Jan. 14, 1941. F. J. HAYES 2,228,894

SWITCH OPERATING MECHANISM

Filed May 3, 1939 4 Sheets-Sheet 1

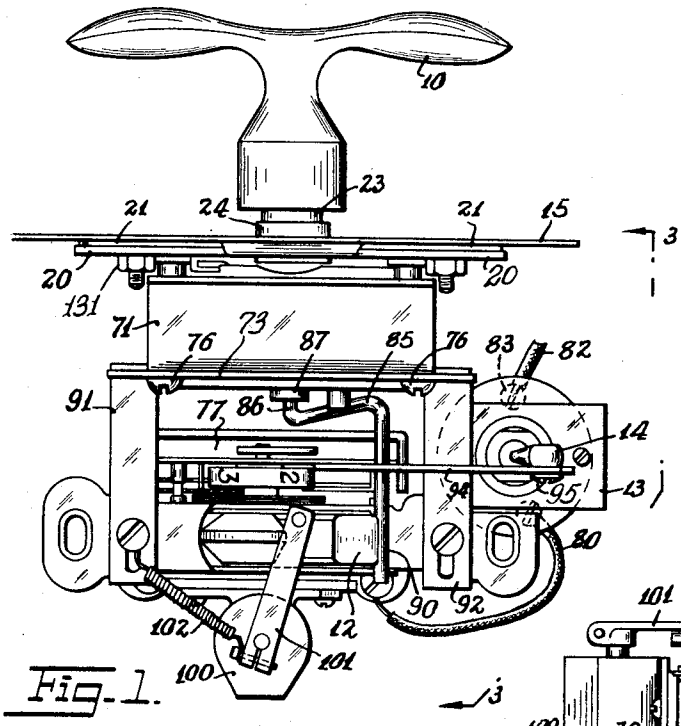

Fig. 1.

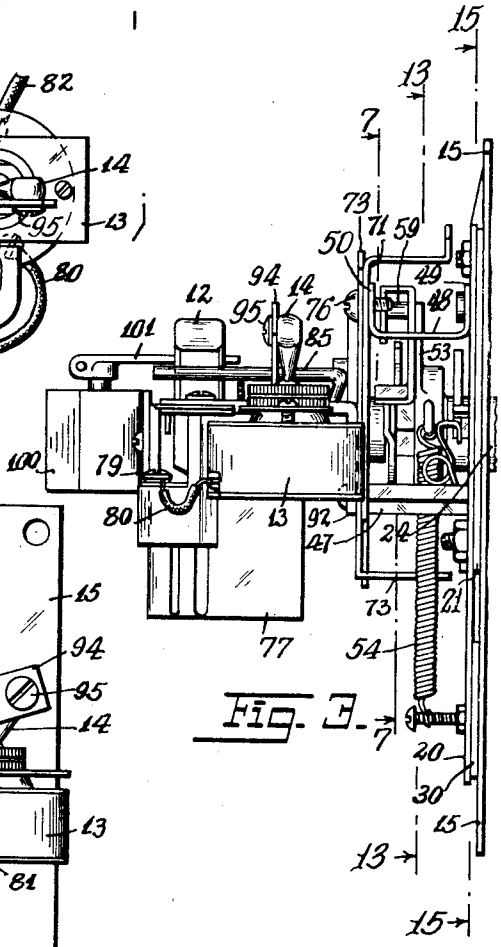

Fig. 3.

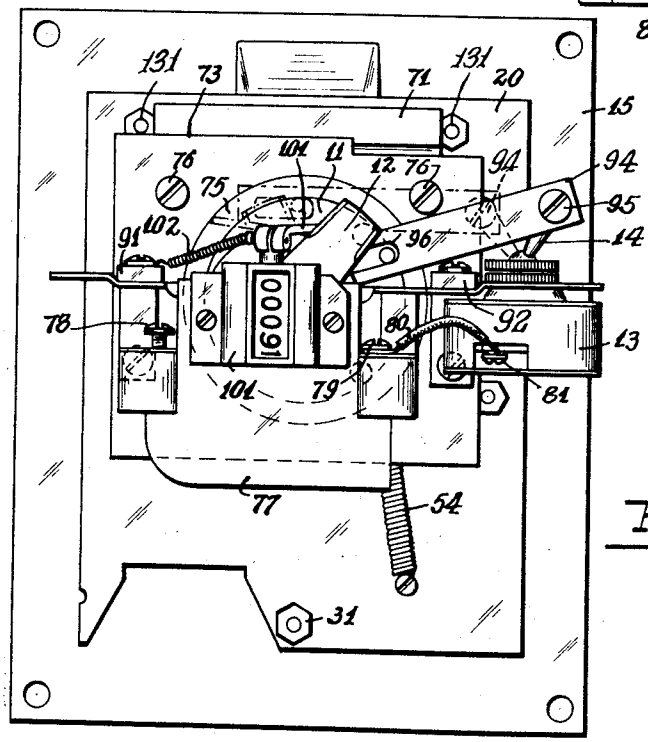

Fig. 2.

