Feb. 4, 1936. G. PAULSON 2,029,502

AUTOMATIC CONTROL SYSTEM FOR AUTOMOBILE LIGHTS

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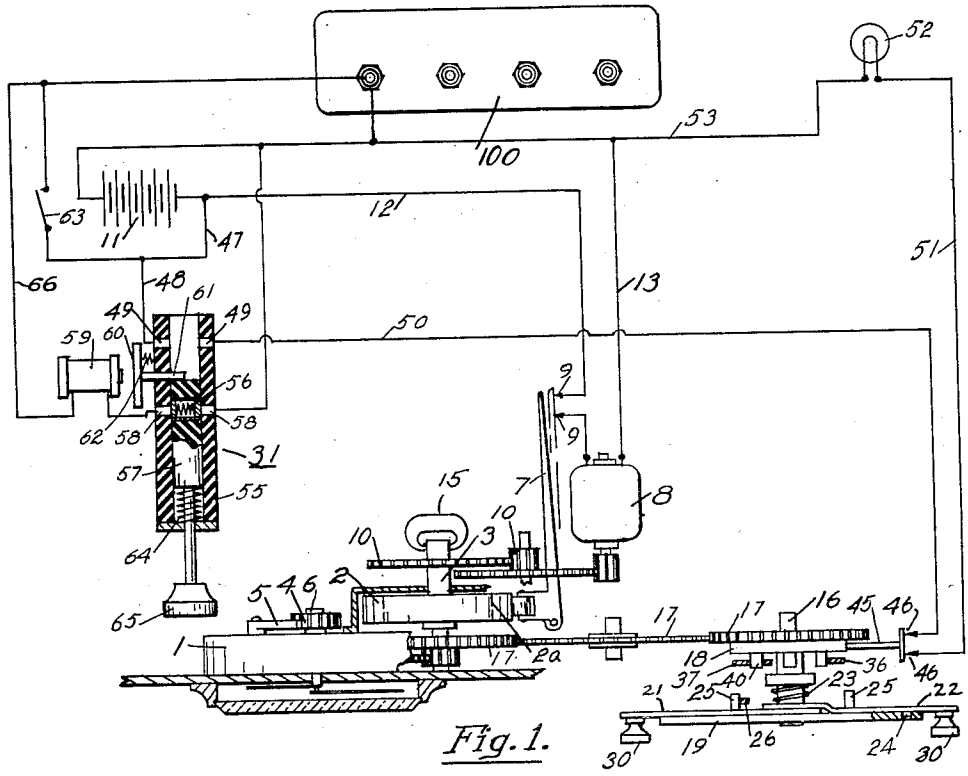


Fig. 1.

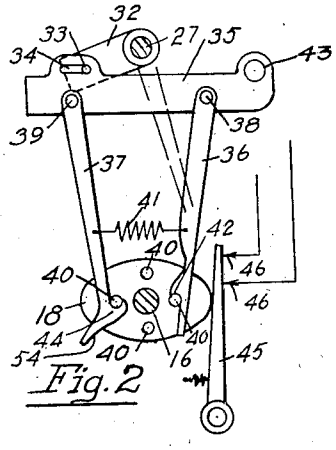


Fig. 2

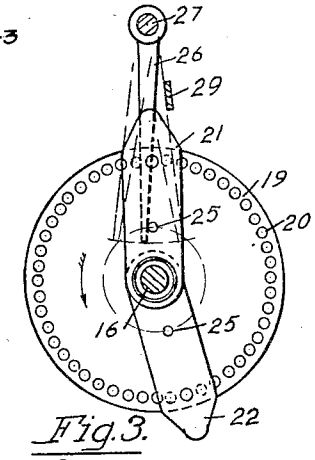


Fig. 3.

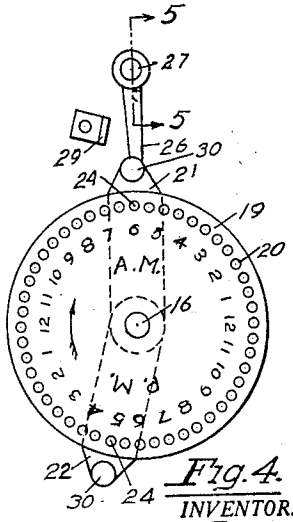


Fig. 4.

