Oct. 16, 1951 C. V. BATES 2,571,185

PERIOD TIMING MECHANISM

Filed April 4, 1947 4 Sheets-Sheet 1

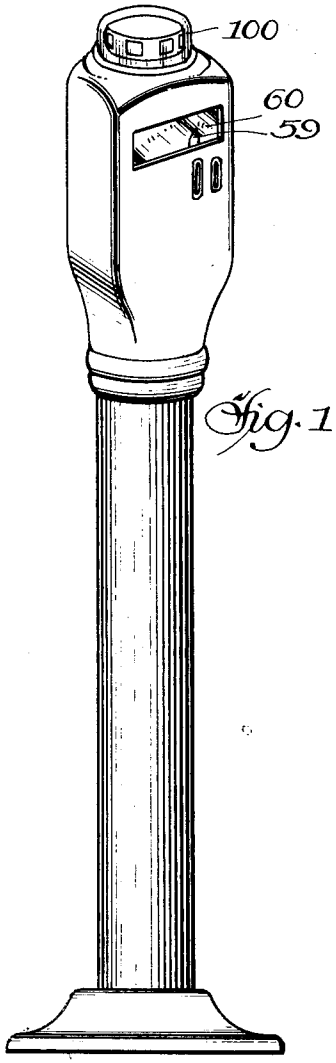


Fig. 1

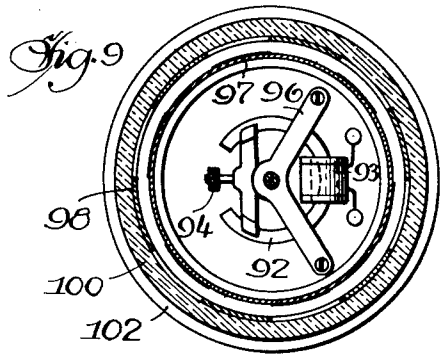


Fig. 9

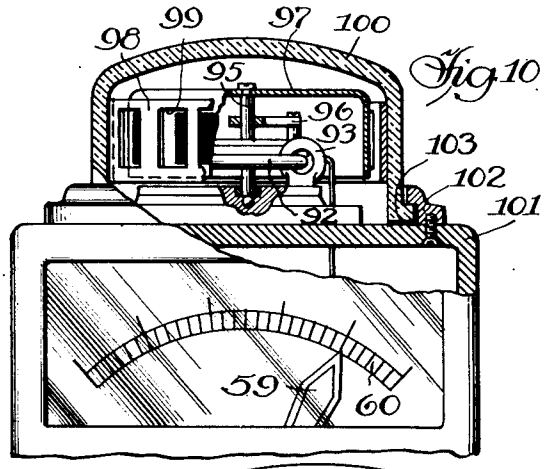


Fig. 10

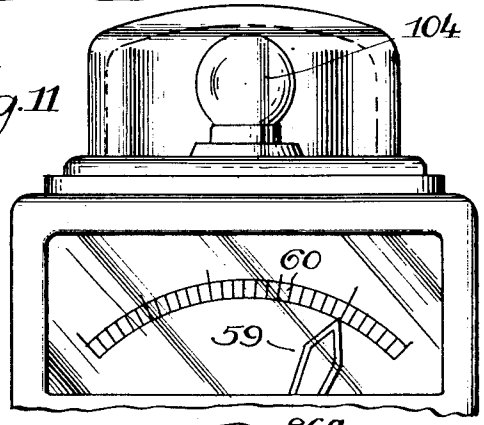


Fig. 11

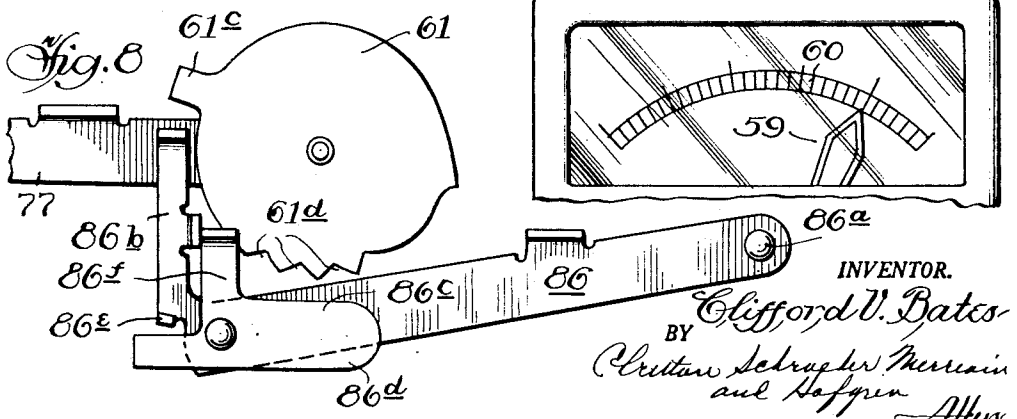


Fig. 8

INVENTOR.
Clifford V. Bates
BY
Critton Schrageler Merriam and Hoffman Attys.