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Jan. 14, 1941. F. J. HAYES 2,228,894

SWITCH OPERATING MECHANISM

Filed May 3, 1939 4 Sheets-Sheet 2

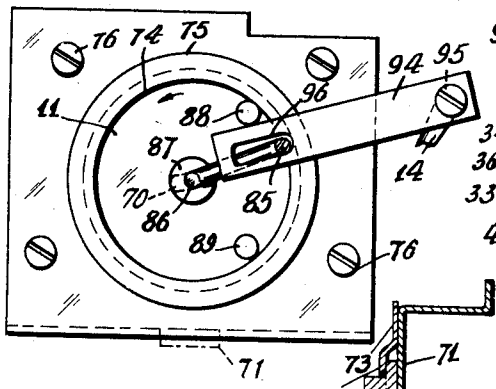

Fig. 4.

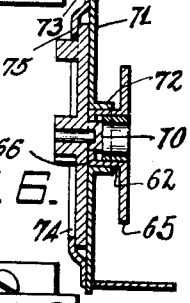

Fig. 6.

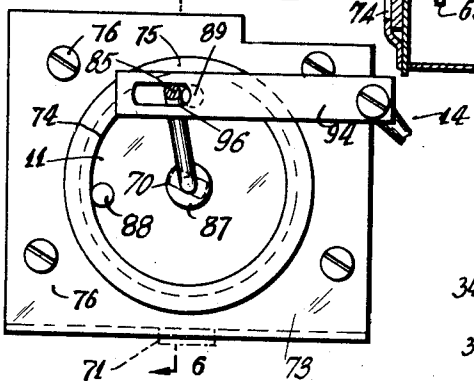

Fig. 5.

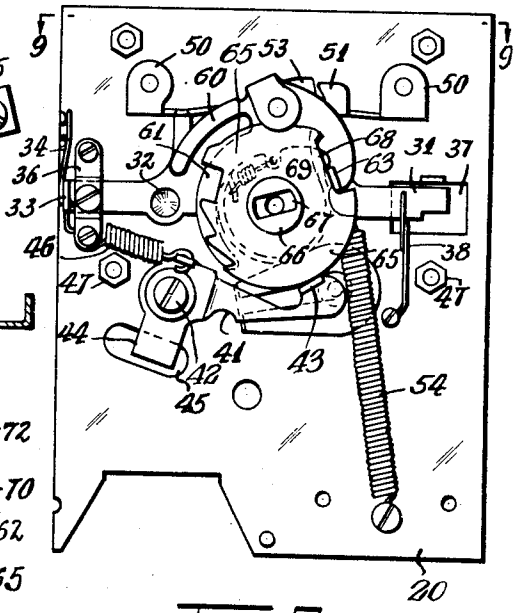

Fig. 7.

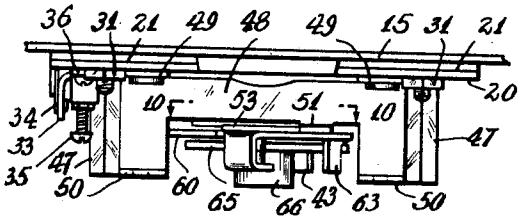

Fig. 9.

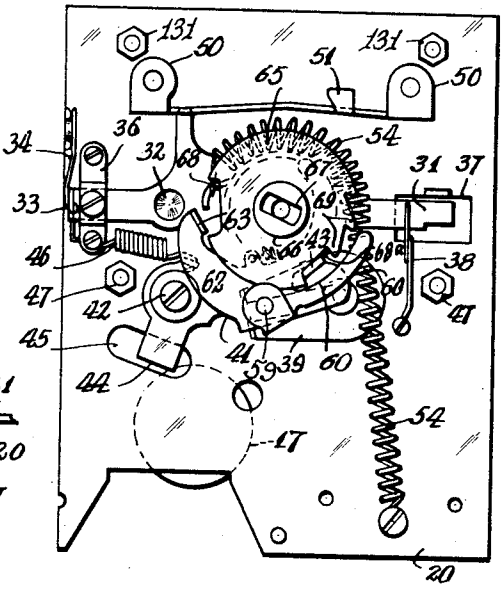

Fig. 8.