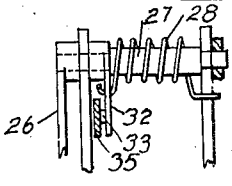


Fig. 5.

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AUTOMATIC CONTROL SYSTEM FOR AUTOMOBILE LIGHTS

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Application August 2, 1934, Serial No. 738,093

5 Claims. (Cl. 161—1)

My invention relates generally to automatic electric control systems and it has particular relation to a control system for parking and running lights for an automobile. All devices of this character made according to the teachings of the prior art, and with which I am familiar, require some manual control means for energizing a control system for the lights of an automobile. It is, accordingly, an object of my invention to provide a control system which will automatically energize the lighting circuit of a motor vehicle at predetermined times and automatically deenergize the circuit at another predetermined time.

Another object of my invention is to provide means for automatically winding a clock controlled by the expansion and contraction of the main clock spring cooperating with a spring-urged switch.

Another object of my invention is to provide automatic means for energizing the lights on a motor vehicle when the motor of the vehicle is operated.

Another object of my invention is to provide means whereby the lights of the motor vehicle cannot be turned off when the motor is running.

Another object of my invention is to provide a control system for automobile lights which will require a minimum amount of power.

Another object of my invention is to provide an automatic control system for motor vehicle lights which is simple in construction, easy to operate when the lights are not required, economical in cost, and requiring a minimum amount of space.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawing, in which

Fig. 1 is a diagrammatic view of my novel control system with the housing of the main switch shown in cross-section.

Fig. 2 is a view in front elevation of the linkage system for operating the cam member which controls the lighting system.

Fig. 3 is a view in rear elevation of the disc member and associated hands for selecting the time at which the lighting system operates through the operation of the cam member shown in Fig. 2.

Fig. 4 is a view in front elevation of the disc member shown in Fig. 3.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Referring to the drawing, the system shown in Fig. 1 comprises an ordinary clock 1 provided with the usual flat coil spring 2 fixed on a shaft 3 which furnishes power for the clock 1 upon winding thereof. A ratchet wheel 4 engaging a spring-urged pawl 5 is fixed on the main shaft 6 of the clock 1 to prevent the clock mechanism from being turned counter-clockwise. A spring-urged quick-acting switch 7 is associated with the spring 2 and controls the electric motor 8 through contact members 9. The motor 8 automatically winds up the spring 2 through any suitable gear system 10 when the spring 2 expands to a predetermined diameter and is deenergized when the spring 2 is compressed to a predetermined diameter. The motor 8 receives its motive power from the battery 11 when the switch 7 completes the following circuit: through wire 12, the contact members 9, the motor 8, and wires 13 and 53. The clock 1 will be mounted on the instrument board of an automobile in its preferred embodiment. The flat coil spring 2 will be of such size that power will be provided for the clock 1 for at least eight days. The battery 11 may therefore be removed during this time without hindering the movement of the clock 1. It will also be apparent that the motor 8 will only have to be operated every six or eight days, thus requiring a minimum amount of power with all the advantages of an electric clock. A wing-nut 15 is provided on shaft 3 to wind spring 2 manually.

Besides providing power and control means for the clock 1, the coil spring 2 operates shaft 16 through shaft 3 and suitable gearing 17. The shaft 16 has mounted thereon a cam member 18 and a disc member 19, the disc member 19 rotating with the shaft 16 and the cam member 18 free to rotate relative to the shaft 16. The disc member 19 has a series of apertures 20 around the periphery thereof, all or some of which may be suitably numbered to indicate the hours of the day and night to which they correspond. The time may be selected on the half or quarter hour according to the number of apertures 20 provided in the disc member 19. Two hands 21 and 22 are pivotally and flexibly secured to the shaft 16 and are held against the rear surface of the disc member 19 by the coil spring 23 which surrounds the shaft 16. Each of the hands 21 and 22 is provided with small pins 24 to engage the apertures 20 and large pins 25 to engage the pivoted arm 26. The pivoted arm 26 is fixed on the shaft 27 which it rotates upon any movement. A coil spring 28 surrounds the shaft 27 and tends to urge the arm 26 toward the stop-member 29 and opposite the rotation of the disc member 19.

