Aug. 25, 1931. J. FERGUSON 1,820,306

TIME SWITCH

Filed July 1, 1930

Fig. 1.

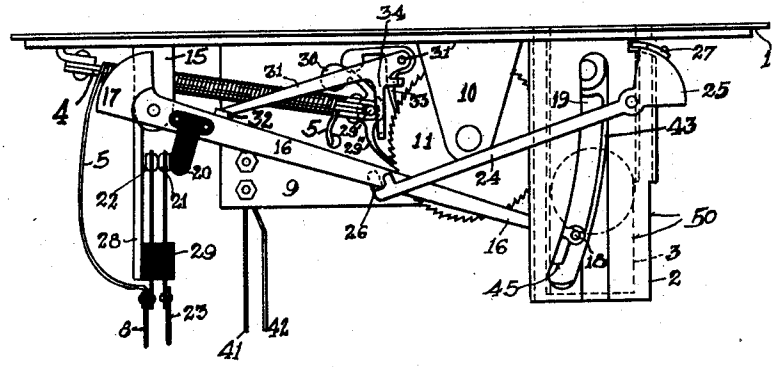
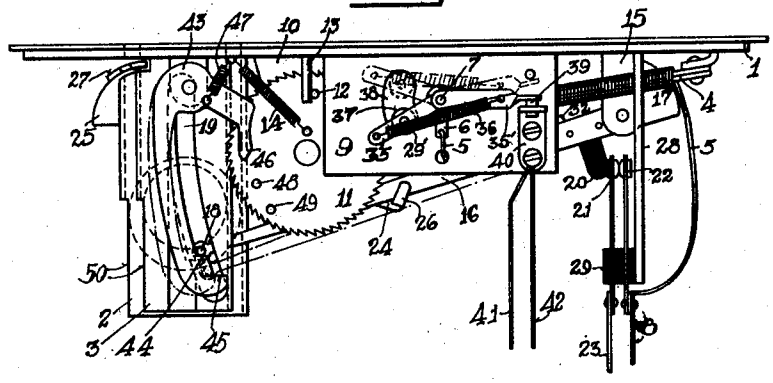


Fig. 2.



INVENTOR,
BY James Ferguson
J. E. Trabucco
ATTORNEY.

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JAMES FERGUSON, OF SAN FRANCISCO, CALIFORNIA

TIME SWITCH

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This invention relates to improvements in time switches of the kind adapted for use in automatically closing and opening circuits to a radio receiving set or other apparatus to be operated.

An object of my invention is to provide an improved coin or token controlled switch for automatically closing and opening circuits.

Another object of my invention is to provide an improved time switch which so operates upon the insertion of a coin or token therein as to close a circuit to a device to be electrically operated, and thereafter maintains the circuit in a closed position for a definite period of time.

A further object of my invention is to provide an improved time switch which is adapted to receive coins of different denominations, and to maintain circuits in closed positions for definite periods of time, dependent upon the particular kind or size of coin inserted therein.

A still further object of my invention is to provide an improved time switch for closing and opening a circuit to a device to be electrically operated, having coin slots of different sizes, and also means actuated by a coin inserted in one of the slots for maintaining the circuit in a closed position for a definite period of time, dependent upon the particular size of the coin inserted therein.

Other objects more or less apparent will present themselves or will be specifically pointed out in the following description.

In the accompanying drawings:

Figure 1 is a side elevation of a time switch constructed in accordance with my invention; and

Figure 2 shows the switch as viewed from its opposite side.

Referring to the drawings, the numeral 1 represents a supporting member having coin or token chutes 2 and 3 mounted thereon in spaced relationship to one another, with the former located directly behind the latter, and each having a slot therein of a size suitable to accommodate coins of a particular denomination.

Suitably secured at one end thereof to the underneath side of the support is an inclined thermostatic rod 4 comprised of strips of suitable material such as copper and German silver. The free end of the thermostatic rod moves upwardly or toward the support when heat is applied thereto, by reason of the copper strip expanding faster than the German silver strip, and when heat is taken away from the said rod the said free end thereof then moves in the opposite direction because of faster cooling and contraction of the copper strip.