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Jan. 14, 1941. F. J. HAYES 2,228,894

SWITCH OPERATING MECHANISM

Filed May 3, 1939 4 Sheets-Sheet 3

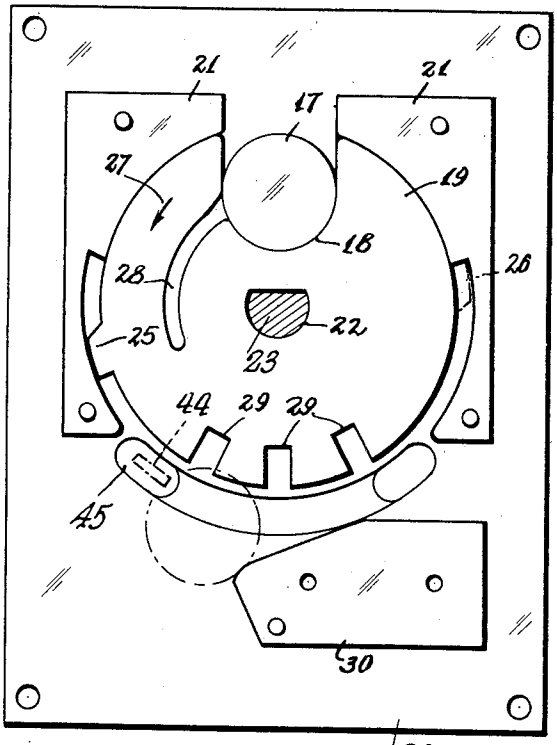

Fig. 15.

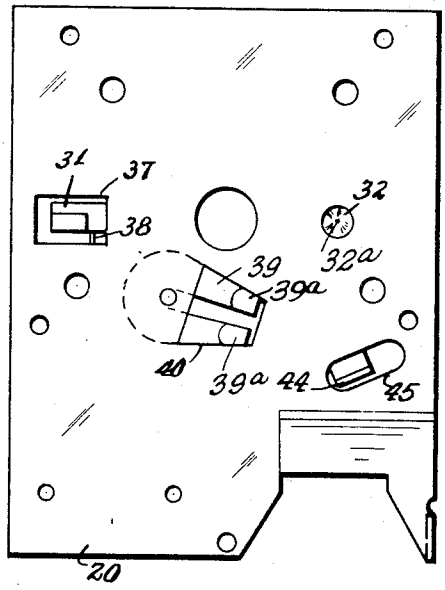

Fig. 14.

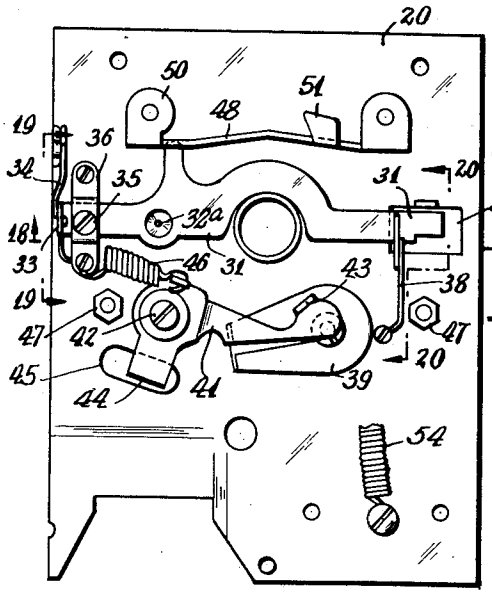

Fig. 13.

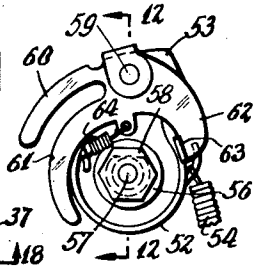

Fig. 11.

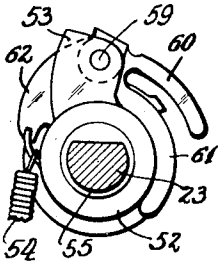

Fig. 10.

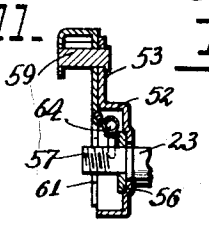

Fig. 12.

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Jan. 14, 1941. F. J. HAYES 2,228,894

SWITCH OPERATING MECHANISM

Filed May 3, 1939 4 Sheets-Sheet 4

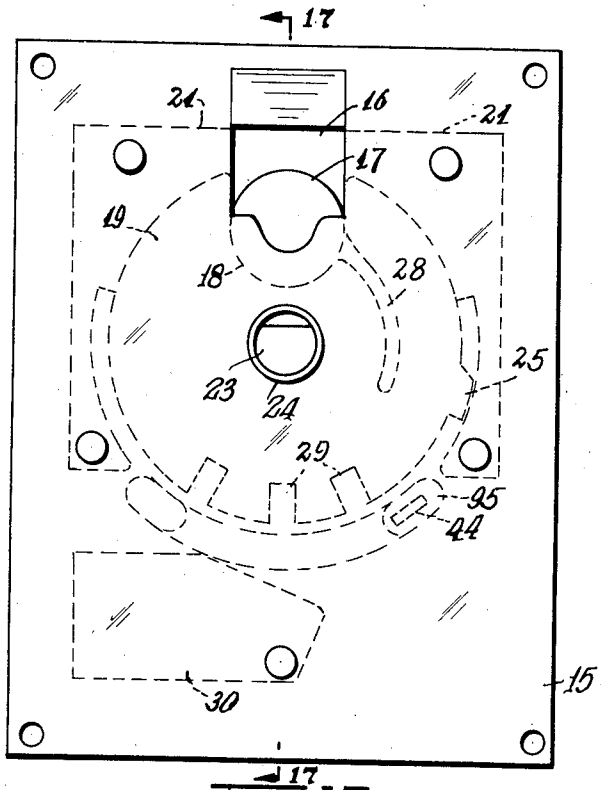

Fig. 16.