The flexible hands 21 and 22 have handles 30 which permit the pins 24 to be disengaged by slight pressure thereon. It will be seen that the hands 21 and 22 may be moved to any position with respect to the apertures 20 and therefore any time of day or night may be selected by engaging the pins 24 in the aperture 20 desired. When the disc member 19 rotates in the direction of the arrow, the pins 25 on the hands 21 and 22 will engage the arm 26 and move it against the force of the spring 28 and away from the stop member 29. The arm 26 is of such length that when it moves a predetermined distance it will slide over the pin 25 on hand 21 in which it is in engagement and the spring 28 will bring it back against the stop member 29 or if the pin 25 on the opposite hand 22 is set rather close, it will immediately engage this pin. The disc member 19 rotates continually and controls the lights at all times when the lighting circuit is closed.

The linkage system shown in Fig. 2 comprises a lever 32 fixed on the shaft 27 and which moves therewith upon the movement of the arm 26. The lever 32 has a pin 33 projecting therefrom which moves in a slot 34 in the pivoted arm 35. A thrust member 36 and a hook member 37 is pivotally connected to the arm 35 at 38 and 39 and are arranged to engage laterally projecting pins 40 on the side surface of the cam member 18. A coil spring 41 tends to draw the members 36 and 37 towards each other. Upon movement of the arm 35, the thrust member 36 moves downwardly with the portion 42 bearing on the pin 40 and slightly rotating the cam member 18. During this downward movement of the arm 35, the hook member 37 moves a greater distance than the thrust member 36 because the arm 35 is pivoted at 43. The hook portion 44 of the member 37 will therefore move downwardly and take a position immediately beneath the next succeeding pin 40. When the arm 26 slides over the pin 25 and is snapped back by the spring 28, the lever 32 will accordingly move upwardly with a sudden thrust pulling the hook member 37 therewith. This movement rotates the cam member 18 one-quarter of a revolution and the portion 42 of the thrust member 36 prevents the cam member 18 from returning to its previous position. This movement of the cam member 18 moves the spring-urged quick-acting switch 45 to a make or break position with the contact members 46. When the contact members 46 are bridged, a circuit is completed from the battery 11, through wires 47 and 48, contact members 49 when in operative condition, wire 50, contact members 46, wire 51, automobile lights 52, and wire 53 back to battery 11. The hook portion 44 is of such construction that after the cam member 18 completes its rotation, the hook portion 44 also prevents the cam member 18 from reversing. The curved portion 54 on the bottom part of the hook member 37 is of such design that it will bear on the next succeeding pin 40 and will roll down over this pin upon the downward movement of the hook member 37 until the hook portion 44 is under the next succeeding pin 40.

A switch 31 for controlling the lighting circuits is provided with a switch-box 55 having a movable contact member 56 disposed in a plunger 57 alternately associated with contact members 49 and 58. A solenoid 59 has an armature 60 associated therewith which has a projecting portion 61 adapted to move in the path of the plunger 57. A spring member 62 tends to hold the projecting portion 61 of the armature 60 in the path of the plunger 57 and is drawn therefrom when the ignition switch 63 of the motor vehicle is closed. The wire 66 may be connected to any part of the electrical system of the vehicle as very little energy is needed to energize the solenoid 59. It will be seen that when the motor vehicle represented by the motor block 100 is in operation, the plunger 57 will not remain in a position shown in Fig. 1 because the projecting portion 61 will be drawn from the path of the plunger 57 and the coil spring 64 will force the plunger 57 inwardly. A handle 65 is provided to place the plunger 57 in a position where the movable contact 56 is associated with the contact members 58 in which case the lighting circuit is deenergized if it is dark and the position of the hands 21 and 22 on the disc member 19 is such that the lighting circuit will be energized. It will be seen that the lighting system will not be energized unless the contact members 46 are bridged by the switch member 45 which in turn is controlled by the cam member 18 and its associated mechanisms. The time keeping mechanism described will keep the switch member 45 in circuit closing position during those hours when cars should display lights and will keep such switch in open circuit condition during other times when lights are not required.

