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 DEVICE FOR DRIVING ELECTRIC CLOCKS AND SIMILAR APPARATUS.
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Patented May 13, 1913.

Fig. 1.

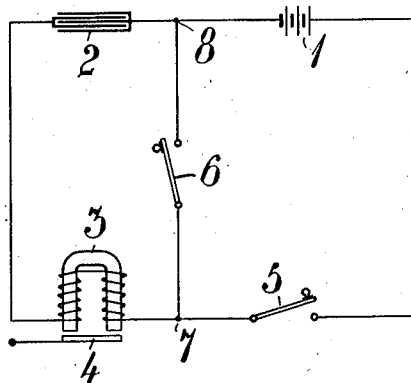


Fig. 2.

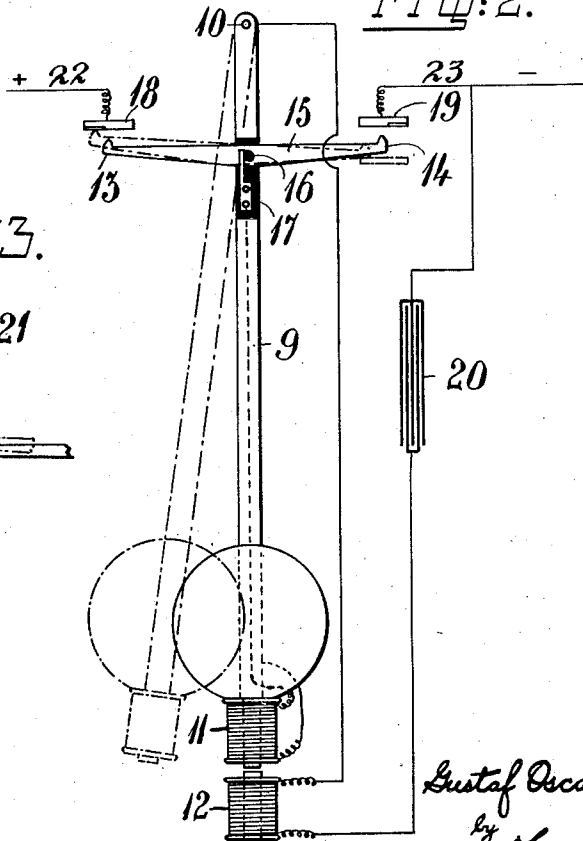
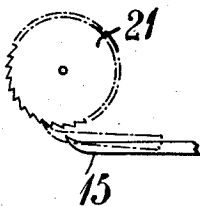


Fig. 3.



Witnesses.

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DEVICE FOR DRIVING ELECTRIC CLOCKS AND SIMILAR APPARATUS.

1,061,550.

Specification of Letters Patent.

Patented May 13, 1913.

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To all whom it may concern:

Be it known that I, GUSTAF OSCAR LARSSON, a citizen of the Kingdom of Sweden, residing at Stockholm, Sweden, have invented 5 new and useful Improvements in Devices for Driving Electric Clocks and Similar Apparatus, of which the following is a specification.

This invention relates to an improved device for driving electric clocks and similar apparatus, such as self-registering barometers, musical instruments, and so on, in which the driving power consists of electric impulses supplied at certain intervals from 10 an electric source of current. In apparatus of said kind the greatest difficulty has been to construct contacts which are not injured by the circuits unceasingly being closed and broken. It is especially the breaking spark 20 which on account of its intensity destroys the contacts, and in order to reduce the same it has been proposed to use condensers that take up the extra current in breaking the circuit. In the present device, which is 25 adapted to be used in apparatus driven from a source of continuous electric current, is also used a condenser but in such a manner that the condenser takes up the working current from the source of electric current 30 and thereupon supplies the same to a discharge circuit by means of contact devices which are controlled by the driven apparatus itself in such a manner that a continuous circuit is never closed and the circuit is not 35 broken at the contacts until the condenser has been charged or discharged. By this means the formation of sparks in breaking the circuit will be fully obviated, the breaking taking place at currentless contacts, and 40 the contacts will be influenced only by the comparatively harmless closing spark.