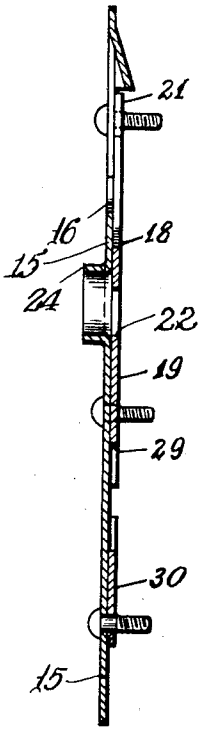

Fig. 17.

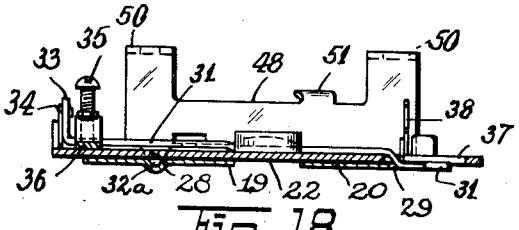

Fig. 18.

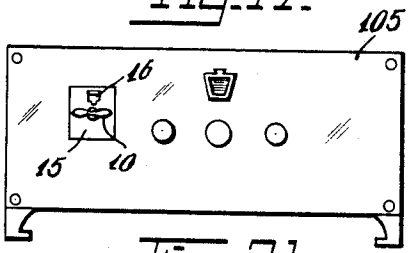

Fig. 21.

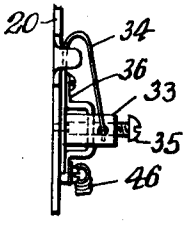

Fig. 19.

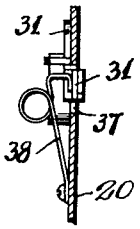

Fig. 20.

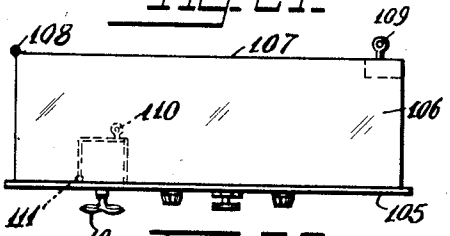

Fig. 22.

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Patented Jan. 14, 1941 2,228,894

UNITED STATES PATENT OFFICE

2,228,894

SWITCH OPERATING MECHANISM

Frank J. Hayes, Brooklyn, N. Y., assignor of one-fifth to Benjamin Webster, Brooklyn, N. Y.

Application May 3, 1939, Serial No. 271,588

2 Claims. (Cl. 200—33)

This invention relates to new and useful improvements in a coin operated electric time switch.

The invention has for an object the construction of a coin operated electric time switch which is adapted to turn on the controlling circuit of a radio receiving set, or other apparatus for a limited time, for each coin inserted.

More particularly the invention contemplates the provision of a coin control mechanism, a time switch, and a novel arrangement whereby the coin control mechanism may operate the time switch upon the proper insertion of a coin so as to close the circuit for a predetermined time in association with an arrangement whereby persons cannot cheat by holding the coin control mechanism in a position in which the time switch can be repeatedly actuated.

In particular it is proposed to provide a circuit switch in series with the time switch and associated mechanism between the circuit switch, the time switch and the coin control mechanism, to return certain parts to their original positions in which they have retained the coin and in which they are ready to receive a new coin before the circuit is actually closed so that the purchaser may avail himself of the radio, if the object being controlled by the circuit is radio. Of course this invention can be applied to control any other mechanism in which a control circuit is provided.

The invention relates particularly to the associated mechanism with the particular type of time switch and coin control so that an operator may not cheat the arrangement.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a plan view of a coin operated electric time switch constructed according to this invention.

Fig. 2 is an elevational view of the rear of the mechanism shown in Fig. 1.

Fig. 3 is a side elevational view of the device looking in the direction of the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary rear elevational view of a portion of the device, this view being similar to Fig. 2 except that the time switch and certain parts of the coin control mechanism have been removed.

Fig. 5 is a view similar to Fig. 4 but showing the parts in different positions.

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 5.