Oct. 16, 1951 C. V. BATES 2,571,185

PERIOD TIMING MECHANISM

Filed April 4, 1947 4 Sheets-Sheet 2

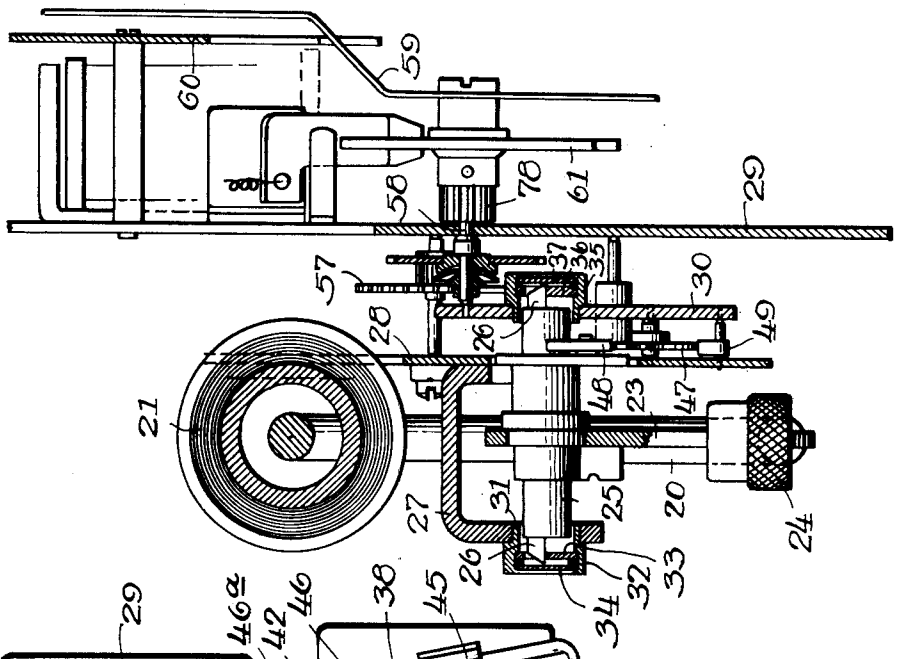


Fig. 3

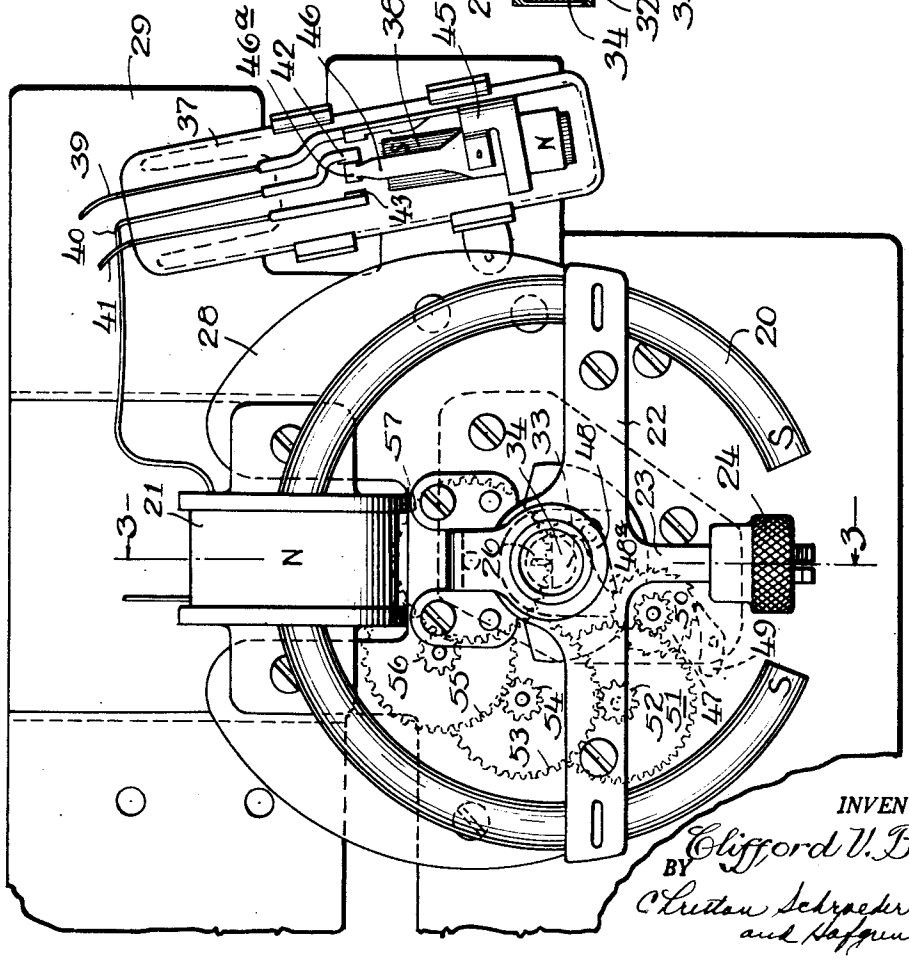


Fig. 2

INVENTOR.
Clifford V. Bates,