In the accompanying drawing Figure 1 shows diagrammatically one embodiment of my invention, while Fig. 2 illustrates the application of my invention to an electric pendulum. Fig. 3 shows a detail.

Referring to Fig. 1, 1 indicates a source of electric current, 2 a condenser and 3 an apparatus for transforming the electric impulses into mechanical power. The said apparatus 3 consists of an electro-magnet and an armature 4 or any equivalent device serving to drive the clock or any other apparatus to be driven. 5 and 6 indicate two

switches which alternately are opened and 55 closed by the action of the apparatus driven by the current for instance by means of a pendulum, an oscillating balance wheel, a continuously rotating wheel, or the like. The switch 5 is connected in series with the 60 condenser and the electromagnet 3 and serves to close the circuit for charging the condenser, while the switch 6 is inserted in a bridge 7—8 and serves to discharge the 65 condenser. Though a source of continuous electric current is used, a continuous current cannot, as is easily understood, flow through the switch 5 but only a rapidly decreasing impulse of current for charging the condenser. The switch 5 is thereupon opened 70 when the charging current has ceased and before the switch 6 is closed for discharging the condenser. Also through the switch 6 passes only a short impulse of current which is rapidly reduced to *nil*, whereupon the 75 switch 6 is opened before the switch 5 next time is closed, so that a continuous circuit of the source of current is never closed. As is obvious from the above the apparatus 3, 4 serving to drive the clock, or the like, 80 receives two impulses of current for each period of charging and discharging, during which the switches 5 and 6 are each closed and opened one at a time in such a manner that both are never closed simulta- 85 neously and so that the opening always takes place at currentless contacts after the charging or discharging of the condenser. Obviously the switches 5 and 6 may be combined to a two-way switch if desired. The driving 90 magnet 3 may be inserted at an arbitrary place in the circuit 6, 5, 1, 8 or in the bridge 7, 8. In the former case the discharge current of the condenser and in the latter case the charging current of the same 95 is consumed without being utilized, so that the magnet 3 receives only one impulse of current of unchanged direction during each period of charging and discharging.

The device described above is especially 100 suitable for driving electric clocks from a lighting circuit in which case a condenser of a few microfarads is sufficient if the charges and discharges occur with so short intervals as correspond to the movements of 105 the pendulum.

Referring now to Fig. 2, 9 indicates the rod of a pendulum which oscillates on a center

10. On the lower end of the pendulum is provided an electromagnet 11. Another electro-magnet 12 is secured to the frame of the clock (such frame not shown). The pendulum is in well known manner kept in motion by the attraction or repulsion between the said electromagnets. On the pendulum rod, which is of a conducting material, such as metal, is further provided a contact arm 15 which is pivoted on a pin 16 and electrically insulated from the pendulum rod 9, said arm 15 having contacts 13 and 14 at the ends thereof. The movements of the arm 15 are somewhat checked by means of a weak spring plate 17 secured to the pendulum rod 9 and electrically insulated therefrom and bearing against the arm 15. 18 and 19 are two contact plates each of which is connected by means of a wire 22 and 23 respectively to one pole of a source of electric current, (not shown), the contacts 13 and 14 of the contact arm 15 striking said plates during the movements of the pendulum. The electromagnet 11 is connected up between the pendulum rod 9 and the spring plate 17, while the electromagnet 12 and the condenser 20 are connected up between the pendulum rod 9 and that pole of the source of electric current, which is connected to the contact plate 19. The condenser is thus inserted between the one pole of the electric source and the contact arm 15. When the contact 13 strikes the contact body 18, the current from the latter flows through the arm 15, the spring 17 to the electromagnet 11 and therefrom through the pendulum rod 9, the pin 10 and the electromagnet 12 to the condenser 20, the latter thus being charged. When the contact 14 strikes the contact plate 19 the electricity accumulated in the condenser flows through the said contacts 19 and 14, the arm 15, the spring 17, the electromagnets 11 and 12 and back to the condenser, the latter thereby being discharged. If the contact body 18 be provided at the same side as the contact body 19 and below the latter, as is indicated by dotted lines in Fig. 2, the arm 15 need extend only to the one side and have only one contact end. Instead of two electromagnets only one electromagnet with an armature may be used to keep the pendulum in motion.