Fig 7 is an elevational view of the device on line 7—7 of Fig. 3 but showing additional parts removed, this view being substantially identical with Fig. 2 except the parts shown in Fig. 4 have been removed.

Fig. 8 is a view similar to Fig. 7 but showing the parts in a different position.

Fig. 9 is a plan view of Fig. 7 seen as though looking in the direction of the line 9—9 of Fig. 7.

Fig. 10 is a fragmentary sectional view as though taken on the line 10—10 of Fig. 9.

Fig. 11 is a front elevational view of the parts shown in Fig. 10.

Fig. 12 is a fragmentary sectional view taken on the line 12—12 of Fig. 11.

Fig. 13 is a section taken on the line 13—13 of Fig. 3 showing more of the parts removed.

Fig. 14 is a front elevational view of the parts shown in Fig. 13.

Fig. 15 is a section taken on the line 15—15 of Fig. 3.

Fig. 16 is a front elevational view of Fig. 15.

Fig. 17 is a sectional view taken on the line 17—17 of Fig. 16.

Fig. 18 is a sectional view taken on the line 18—18 of Fig. 13.

Fig. 19 is a fragmentary elevational view looking in the direction of the line 19—19 of Fig. 13.

Fig. 20 is a sectional view taken on the line 20—20 of Fig. 13.

Fig. 21 is a front elevational view of a radio receiving set, showing the device mounted thereon.

Fig. 22 is a plan view of Fig. 21.

The coin operated electric time switch according to this invention comprises a coin control mechanism including a handle 10 normally restrained from moving to switch actuating position, as hereinafter set forth, and associated with a coin control to release said restraining means and with a rotatable member 11 Figs. 2 and 4 to move along with said handle, said handle being movable when released into one position to cause the coin mechanism to retain an inserted coin and back to an original position to set the mechanism for receiving another coin. The coin is released shortly after the beginning of the return movement of the handle. In conjunction with the coin control mechanism there is a time switch which includes a pivotal handle 12 Figs. 2 and 3 movable in one direction to wind the time mechanism thereof and to close an electric circuit and turnable to a normal position without affecting the circuit and time mechanism, the time mechanism opening the circuit after a predetermined time.

A circuit switch 13 (Fig. 3) is arranged in series with the time switch and has a movable handle 14 for moving into one position to turn it "on" and into another position to turn it "off". The coin control mechanism, details of the time

switch, and details of the circuit switch form no part of this invention. The invention resides in a novel means connected with the rotatable member 11 for simultaneously moving the handle 12 of the time switch to wind the time mechanism and the handle 14 of the circuit switch to cause the circuit switch to break the circuit when the handle 12 of the time switch is moved to wind and close the time switch mechanism. This arrangement is of importance in that then the device cannot be cheated by holding the handle 10 in a position in which the handle 12 of the time switch would be held in position in which the circuit is held closed, since when the handle 12 is in the latter mentioned position the handle 14 of the switch 13 will hold the switch open and consequently it is necessary that the handle 10 be returned to its initial position before the circuit is actually closed. The details of construction, the operation of the parts, and the objects of the invention will be more fully understood as this description proceeds.

In order to fully understand the invention the construction of the coin control mechanism will now be given in detail. This coin control mechanism comprises a front panel 15 which is formed with a coin insertion opening 16 (Figs. 16 and 17). A coin 17 may be inserted into the opening 16 and assumes a position within a receiving cutout 18 of a coin moving disc 19 which is supported rotatively immediately behind the panel 15. The coin is held in this position by reason of the bottom of the opening 16 being formed of a shape so that portions of the panel 15 extend over the cutout 18 (Fig. 17). The coin is restrained from moving rearwards by a plate 20 (Fig. 3) which is secured upon the rear of the panel. A pair of opposed guide plates 21 (Fig. 1) is mounted between the panel 15 and the plate 20 and serve to rotatively guide the disc 19. The disc 19 is also rotatively held by reason of an opening 22 with a flat side arranged at its center (Fig. 15) and engaged upon a similarly shaped shaft 23 (Fig. 10) connected with the handle 10.

This shaft passes through an outturned flange 24 (Fig. 1) formed by turning the metal of the panel 15 outwards. A lug 25 (Fig. 15) projects from the edge of the disc 19 for the purpose hereinafter described and also moves within cutouts arranged in the plates 21. The dot and dash lines 26 indicate a completely turned position of the disc 19 in the direction of the arrow 27 in which position the lug 25 restrains the disc 19 from further rotation. A slight surface groove 28 is formed upon the rear face of the disc 19 for the purpose hereinafter further described. The periphery of the disc 19 is also formed with several cutout portions 29 for the purpose hereinafter to be described. Another plate 30 (Fig. 17) is also mounted between the panel 15 and the plate 20 and serves to hold the coin 17 when the disc 19 has been rotated to a position in which the coin tends to fall downwards. A plurality of bolts and nuts 131 (Fig. 1) serves to attach the plate 20 upon the panel 15.

