G. L. HALL.

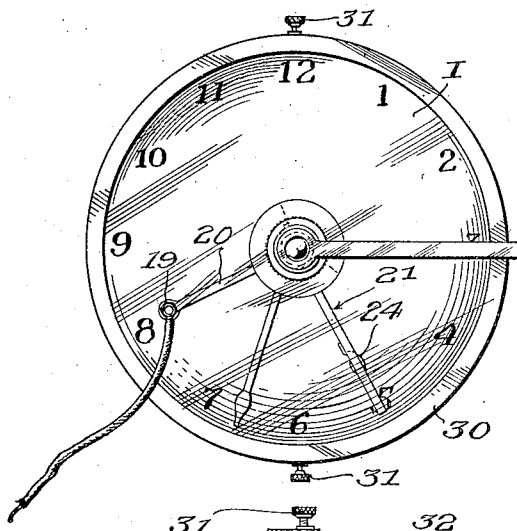
TIME CONTROLLED CIRCUIT CONTROLLER.

APPLICATION FILED OCT. 14, 1919.

1,362,299. Patented Dec. 14, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



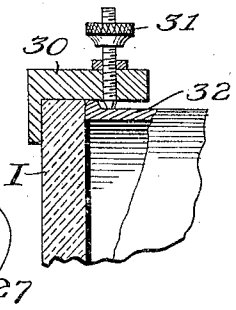


Fig. 3.

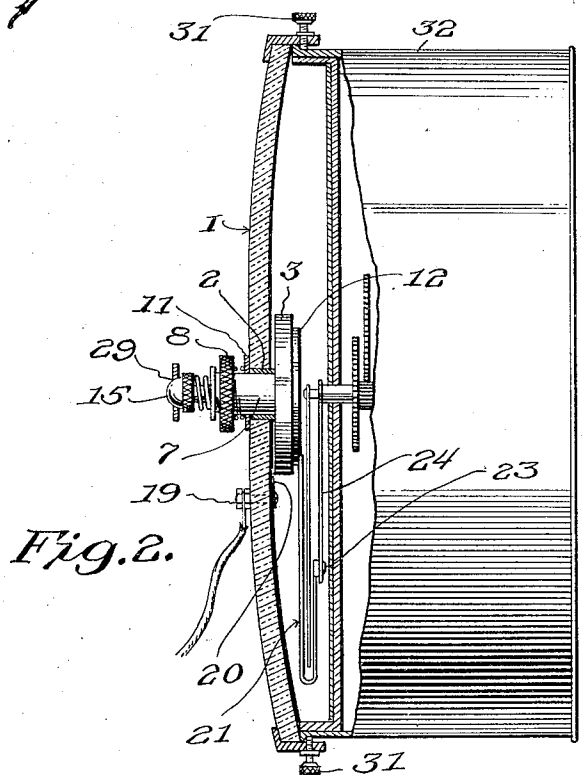


Fig. 2.

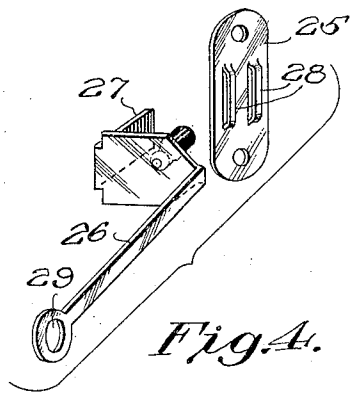


Fig. 4.

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2 SHEETS—SHEET 2.

