock, substantially as and for the purposes specified.

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Attest:

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