A transverse bar 31 (Fig. 13) is movably mounted upon the rear of the plate 20 and has a conical projection 32^a which passes through an opening in the plate 20 (Fig. 18) and engages normally into the face groove 28 in disc 19. The arrangement is such that when the disc 19 is turned the conical projection 32^a relatively travels along the groove 28 until the end of the groove is reached when the disc is stopped, but if there is a proper coin 17 within the coin receiving opening 18 then the lever 31 will be pushed rearwards, being cammed by the coin, to remove the projection 32^a from the groove and to allow further rotation of the disc 19. The lever 31 is pivotally supported for horizontal motion at the elbowed end 33 by a spring 34 which is mounted on the plate 20. This spring urges the lever 31 rearwards against an adjustment screw 35 threadedly engaged in a bracket 36 mounted on the plate 20 and transversely engaging over the end of the lever 31. The screw 35 acts as a pivot for one end of the arm 31 when the coin engages the conical projection 32^a to push the opposite end of the arm 31 back out of a cut-out 29.

The other end of the lever 31 is located immediately over an opening 37 (Figs. 7, 8, and 13) in the plate 20 and is adapted to extend through this opening and, after the disc 19 is rotated, to engage the cutouts 29 of the disc 19 because the plate 20 lies snugly against the disc 19, as is clear from Figs. 3 and 15 to prevent rotation of the disc unless there is a proper coin 17 in the coin opening 18 to push the lever 31 rearwards. Then rotation of the disc 19 is possible. A spring 38 is mounted upon the plate 20 and urges the free bent end of the lever 31 (Fig. 18) frontwards through the opening 37. A member 39 is attached upon the rear of the plate 20 and has portions 39^a thereof extending at right angles through an opening 40 (Fig. 14) so as to engage against the side of the disc 19 to act against the edge of the coin and prevent turning of the disc in the event that the coin is too thick and consequently a counterfeit or slug.

A lever 41 (Figs. 7, 8, and 13) is pivotally mounted by a stud 42 upon the plate 20 and has a pawl portion 43 for the purpose hereinafter explained. The lever 41 has a downturned end 44 which engages through the opening 45 (Fig. 13) in the plate 20 and is adapted to be engaged and moved by the coin 17 (Fig. 15) as the coin passes so as to move the pawl 43 to a releasing position as hereinafter explained. A spring 46 (Figs. 7, 8, and 13) connects with the lever 41 and with the bracket 36 for urging the pawl 43 of the lever into an operative position by rotating the lever 41 on the stud 42.

A pair of hexagonal posts 47 (Fig. 9) are mounted upon the plate 20 for the purpose of supporting parts of the coin mechanism. A bracket 48 is also secured upon the plate 20 for the same purpose. The bracket 48 is provided with front lugs 49, see Fig. 3, by which it is attached upon the plate 20 and rear lugs 50 which are adapted to receive holding screws to hold other parts of the coin mechanism in place. A stop 51 (Fig. 7) projects from the bracket 48 for engaging a stop 53 and limiting rotation of a drum 52 which is mounted upon the shaft 23.

The drum 52 is provided with a projecting arm 53 (Figs. 10 and 11) which is adapted to act against the stop 51. A spring 54 acts between a lug projecting from the side of the drum 52 and the plate 20 for normally urging the drum 52 into the position in which the stop 53 engages the lug 51 (Fig. 9). The drum 52 is formed with a circular opening 55 (Fig. 10) having a flat side so as to engage upon the corresponding part of the shaft 23 and consequently to turn as the shaft 23 turns. A washer 56 (Fig. 12) is disposed within the drum 52 upon a reduced end 57 of the shaft 23. A nut 58 (Fig. 11) threadedly engages upon the reduced end 57 and holds the drum upon the shaft. A peg 59 (Fig. 12) projects

from the arm 53 of the drum 52 and serves as a pivot for supporting a cam lever having a pair of arms 60 and 61. This cam lever also has a finger 62 provided with a pawl portion 63 (Figs. 7 and 8). A spring 64 (Fig. 11) acts between the cam lever and a lug stamped from the inside of the drum 52 so as to normally urge the cam lever into a certain neutral position.