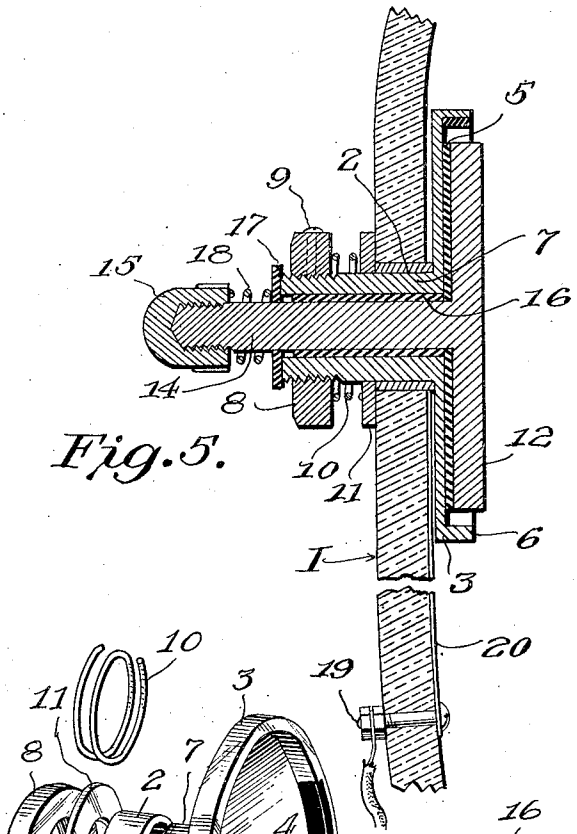


Fig. 5.

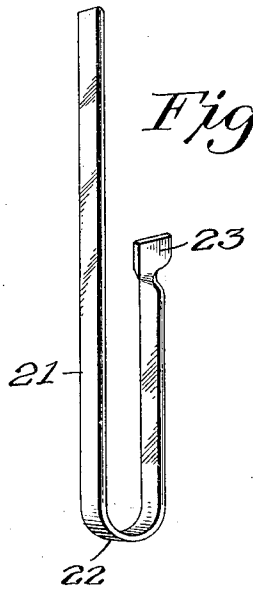


Fig. 6.

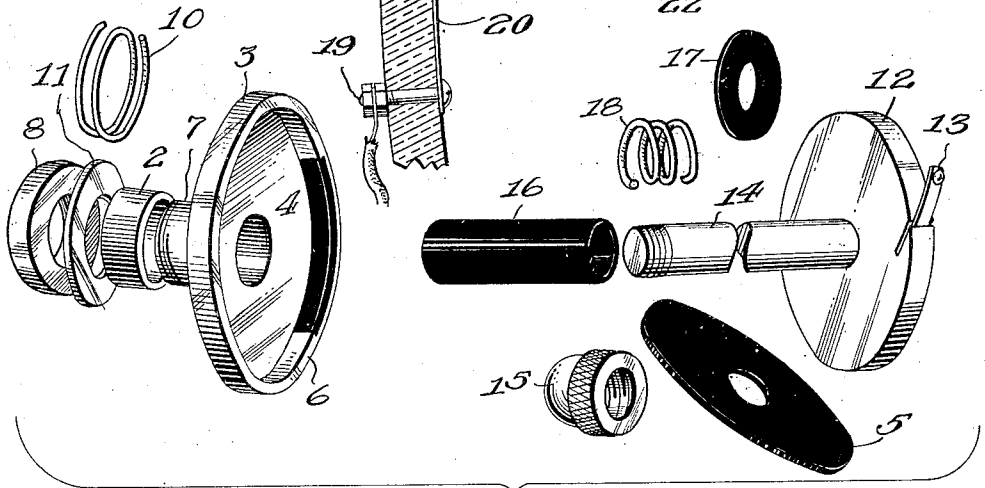


Fig. 7.

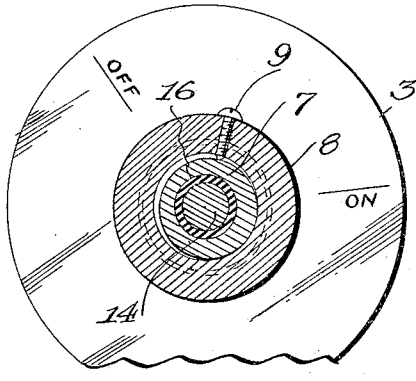


Fig. 8.

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By Frank H. Borden

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UNITED STATES PATENT OFFICE.

GEORGE L. HALL, OF WASHINGTON, DISTRICT OF COLUMBIA.

TIME-CONTROLLED CIRCUIT-CONTROLLER.

1,362,299. Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed October 14, 1919. Serial No. 330,563.

To all whom it may concern:

Be it known that I, GEORGE L. HALL, a citizen of the United States, residing in Washington, District of Columbia, have invented certain new and useful Improvements in Time-Controlled Circuit-Controllers, of which the following is a specification.

My invention relates to time controlled circuit controllers, and pertains particularly to attachments applicable to clocks for controlling circuits.