In the operation of the above described system, the clock will be continuously operated by the control of the motor 8 through the expansion and contraction of the main spring 2 of the clock 1. The continuous operation of the clock mechanism will continuously operate the disc member 19 and the hands 21 and 22 associated therewith. The pins 25 on the hands 21 and 22 will be continually coming in contact with the arm 26 and moving it against the force of the spring 28 until it slides over the pin 25 and returns to engage with the next pin 25. This movement of the arm 26 will move the lever 32 and arm 35 through shaft 27 and therefore the thrust and hook members 36 and 37. The thrust and hook members 36 and 37 will engage the pins 40 to rotate the cam member 18 at predetermined times and operate the switch 45 to bridge the contact members 46 and energize the lighting circuit. If the plunger 57 is in a position as shown in the drawing, the contact members 49 will not be bridged and accordingly the lighting circuit will be open whether the contact members 46 are bridged or not. When the motor is operated by closing the ignition switch 63, the solenoid 59 will be energized and will draw the armature 60 and its projecting portion 61 away from the path of the plunger 57. The movable contact member 56 will then bridge the contact members 49 and the lighting circuit will be energized if the contact members 46 are bridged.

The above described apparatus is fool proof in that the lights cannot be cut out by the switch 31 while the car is being operated at night. A continuously operated block is provided and one does not have to remember to turn on some switch when he parks for the lights will automatically be energized at night and deenergized in the daytime as long as there is any energy left in the battery. When the car is in a garage or parked on a street where no parking lights are required, the plunger 57 can be pulled out to the position shown in the drawing. The small motor 8 is operated every six or eight days for less than a minute and the solenoid 59 for perhaps a

second a day. The small amount of power necessary to operate this system is readily apparent.

Any suitable means may be provided for setting the clock I. This means may be used for providing running lights during the day while traveling by setting the clock twelve hours ahead. Special parking lights may be provided instead of using the same lights for both parking and running lights. Any skilled mechanic could arrange separate circuits for the parking and running lights in association with the control switches disclosed.

I do not wish to be restricted to the specific structural details, arrangement of parts, or circuit connections herein set forth, as various other modifications thereof may be effected without departing from the spirit and scope of the invention. I desire, therefore, that only such limitations shall be imposed as are indicated in the appended claims.

What I claim is:

1. In a device of the class described, in combination, an illuminating circuit, a second circuit, a source of power for said circuits, a switch for breaking said illuminating circuit manually, means operated by the energy in said second circuit for automatically closing said manually operated switch when said second circuit is energized, said closing means preventing the permanent opening of said switch without permanent manual intervention when the second circuit is energized, and automatically operated selective means in said illuminating circuit for opening and closing said illuminating circuit at predetermined times.

2. In a device of the class described, in combination, an illuminating circuit, a second circuit, a source of power for said circuits, a switch for breaking said illuminating circuit manually, means operated by the energy in said second circuit for automatically closing said manually operated switch when said second circuit becomes energized, and continuously and automatically operated selective means in said illuminating circuit for continuously and automatically opening and closing said illuminating circuit at predetermined times.

3. In a device of the class described, in combination, an illuminating circuit, a second circuit, a source of power for said circuits, a switch for breaking said illuminating circuit manually, means operated by the energy in said second circuit for automatically closing said manually operated switch when said second circuit is energized, and continuously and automatically operated selective means in said illuminating circuit for continuously and automatically opening and closing said illuminating circuit at predetermined times comprising a switch in said illuminating circuit, mechansm for continuously operating said switch at predetermined times, a clock synchronized with and operating said mechanism, and power means for continuously operating said clock, said power means receiving its power from said source of power.

4. In a device of the class described, in combination, an illuminating circuit, a second circuit, a source of power for said circuits, a switch for breaking said illuminating circuit manually, means operated by the energy in said second circuit for automatically closing said manually operated switch when said second circuit is energized, and automatically operated selective means in said illuminating circuit for opening and closing said illuminating circuit at predetermined times.

5. In a device of the class described, in combination, an illuminating circuit, a second circuit, a source of power for said circuits, a switch for breaking said illuminating circuit manually, means operated by the energy in said second circuit for automatically closing said manually operated switch when said second circuit is energized, and automatically operated selective means in said illuminating circuit for automatically opening and closing said illuminating circuit at predetermined times comprising a switch in said illuminating circuit, mechanism for operating said switch at predetermined times, selective means for controlling said mechanism, an automatically wound clock synchronized with and operating said mechanism, and power means for operating said clock, said power means receiving its power from said source of power.

GEORGE PAULSON.