A ratchet plate 65 (Figs. 7 and 8) is formed with a hub portion 66 having a rectangular rear opening 67. The ratchet plate 65 has an edge cutout 68 in which the pawl 63 engages so as to turn the ratchet plate as the drum 52 turns. The ratchet plate 65 is formed with a second edge cutout 68a and several teeth 69 which are adapted to be engaged by a pawl 43 of the lever 41. When the cam lever is turned from the position shown in Fig. 7 to the position shown in Fig. 8 the arm 61 passes under the pawl 43, which is held in the cutout 68a by the spring 46, to cam the pawl portion 63 out of the cutout 68. In Fig. 7 the parts are shown in their normal position, that is, a position in which the disc 19 is in the position illustrated in Fig. 15. When the coin has been inserted into the device and the handle 10 turned as far as the projection 25 of the disc 19 allows turning, that is to the position 26 then the parts will be in the position illustrated in Fig. 8. It should be noticed that the pawl portion 43 engages the teeth 69 as the ratchet disc 65 is turned into the position shown in Fig. 8, thereby preventing the reverse turning. Therefore when a coin has been inserted the handle 10 must be completely turned. The rotatable member 11 is formed with a rectangular projection 70 which engages into the opening 67 in the hub 66 so that the rotatable member turns along with the ratchet disc 65. A support plate 71 (Fig. 6) has a hub portion 72 engaging over the hub portion 66 of disc 65. The plate 71 has portions resting upon the lugs 50 and the front ends of the posts 47 (Fig. 3) and is provided with openings so that screws 76 (Fig. 1) may pass therethrough to attach the plate in place. Another plate 73 (Fig. 6) is engaged immediately adjacent the plate 71 and has a circular opening 74 through which a portion of the rotatable member 11 may be seen (Fig. 5). The plate 73 is provided with an annular raised section 75 which serves in conjunction with the plate 71 to prevent other than rotative movement of the member 11. The plate 73 is held in place by screws 76 which also engage through the openings of the plate 71 and threadedly engage the lugs 50 and the hexagonal members 47 (Fig. 3).

The time switch illustrated on the drawings is one generally known upon the market. It is very similar to the time switch illustrated and described in the patent to Marcus H. Rhodes #1,773,697 dated August 19, 1930. The only distinction between the switch of the patent and the switch illustrated is that the patent discloses an additional handle known as the time control handle which may be operated to turn "on" the timing mechanism or turn "off" the timing mechanism. If the time handle is moved to the "on" position then the circuit handle may be moved to the "on" position and the switch maintain the circuit closed according to the predetermined setting of the switch even though the circuit handle is immediately moved to the "off" position. If the time handle is moved to the "off" position then the switch will be opened and closed according to the position into which the circuit handle is moved. The details of the time switch illustrated on the drawings will not be gone into since its construction is identical to that of Rhodes except for the distinctions mentioned. The circuit handle 12 corresponds with the circuit handle of Rhodes patent. If the circuit handle 12 is turned to move the link 94 from the position shown in full lines in Figs. 1–3 of the drawings to the position indicated by the dot and dash lines the timing switch will be wound and ready for operation even though the handle 12 is immediately moved back to its original position. The exact switch of Rhodes could be used in the present invention but in that event the time handle should always be turned on since it is desired that the time mechanism work continuously.

On the drawings the casing for the time switch is indicated by reference numeral 77 (Figs. 2 and 3). It is shown provided with a binding post 78 to which one lead of the circuit may connect. Another binding post 79 constitutes the other terminal of the switch. A lead 80 connects the terminal 79 with the terminal 81 of the switch 13. The radio circuit is completed by connection of the lead 82 (Fig. 1) with the other terminal 83 of the switch 13 and to one terminal of the radio chassis, the other terminal of the chassis being connected with the terminal 79.

The present invention comprises merely the provision of a means connected from the rotatable member 11 for simultaneously moving the handle 12 of the time switch and the handle 14 of the circuit switch to cause the circuit switch to break the circuit when the handle of the time switch is moved to close the circuit. This means comprises a crank member 85 having one of its ends 86 engaged in a central opening formed in a hub piece 87 upon the rotatable member 11. The central portion of the crank 85 engages between a pair of pegs 88 and 89 (Figs. 4 and 5) projecting from the rotatable member 11. The crank 85 has its other end 90 engaging against one side of the handle 12 (Fig. 1) of the time switch so as to be capable of moving the time switch into its "on" position. A pair of supporting brackets 91 and 92 are attached upon the casing 77 of the time switch and upon the plate 73 by the lower two screws 76 so as to connect the time switch with the coin control mechanism in a unit. The switch 13 is attached upon the body 77 of the time switch. A link 94 has one of its ends pivotally mounted by a screw 95 to the control handle 14 of the switch 13. The other end of this link is formed with an elongated slot 96 (Fig. 2) which engages over the crank 85.

In Figs. 21 and 22 the device is shown to be mounted to the panel board 105 of a radio receiving set 106. The back 107 of the radio set is hinged at 108 and locked with a key 109. A second key lock 110 is provided for locking the hinged L shape cover 111 for safe guarding the coins inserted in opening 16.

The operation of the device may be understood by considering a practical installation for the coin operated electric time switch. This mechanism may be installed to control the circuit of a radio set. It allows purchasers to insert specified coins into the coin control mechanism and turn on the current for a specified length of time depending upon the time switch. After this length of time the circuit is automatically broken. To obtain additional service it is necessary that another coin be inserted.