By using a ratchet wheel 21, connected to one pole of the source of electric current instead of one of the contact plates 18 or 19 and forming the corresponding end of the arm 15 as a pawl, as is indicated in Fig. 3, the movements of the arm 15 may simultaneously be utilized to drive the moving gear of the clock. Also other step-by-step motions well known in the art may be used in combination with the pendulum to drive the clock or the like.

Having now described my invention what

I claim as new and desire to secure by Letters Patent is:

1. In an electrically driven clock and its operating circuit, the combination of an electric condenser in said circuit for taking up and delivering the driving currents of the driven clock, and means actuated by the clock for periodically closing and breaking the circuit of said condenser, substantially as and for the purpose set forth.

2. In an electrically driven pendulum actuated clock and its operating circuit, the combination of an electric condenser in said circuit for taking up and delivering the driving current of the said clock, and an oscillating member for closing and breaking the circuit of said condenser, substantially as and for the purpose set forth.

3. In an electrically driven pendulum actuated clock and its operating circuit, the combination of an electric condenser in said circuit for taking up and delivering the driving currents of the said clock, an oscillating member, and an electro-magnetic device controlled by said oscillating member for maintaining the movements of the said oscillating member and supplied by current impulses from the condenser, substantially as and for the purpose set forth.

4. In an electrically driven clock and its operating circuit, an electric condenser in said circuit for taking up and delivering the driving currents of the clock, an oscillating member having contacts for closing and breaking the circuit of said condenser, and an electro-magnetic device connected in series with the condenser and adapted to maintain the movements of the said oscillating member, substantially as and for the purpose set forth.

5. In an electrically driven clock, the combination of an electric condenser for taking up and delivering the driving currents of the clock, a charging circuit for said condenser, a discharging circuit for the same, an oscillating member, and an electro-magnetic clock-actuating device connected to one of said circuits, substantially as and for the purpose set forth.

6. In an electrically driven clock, the combination of a swinging member, a contact device controlled by said member, and an electro-magnetic device for maintaining the movements of the said swinging member, an electric condenser connected in series with the said contact device and the said electro-magnetic device whereby said condenser will discharge current impulses for operating said electro-magnetic device and said condenser will be charged and discharged in timed relation to said swinging member, substantially as and for the purpose set forth.

7. In an electrically driven clock, the combination of a pendulum, switches controlled

by the said pendulum, an electro-magnetic device for maintaining the movements of the said pendulum, and an electric condenser connected to said switches for taking up and
5 delivering the driving currents of the clock to said device, substantially as and for the purpose set forth.

8. The combination with a source of high tension electricity and contact terminals
10 therefor; of a pendulum, electro-magnetic mechanism to maintain the movement of the pendulum, a condenser connected to the source of electricity, and a contact member insulated from and actuated by the pendu-
15 lum to periodically and alternately close circuit through the electro-magnetic devices to the condenser, whereby said condenser will be alternately charged and discharged to periodically energize the electro-mag-
20 netic pendulum propelling devices.

9. The combination with a source of high tension electricity and a positive and negative contact terminal therefor; of an oscillating member, electro-magnetic means to
25 actuate the oscillating member, a condenser

connected to one pole of the source of electricity and means operated by the oscillating member to charge and discharge the condenser through said operating devices.

10. In an electric clock, the combination 30 with a moving driving element of the clock and electro-magnetic devices for maintaining the operation of said element; of a high tension electric supply circuit for continuous current, a condenser connected between 35 said circuit and the electro-magnetic devices, and contacts for charging the condenser from the supply circuit and discharging the condenser through said devices at different times and controlled by said ele- 40 ment, whereby impulses from the condenser substantially constant in pressure and volume are supplied to said devices.

In testimony that I claim the foregoing as my invention, I have signed my name in 45 presence of two subscribing witnesses.

GUSTAF OSCAR LARSSON.

Witnesses:

EVALD DELMAR,
JOHN DELMAR.