An insulated wire 5, having one end connected by means of a connecting strip 6 to a metal pin 7 and its other end connected to a wire 8 leading to a device to be operated, extends around the thermostatic rod 4 for a number of times and serves as means for applying heat to the said rod when a current of electricity is passed through the said wire. The connecting strip 6 and the pin 7 are mounted on an insulating panel 9 suitably secured to the underneath side of the support 1.

Rotatably mounted on a bracket 10 secured to the underneath side of the support 1, is a wheel 11 having a plurality of teeth projecting from its circumferential edge. The wheel is provided at a point above its center with a projecting pin 12 which is adapted to contact with a downwardly disposed projection 13 extending from the support 1. A spiral wire spring 14, having one end secured to a projection located on the wheel above its center and its other end secured to the support 1, serves to carry the wheel back to its normal position with the pin 12 contacting with the projection 13. After the wheel 11 has been rotated for a certain part of one revolution in a clockwise direction (Fig. 2) by a mechanism to be hereinafter described, the spiral spring 14 moves the said wheel in a counter clockwise direction until the pin 12 thereon encounters the projection 13.

Pivotally mounted on a bracket 15 secured to the underneath side of the support 1 is a rod 16 having a counter balancing weight member 17 at one end and a cross piece 18 at its opposite end. The ends of the cross piece extend into arcuate slots 19 located in the

chutes 2 and 3 and are positioned to intercept coins dropped into the said chutes through suitable openings located in the support 1. The rod 16 is normally maintained in a substantially horizontal position by the counter balancing weight member 17. The rod 16 is provided at a point adjacent its pivotal connection to the bracket 15, with a downwardly disposed insulated member 20 which, upon the downward movement of the said rod, contacts with a resilient contact member 21 and moves it into engagement with another similar contact member 22 that connects with the wires 5 and 8. The weight of coins dropped into the slots of either of the chutes 2 and 3 moves the end of the rod 16 on which the cross piece 18 is located in a downward direction, thereby causing the insulated member 20 to move the contact member 21 into engagement with the contact member 22, the latter being connected by a wire 23 to a source of electrical energy. Pivotally mounted on the coin chute 3 is a rod 24 having a counter balancing weight 25 at one end and a curved part 26 at its other end, the said curved part underlying the rod 16. The counter balancing weight is provided with a guard 27 which is adapted to extend into the upper ends of the coin chutes 2 and 3 to prevent a coin from passing through either of the said chutes while the rod 16 is maintained with its cross piece end in a downwardly disposed position. When the rod 16 is moved about its pivot by a coin inserted in a coin chute, the rod 24 is also moved about its pivot through the curved part 26 being depressed by the rod 16. Upon the movement of the rod 16 in a direction whereby its cross piece 18 moves upwardly, the rod 24 is also moved by its counter-balancing weight 25 so the guard 27 no longer prevents coins from passing through the coin chutes 2 and 3. The contact members 21 and 22 are supported by a bar 28 secured to the support 1, and an insulating member 29 serves to insulate the said contact members from the said bar and from each other.

Pivotally mounted on a pin 29′ carried by the free end of the thermostatic rod 4 is a catch member 29″, the lower end of which is normally positioned adjacent the circumferential edge of the wheel 11. The upper end of the catch member is provided with a counterbalancing weight 30 which is adapted to move the lower end of the said catch member into engagement with the teeth on the wheel 11. Pivotally mounted at its top end on a pin 31′ secured to the insulating panel 9 is lever member 31 having an arm 32 which normally rests against the upper edge of the rod 16. Also mounted on the pin 31′ is a counter balanced catch member 33 having its lower end normally held in contact with the teeth of the wheel 11 by its weighted upper end. The lever member is provided with a downwardly disposed flange 34 which carries two inwardly extending projections that are adapted to engage with the lower end parts of the catch members 29″ and 33. Upon the rod 16 being moved downwardly by a coin dropped on the cross piece 18, the lever member 31 through its weighted lower end moves about its pivot so as to carry the flange 34 and its inwardly disposed projections in a direction toward the bracket 10, thereby permitting the lower ends of the catch members 29″ and 33 to be carried by their weighted top ends into engagement with the teeth of the wheel 11.