The coin is inserted through the opening 16. Then the handle 10 is turned. The coin, for ex-

ample coin 17, will engage beneath the conical extension 32a of portion 32 of the lever 31 so as to push the free end of the lever rearwards to prevent it from engaging the cutouts 29 and allowing rotation of the disc 19. The handle 10 is then further turned so that motion from the shaft 23 is communicated to rotate the drum 52. The pawl portion 63 upon the cam lever 62 moves along with the drum 52 and consequently moves the ratchet disc 65 with it from the position shown in Fig. 7 to that shown in Fig. 8. During this motion the pawl 43 will engage the ratchet teeth 69 of the ratchet disc 65 so as to prevent reverse rotation once the coin has been inserted and the handle turned a sufficient distance.

When the handle has been completely turned as determined by the projection 25 on the disc 19 reaching the position 26 (Fig. 15) then the coin 17 can fall downwards by gravity and assume a position between the inturned end 44 of the lever 41 and the plate 30. As the handle 10 is turned the ratchet disc 65 always turns along as just stated, and causes the rotatable member 11 through the connection 70 to turn correspondingly. The rotatable member 11 during this turning causes the peg 69 to strike against the crank 85 (Fig. 5) and pivot the crank about in an arc so that the crank moves the handle 12 of the timing switch into its "on" position shown by the dot and dash lines in Fig. 2. Furthermore the crank 85 will draw upon the link 94 and move the switch 14 to its "off" position. It should be noticed that the circuit still is "off" even though the time switch is in the "on" position since now the switch 13 is off. Consequently before the radio may play, or other services be had, it is necessary that the handle 10 be rotated back to its original position.

The handle need only be released since the spring 54 (Figs. 10 and 11) will rotate the drum 52 and carry all of the parts together to the original position. As the disc 19 is moved past the position in which the coin 17 falls downwards one of the corners of the opening 18 in the disc 19 will move the coin into the position shown by the dot and dash lines in Fig. 15 so that it is pried in between the cam end 44 of the lever 41 pivoting the lever on screw 42 so that the pawl portion 43 disengages from the teeth 69 and releases the ratchet disc 65 so that it may thereafter return to its original position under the influence of the spring 54. As the disc 19 moves back to its original position the projection 25 will strike the coin and dislocate the latter from its retained position dropping the coin into a cash box (not shown on the drawings).

As the handle moves back to its original position the rotatable member 11 will move back to the initial position and allow the pawl 43 to assume its original position (Fig. 7) under the action of the spring 54 as may be clearly seen from the Rhodes patent mentioned. When the handle 10 is completely back to its original position the switch 13 will be closed and the circuit remain closed until the time clock has run down. A conventional counter 100 is attached upon the time switch and has its pivoted operating lever 101 (Figs. 1 and 2) in the path of motion of the handle 12 and of the time switch so as to count each time that the device is used. A spring 102 is connected between the arm 101 and the body of the time switch so as to normally urge the arm 101 to follow motion of the handle 12 on the time switch. In this manner a record will be had of the number of times the device has been used.

While I have shown and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A mechanism for operating a time switch and a circuit switch connected in series in radio apparatus, comprising a rotatable shaft, a handle secured to said shaft, a member substantially parallel to the shaft and spaced from the axis thereof, means connecting said member to said shaft to move said member bodily around said shaft axis upon turning of said shaft, a pivoted circuit switch operating lever, a bar pivotally connected to said lever movable forward and backward to move said lever to switch opening and closing positions, said bar having a slot therein, said member extending through said slot, a pivoted time switch operating lever, said last lever having a portion extending into the path of movement of said member to be engaged and moved thereby, whereby movement of said handle in one direction moves said first lever to switch opening position and said second lever to winding and closing position, while movement in the opposite direction moves said first lever to switch closing position without affecting the position of the second lever.

2. A mechanism for operating a time switch and a circuit switch connected in series in a radio apparatus comprising a rotatable shaft having a handle secured to one end of said shaft, said shaft having a hole in its other end, a circular disc secured on the second end of said shaft, two lugs extending from the outer face of said disc, a bent member having a portion substantially parallel to said shaft and spaced from the axis thereof, a second portion extending into said hole, and a third portion within the path of movement of said lugs whereby turning of said disc causes said bent member to move bodily around said shaft axis, a pivoted circuit switch operating lever, a bar pivotally connected to said lever movable forward and backward to move said lever to switch opening and closing positions, said bar having a slot therein, a portion of said member which is parallel to said shaft extending through said slot, a pivoted time switch operating lever, said last lever having a portion extending into the path of movement of the portion of said member which is parallel to the shaft, to be engaged and moved thereby, whereby movement of said handle in one direction moves said first lever to switch opening position and said second lever to winding and closing position, while movement of said handle in the opposite direction moves said first lever to closing position without affecting the position of said second lever.

FRANK J. HAYES.