BY
Creston Schroeder Merriam
and Hoffman Attys.

Oct. 16, 1951 C. V. BATES 2,571,185

PERIOD TIMING MECHANISM

Filed April 4, 1947 4 Sheets-Sheet 3

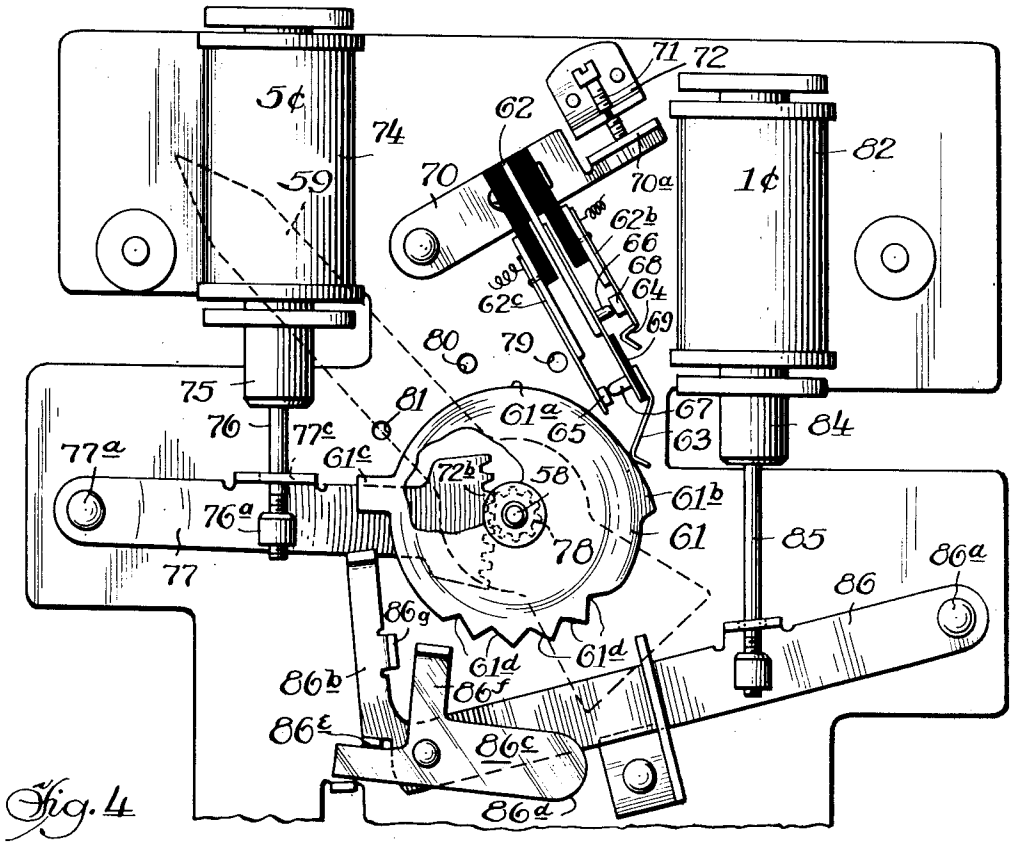
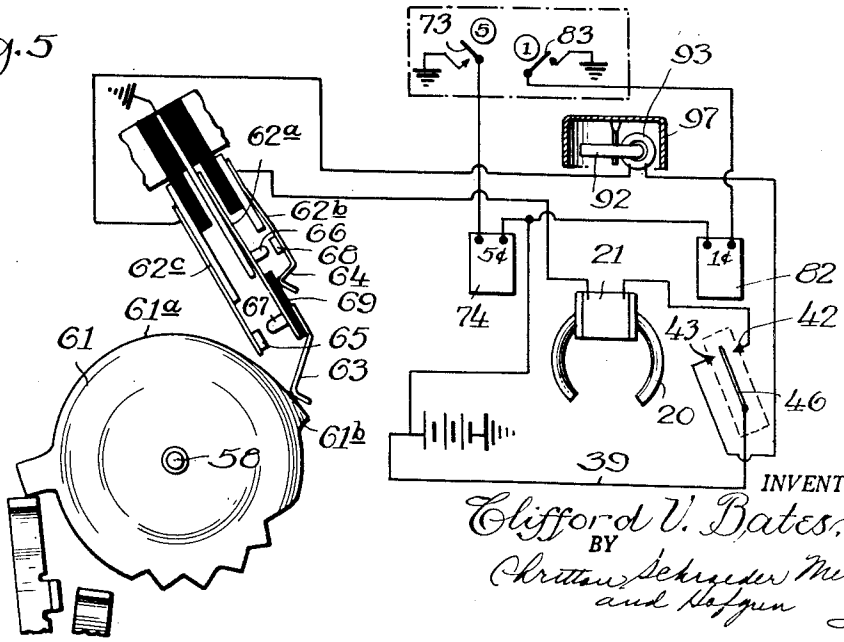