In operating an automobile it frequently occurs that the owner cannot conveniently light his lamps at the time required by law, and hence it is desirable that his lamps be automatically lighted at a predetermined hour, and my invention pertains particularly to a device for this purpose.

There has been great activity in the art of time controlled circuit controllers, and as far as is known it divides into three general classes.

There are, first, devices actuated by the movement of an alarm clock or by the unwinding of the winding key or similar mechanisms, which are located in back of the clock. This class is not generally applicable to automobile lighting as the contact mechanism is all behind the clock and is too inaccessible for use. This will be apparent when it is remembered that automobile clocks are usually mounted on a dash board and that they are customarily set flush therewith so that only their faces are visible.

The second class is that in which the current passes through the clock train itself with various means for closing the circuit, usually part of the clock train. The disadvantage of this form of circuit closure is that it requires a specially constructed clock, as it is impossible to attach a circuit closing device to it without material modification, and then there is the great disadvantage of magnetizing the clock train and interfering with its proper movement.

The third class, and that to which my invention belongs, is that in which the hands of the clock act as a means to operate the circuit closing device. As a modification of this class there is the type in which the hand of the clock itself is a current conducting element. This requires a modification of the clock structure and is subject to the liability of magnetizing the clock train.

If the circuit controlling device is to be used as an attachment to clocks already in use, it is important that it be made so that it can be attached without affecting the clock train or modifying any of the elements thereof, and it is very desirable that it be simple enough to be readily attached by a layman.

It is the object of my invention to make such an attachment and one that eliminates the objections to the various forms of time controlled circuit controlling devices previously constructed.

In carrying out my invention I preferably provide a clock crystal, carrying rotary contact mechanism adapted to be actuated by one of the hands of a clock, and which is preferably produced as a unit to be readily attached to a clock. In applying my invention to a clock, all that is necessary is to remove the crystal already in the clock and substitute my attachment and connect the contact members to leads from the electric lighting system.

By using the clock crystal as a support for the contact members, it will be apparent that the crystal acts as an insulator to prevent the passage of the circuit through any parts of the clock proper, as the circuit passes only through leads mounted on the crystal itself.

It is important that the attachment should not interfere with the visibility of the clock face, and this I insure by reducing the space taken up by the contact mechanism to a minimum.

In the accompanying drawings forming a part of my specification:—

Figure 1 is a front elevation of a clock with my attachment in position thereon, and showing the location of the contacts.

Fig. 2 is a side elevation of a clock with my attachment in position, partially broken away in order to show the relation of the contact mechanism to the hands of the clock.

Fig. 3 is a detail, showing the structure by which the crystal may be fastened in position.

Fig. 4 is a perspective view of the switch.

Fig. 5 is a vertical section, on an enlarged scale, of the attachment, showing the relation of the parts.

Fig. 6 is a view of the arm against which the clock hands impinge in their rotation in order to operate the device.

Fig. 7 is a detached perspective view of the contact mechanism, and

Fig. 8 is a horizontal section through the contact mechanism looking down.

The clock crystal 1 is preferably concave in shape and has a hole in the center in which is received a metal bearing or bushing 2. The normally stationary but adjustable contact member 3 has a recess 4 in its lower face. The bottom of this recess is covered with insulation 5, which may be integral therewith or applied as a washer, and the inner periphery of the contact flange 6 is insulated preferably for one-third of its extent. This insulation is flush with the remaining contact surface. This contact member is mounted on a hollow spindle 7 threaded at its upper extremity to receive a lock nut 8 which is preferably provided with a knurled edge, and is held in position by suitable means, such as a set screw 9. This lock nut bears against a small spring 10 and presses it against a washer 11 bearing against the face of the crystal. This gives a variable frictional engagement of the contact member 3 with the inner face of the crystal, sufficient for it to resist rotation by the rotating contact member, but permitting rotary adjustment by pressure on the locknut 8.

Fitting within the recess 4 of the contact member 3 and bearing against the insulation 5 thereof, is the rotary contact member 12. This is provided with a wipe contact or brush 13 extending substantially tangentially from the outer periphery and bearing against the inner periphery of the contact flange 6. This last mentioned contact member is mounted on a post 14 which is threaded at the top to receive a nut 15. The post 14 is insulated from the hollow spindle 7 by the fiber bushing 16, in which it is readily rotated. A fiber washer 17 bears against the end of the hollow spindle, and the spring 18 is compressed thereagainst by the nut 15. It will be seen that this gives a frictional engagement between the contact members, sufficient to keep them in their proper operable positions, and yet not too great to prevent the rotation of the rotary contact 12.