Pivotally mounted at ends thereof on the metal pin 7, which is secured to the insulating panel 9, and connected to the wire 5 of the thermostatic rod 4 by strip 6, are two bars 35′ and 35. The outwardly disposed ends of the bars are attached to the ends of a coiled spring 36 which is at all times under tension. The bar 35 is pivotally attached to an insulating block 37 which extends through an arcuate slot 38 in the insulating panel 9 and is attached to the pin 29′ carried by the free end of the thermostatic rod 4. Upon the thermostatic rod 4 moving upwardly and downwardly the bar 35 to which it is connected is likewise moved upwardly and downwardly. The other bar 35′ is provided at its end with a contact point 39 which is adapted to contact with a contact plate 40 mounted on the insulating panel 9. The contact plate 40 is connected to a wire 41 leading to the device to be operated and also to a wire 42 leading to the source of electrical power. The contacting of the contact point 39 of the bar 35′ with the contact plate 40 completes the circuit through the wire 5 encircling the thermostatic rod 4. The upward movement of the thermostatic rod when the same is being heated carries the bar 35 upwardly, and when the spring 36 has been carried past the pin 7, the bar 35′ is moved about its pivot in an upward direction, thereby disengaging the contact point 39 from the contact plate 40, which movement breaks the circuit to the wire 5. The discontinuance of the flow of electricity through the wire 5 enables the thermostatic rod 4 to become cooled and move in a downward direction. As the said thermostatic rod moves downwardly, the bar 35 is carried in the same direction, and the spring 36 when below the pin 7 moves the bar 35′ downwardly to cause the contact point 39 to engage with the contact plate 40 and again close the circuit to the wire 5. During the upward and downward movement of the thermostatic rod 4, the catch member 29″ is carried with it. The catch member 29″ upon moving downwardly engages with the teeth of the wheel 11 and moves the same in a clockwise direction (Fig. 2). The other catch member 33 is at all times during the operation of the device in contact

with the teeth of the wheel 11, and when the rod 4 moves the catch member 29″ upwardly, the catch member 33 engages with the teeth of the wheel holds, and prevents the latter from being moved by the tension of the spring 14 in the opposite direction. The succeeding downward movement of the thermostatic rod 4 again causes the catch member 29″ to engage with the teeth of the wheel and again rotate the latter in a clockwise direction.

Pivotally mounted on the upper end of the coin chute 3 is a downwardly disposed bar 43, having two separated notches 44 and 45 located at its lower end. The upper part of the bar is provided with an arm 46 which is positioned adjacent a side of the wheel 11, and a spiral wire spring 47 secured to the support 1 and the bar 43 tends to normally maintain the lower end of the bar in a position whereby the notches 44 and 45 are in a position to intercept the cross piece 18 when the same has been moved downwardly by a coin dropped into either of the coin chutes 2 or 3.