Fig. 4

Fig. 5



INVENTOR.
Clifford V. Bates,
BY
Chrittenden Schneider Merriam and Hofgren
Attys.

Oct. 16, 1951 C. V. BATES 2,571,185

PERIOD TIMING MECHANISM

Filed April 4, 1947 4 Sheets-Sheet 4

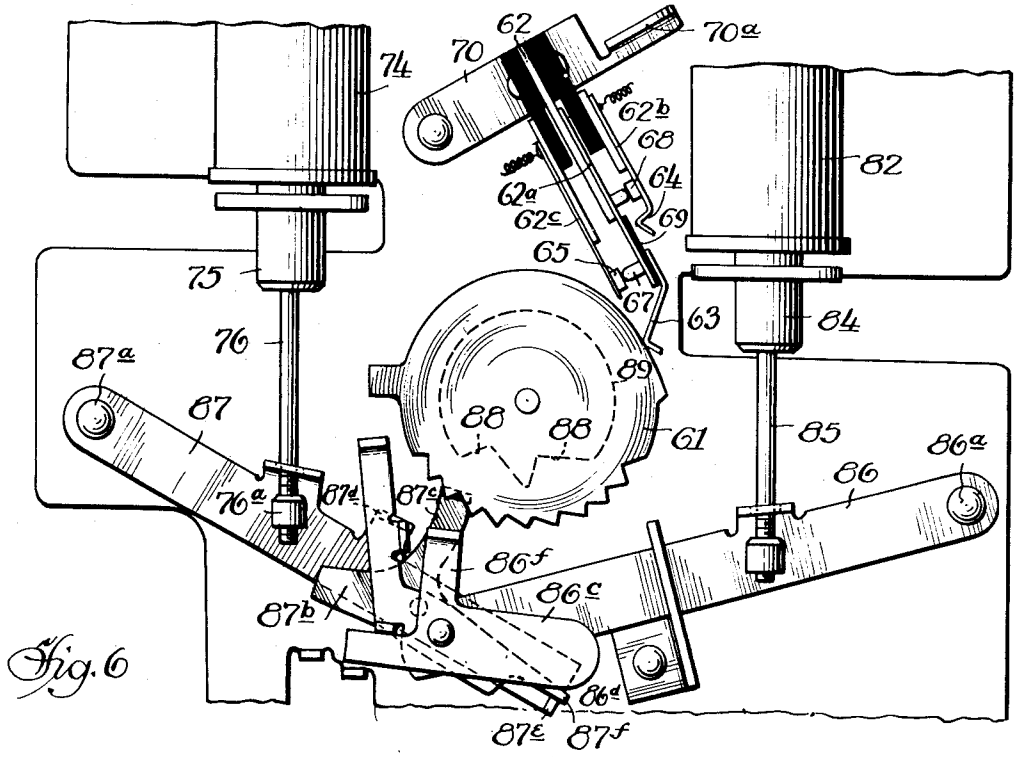


Fig. 6

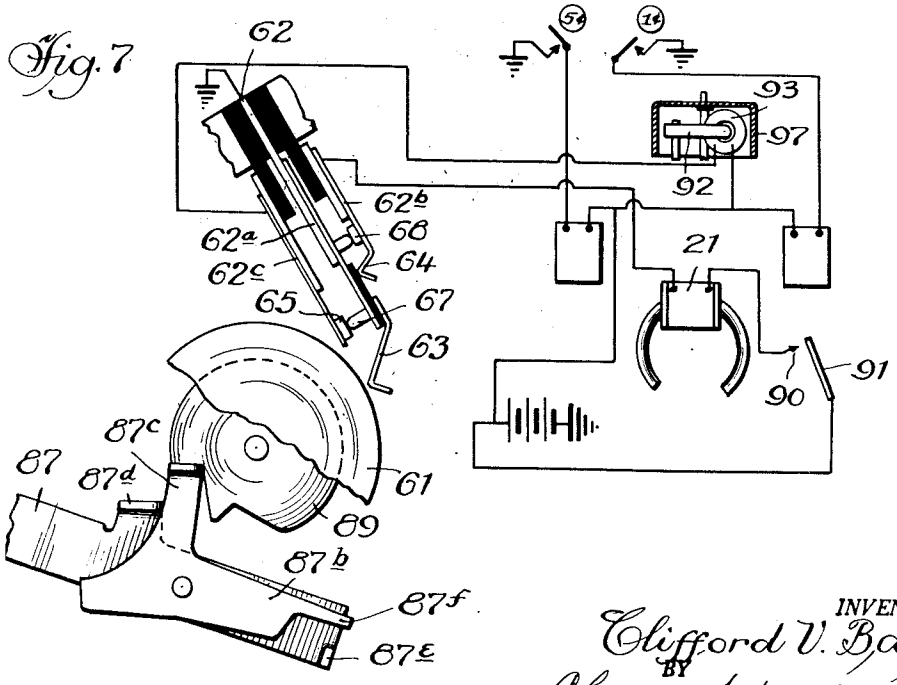


Fig. 7

INVENTOR.
Clifford V. Bates
BY
Christow Schroeder Merriam and Hofgren
Attys

Patented Oct. 16, 1951

2,571,185

UNITED STATES PATENT OFFICE

2,571,185

PERIOD TIMING MECHANISM

Clifford V. Bates, Chicago, Ill.

Application April 4, 1947, Serial No. 739,523

14 Claims. (Cl. 161—15)

1

This invention relates to a period timing mechanism and particularly to such a mechanism that is especially useful in parking meters or the like.

Period timing mechanisms are used for indicating the length of a given period of time and when used as parking meters are started when the user parks his car and are provided with indicators to indicate when the predetermined time is up. Most of these devices are mechanically operated and their operation is begun by turning a lever or the like. The timing mechanism of the present invention is electrically operated and is designed to have a very small consumption of current so that they may be run from an ordinary small dry cell battery, such as those used in flash lights.

The motive mechanism that is used in the new period timing mechanism is preferably of the type shown in my prior patents; for example, Patent No. 1,970,412, patented August 14, 1934, and Patent No. 2,214,654, patented September 10, 1940.