Mounted in the crystal at any convenient point is a binding post 19, to receive a wire from one side of the electric lighting circuit. A flat wire or other conductor 20 extends along the inner face of the crystal from the binding post to the metal bearing 2. In connection with which, it will be apparent that I might still further utilize the insulating quality of the glass crystal by having the conductor embedded therein. The structure disclosed, however, is quite sufficient for ordinary uses and is cheaper to produce, and as the invention is primarily an article of manufacture, this is of importance.

An arm 21, having an elongated U-shaped portion 22 and an offset depending lug 23, is rigidly affixed to the inner or lower side of the rotary contact member 12 and extends radially therefrom. This arm is so designed that the minute hand passes through the U-shaped portion, and the hour hand engages behind the offset lug 23. The lug is offset so that the arm 21 and hour hand 24 will be in the same line, so that the exact time can be readily ascertained from the position of the arm.

The other wire or lead from the electric lighting circuit terminates in the plate 25 which is preferably mounted on the dash board in close proximity to the clock.

It may be advisable to have the other lead terminate in a binding post similarly mounted on the crystal, and connect this binding post to the top of the nut 15 by any suitable means such as a key. Or if it is not desirable to have a key, it might readily be affixed to the nut 15 or post 14. The form disclosed is obviously subject to many modifications and I do not wish to be considered as limited to this precise structure.

The resilient key 26 has a flat portion 27 engaging under the raised ribs 28 of the plate, and bears down upon the curved top of the nut 15 of the rotary contact member. The key is kept in position by a hole 29 in its end through which the head of nut 15 projects.

The crystal may be mounted on a clock in any approved manner, and usually it is held by the same device that held the original crystal.

I have shown one form of fastener which can be used and which comprises an annular ring 30, and set screws 31 bearing upon the outer surface of the clock case 32.

The circuit is as follows: through binding post or terminal 19, conductor 20, bearing 2, spindle 7 and contact member 3, through brush 13 and rotary contact member 12, post 14, nut 15, and then through key 26 to the plate 25, which completes the circuit.

It will be seen that since the rotary contact member is effectively insulated from the adjustable contact member 3, if brush 13 bears against the insulation on the contact flange 6, the circuit will be broken.

In operation, after the attachment has been put in position on the clock, and it will be observed that there is not any chance of magnetizing the clock, as the circuit does not go through any parts thereof, the arm 21 rotates the rotary contact member 12 with the hour hand. The adjustable contact member 3 is moved by means of the lock nut thereon until the line under which "On" is inscribed points to the hour at which it is desired to light the lamps. These lines by the "On" and "Off" inscriptions are located directly above the ends of the insulation on

the contact flange 6. If at 3 p. m. and it is desired to have them light at 7 p. m., the adjustable member is turned until it points to 7, and the key 26 is put in position. When the hour hand reaches 7, the arm 21 will have rotated the contact 12 until the brush 13 just leaves the insulation and bears against the contact surface of the flange 6. This closes the circuit and keeps it closed until the brush 13 again reaches the strip of insulation when it will be broken and the lights will go out.

The length of time that the lights are on is governed by the size of the insulation strip on the flange 6, and as it is more desirable that the device may be set several hours in advance, than that the lights remain on for a longer period, I prefer to use insulation on one-third of the contact face, which leaves the circuit closed for eight hours and broken for four. It is obvious that this might be varied to suit individual requirements.

It is further obvious that many changes might be made in the invention without departing from the spirit thereof, hence I do not wish to be limited to the precise structure disclosed.

I claim as my invention:—

1. As an article of manufacture a horological crystal and contact members mounted thereon, said contact members being adjustable with respect to each other.

2. As an article of manufacture, a horological crystal, and freely rotatable contact members mounted on the crystal.

3. As an article of manufacture, a horological crystal, a contact member mounted on the crystal, and a rotary contact member mounted on the crystal in position to engage said first contact member, said first contact member being adjustable with respect to said rotary contact member.