Projecting from the side of the wheel 11 beneath the arm 46 of the bar 43 are two separated pins 48 and 49, each of which is adapted to intercept the said arm when the wheel 11 is rotated in a clockwise direction (Fig. 2) for a sufficient distance. Each of the chutes 2 and 3 is cut away at its lower side edge as at 50 to provide slots through which coins may pass. A coin of particular size dropped into either of the chutes 2 or 3 will carry the cross piece 18 downwardly until it engages with the upper notch 44 of the bar 43, and the coin will temporarily rest at its top edge against the upper edge of the slot 50 in the particular chute it was inserted. Should the coin be of small size, say a dime, it will pass through the slot 50 as soon as the wheel has been rotated sufficiently to bring the pin 48 thereon into engagement with the beveled end of the arm 46 of the bar 43. As soon as the pin has engaged with the said arm it will cause the bar 43 to move on its pivot, thereby freeing the notch 44 from the cross piece 18. The weight of the coin then carries the cross piece down still farther and until it is no longer partly supported by the upper edge of the slot 50. As soon as this happens the coin drops from its chute and the cross piece 18 is again elevated to a position whereby it is adapted to intercept another coin. Should the coin happen to be of a larger size, say a quarter, it will not drop from its coin chute until after the second pin 49 has moved the bar 43 so the notch 45 is freed from the cross piece 18. The intercepting of pin 48 with the arm 46 of the bar 43 frees the notch 44 from the cross piece, but the lower notch 45 then intercepts the said cross piece as it is lowered still farther by the large coin. The large coin then rests at its top edge against the top edge of the slot 50 in its chute, and is thereby prevented from dropping from said chute until the wheel 11 has been rotated sufficiently to bring the pin 49 into contact with the arm 46 of the bar 43. The pin 49 being located closer to the circumferential edge of the said wheel than the pin 48 moves the arm 46 still further to the left (Fig. 2) when it intercepts the same, thereby moving the bar 43 so the notch 45 is freed from the cross piece 18. The cross piece then moves downwardly to allow the large coin to drop through the slot 50 in its chute.

As soon as a coin has passed through a slot 50 in a chute, the counter balancing weight member 17 carries the cross piece and the rod 16 back to their normal positions. The upward movement of the rod 16 moves the lever member 31 about its pivot, thereby carrying the downwardly disposed flange 34 to the left (Fig. 1). The movement of the flange 34 to the left causes its inwardly disposed projections to move the catch members 29″ and 33 so they no longer engage with the teeth of the wheel 11. As soon as the catch members are freed from the teeth of the wheel, the spiral spring 14 moves the said wheel in a counter clockwise direction to its normal position with the pin 12 thereon in contact with the projecting member 13.

It will be noticed that it will take a certain length of time to rotate the wheel sufficiently to bring the pin 48 in contact with the arm 46, and a still longer length of time to bring the pin 49 in contact with the said arm. During the time between the dropping of a coin in a chute and until it passes therefrom, the circuit to a device to be operated is closed, and as soon as the member 20 is carried away from the contact member 21 the said circuit is broken.

By arranging the pins 48 and 49 in different positions on the wheel 11, the time the circuit is maintained in a closed position may be varied accordingly.

It is apparent to those skilled in the art that my improved time switch may be embodied in other forms equally as efficient as the one shown, so for this and other apparent reasons I desire my invention included broadly within the spirit of the appended claims.

Having described my invention what I claim is:

1. A time switch comprising a coin or token chute, a pivoted rod having means extending into the chute for intercepting a coin or token dropped therein, movable means for temporarily supporting the rod in a certain position, a thermostat, an electrical circuit connected to the thermostat, means actuated by the rod for closing and opening the circuit, rotatable means operated by the thermostat for actuating the means for temporarily supporting the rod and means for returning the rod to normal position.

2. A time switch comprising a coin or token

chute, a pivoted rod having means adapted to intercept a coin or token dropped into the chute supporting means for temporarily holding the rod in a certain position, a thermostat connected to a circuit leading to a source of electrical power, means actuated by the movement of the rod, for closing and opening the circuit, rotatable means actuated by the thermostat for releasing the supporting means from engagement with the rod and means for returning the rod to normal position.

3. A time switch comprising a coin or token chute, means extending into the chute and adapted to temporarily support and be actuated in a certain direction by a coin dropped into the chute, a thermostat connected to a circuit leading to a source of electrical power, a switch located in the circuit and adapted to be closed by the downward movement of the first mentioned means, and means actuated by the thermostat for displacing the coin from a supported position on the first mentioned means, and means for moving the first mentioned means in another certain direction to open the switch.

4. A time switch comprising a coin or token chute, a thermostat connected to a circuit leading to a source of electrical power, a switch located in the circuit, a pivoted rod actuated by a coin dropped into the chute for closing the switch, pivoted supporting means for temporarily maintaining the rod in a position whereby the switch is held in a closed position, a weight member for moving the rod to its normal position, and means actuated by the thermostat for releasing the supporting means from the rod, whereby the weight member may move the rod to its normal position to open the switch.