4. As an article of manufacture, a horological crystal, an adjustable contact member mounted on the crystal, a rotary contact member mounted on the crystal in position to engage said adjustable contact member, a terminal mounted on the crystal, and a conductor connected between said terminal and one of said contact members.

5. As an article of manufacture, a horological crystal forming an insulating support for circuit controllers, an adjustable and a rotary contact member, said adjustment being with respect to the rotary contact member, a contact surface on one of said contact members, insulation on a portion of said contact surface, a brush on the other contact member engaging said contact surface, and means for connecting said contact members with leads to an electric circuit.

6. As an article of manufacture, a horological crystal forming an insulating support for circuit controllers, an adjustable contact member having a contact surface, insulation on a portion of said surface, a rotary contact member insulated from said adjustable contact member, a brush on said rotary contact member engaging said contact surface, and means for connecting said contact members with leads to an electric circuit.

7. As an article of manufacture, a horological crystal forming an insulating support for circuit controllers, an adjustable and a rotary contact member, a contact surface on one of said contact members, insulation on a portion of said contact surface, a brush on the other contact member engaging said contact surface, and means for connecting said contact members with leads to an electric circuit, one of the means comprising a terminal mounted on said crystal and a conductor between the terminal and one of said contact members.

8. As an article of manufacture a horological crystal and contact members mounted thereon, said contact members being rotatably adjustable with respect to each other.

9. In a time controlled circuit controller, a horological crystal, contact mechanisms mounted thereon, capable of rotation with respect to each other and to said crystal, an electric circuit, one of the leads from said circuit going to one of the contact mechanisms, and the other lead going to another of said contact mechanisms.

10. In a time controlled circuit controller, an electric circuit time mechanism, a horological crystal, an adjustable contact member mounted in the crystal and connected to one of the leads of said circuit, a rotary contact member supported on the crystal and continuously actuated by the time mechanism and connected to the other lead of said circuit.

11. In a time controlled circuit controller, an electric circuit, time mechanism, a horological crystal, an adjustable contact member mounted in the crystal, a terminal mounted in said crystal connecting with one of the leads of said circuit, means connecting the terminal and said contact member, a rotary contact member mounted in the crystal actuated by the time mechanism, a terminal for the other lead of said circuit, and means connecting said last mentioned terminal and said rotary contact member.

12. In a time controlled circuit controller, time mechanism, an electric circuit, a horological crystal, an adjustable contact member, a hollow spindle connected therewith and extending through said crystal, a rotary contact member, a post connected therewith and extending into said hollow spindle, said rotary contact member adapted to be continuously rotated by said time mecha-

nism, a partially insulated contact surface on one of said contact members, and a contact brush on the other, insulating means separating the contact members, means for maintaining frictional engagement between said contact members, and means for connecting leads from said electric circuit to said contact members.

13. In a time controlled circuit controller, time mechanism, an electric circuit, a horological crystal, an adjustable contact member, a hollow spindle connected therewith and extending through said crystal, a rotary contact member, a post connected therewith and extending into said hollow spindle, said rotary contact member adapted to be rotated by said time mechanism, a partially insulated contact surface on one of said contact members, and a contact brush on the other, insulating means separating the contact members, means for maintaining frictional engagement between said contact members, and means for connecting leads from said electric circuit to said contact members, one of said means comprising a terminal mounted in said crystal and a conductor connecting the terminal with one of said contact members.

14. In a time controlled circuit controller, time mechanism, an electric circuit, a horological crystal, an adjustable contact member, a hollow spindle connected therewith and extending through said crystal, a rotary contact member, a post connected therewith and extending into said hollow spindle, said rotary contact member adapted to be rotated by said time mechanism, a partially insulated contact surface on one of said contact members, and a contact brush on the other, insulating means separating the contact members, means for maintaining frictional engagement between said contact members, and means for connecting leads from said electric circuit to said contact members, one of said means comprising a terminal mounted in said crystal and a conductor connecting the terminal with one of said contact members, and the other means comprising a terminal and removable conductor means connecting the terminal and the other contact member.

15. The combination with time mechanism including a continuously rotating member, a horological crystal, and contacts insulatedly mounted on said crystal, one of the contacts capable of continuous rotation and adapted to be actuated by said rotating member for controlling a circuit.

In testimony whereof I have hereunto subscribed my name.

GEORGE L. HALL.