5. A time switch comprising a coin or token chute, a thermostat connected to a circuit leading to a source of electrical power, a rod adapted to be actuated by a coin or token dropped into the chute for closing the switch, supporting means adapted to engage with the rod to maintain the same in a position whereby the switch is held in a closed position, a wheel positioned adjacent the thermostat, means actuated by the thermostat for rotating the wheel, means actuated by the wheel for disengaging the supporting means from the rod, and a means for moving the rod to a position whereby the switch is opened.

6. A time switch comprising a thermostat connected to a circuit leading to a source of electrical power, means for closing the circuit, a wheel rotatably mounted near the thermostat, means connected to the thermostat for rotating the wheel, means actuated by the wheel for permitting the circuit to be opened and means for opening the circuit.

7. A time switch comprising a thermostat connected to a circuit leading to a source of electrical power, a switch located in the circuit, a coin actuated lever for closing the switch, a wheel rotatably located adjacent the thermostat, means carried by the thermostat for rotating the wheel, means actuated by the wheel for permitting the circuit to be opened and means for opening the circuit.

8. A time switch comprising a thermostat, a circuit leading to a source of electrical power and connected to the thermostat, a switch located in the circuit, a coin actuated lever for closing the switch, supporting means for holding the lever in a position to hold the switch closed, a wheel located adjacent the thermostat, means actuated by the thermostat for rotating the wheel, and means actuated by the wheel for releasing the supporting means from engagement with the lever, and means for moving the lever to a position whereby the switch may be opened.

9. A time switch comprising a thermostat connected to a circuit leading to a source of electrical power, a switch located in the circuit a coin actuated lever for closing the switch, engaging means for temporarily maintaining the lever in a position whereby the switch is closed, a wheel rotatably mounted adjacent the thermostat, means actuated by the thermostat for rotating the wheel, and means actuated by the wheel for releasing the engaging means from the lever, and a weight member for moving the lever to a position whereby the switch may be opened.

10. In a time switch, a thermostat, a circuit connected to the thermostat having a switch therein, a coin chute, a pivoted rod extending into the chute and provided with means for closing and opening the switch, which said rod is actuated to close the switch by a coin dropped into the chute, means for supporting the rod in a position whereby the switch is closed, rotatable mechanism actuated by the thermostat for moving the means to a position where it no longer supports the rod, and means for actuating the rod so the switch is opened.

11. In a time switch, a thermostat, a circuit connected to the thermostat having a switch therein, a coin chute, a pivoted rod extending into the chute carrying means for closing the switch, which said rod is moved about its pivot in a certain direction by a coin dropped into the chute to close the switch, means for temporarily supporting the rod in a position whereby the switch is closed, rotatable mechanism actuated by the thermostat for moving the means to a position where it no longer supports the rod, and means for moving the rod so the switch is opened.

12. In a time switch, a thermostat, a circuit connected to the thermostat having a switch therein, a plurality of coin chutes, a pivoted rod extending into the chutes carrying means for closing the switch, the said rod being actuated by a coin dropped into either

of the chutes to close the switch, movable means engageable with the rod for supporting the rod in different positions, means actuated by the thermostat for releasing the movable means from the rod, and means for moving the rod whereby the switch may be opened.

13. In a time switch, a thermostat connected to a circuit leading to a source of electrical power, a plurality of coin chutes, a pivoted rod extending into the chutes and adapted to be moved about its pivot in a downward direction by a coin dropped into either of the chutes, means carried by the rod for closing the switch when the rod is moved downwardly, supporting means engagable with the rod for supporting the rod in a number of positions, and means actuated by the thermostat for releasing the supporting means from engagement with the rod, and a weight member carried by the rod for moving the same in an upward direction, whereby the switch may be opened.

In testimony whereof I have affixed my signature.

JAMES FERGUSON.