One of the features of this invention is the provision of an improved period timing mechanism that is automatically started by closing a switch and that runs for the allotted time plus a predetermined amount of overtime; another feature of this invention is the provision of means for starting the mechanism by the use of one or more coins of different denominations; still another feature of the invention is the provision of improved means for adjusting the period of time which the timing mechanism operates; yet another feature of the invention is the provision of an improved timing mechanism having an oscillating member, a motion translating means including a rotatably mounted ratchet member and means for turning the ratchet a small increment of its total circumference during each complete oscillation of the oscillating member; another feature of the invention is to provide an improved support for the oscillating member comprising knife edges resting upon supports and coaxial with the axis of oscillation of the oscillating member; yet another feature is the provision of improved means for preventing undue shock on the knife edges in case the oscillating member and its support are excessively jarred or vibrated; and a still further feature of the invention is the provision of improved means for starting the period timing mechanism by a lever means engaging a control means together with means for preventing the lever means from accidentally becoming disengaged from the control means during the movement of the control means.

2

Other features and advantages of the invention will be apparent from the following description and the accompanying drawings, of which:

Fig. 1 is a perspective view of a parking meter embodying the present invention; Fig. 2 is a rear elevation of one embodiment of the period timing mechanism of the present invention; Fig. 3 is vertical section taken along line 3—3 of Fig. 2; Fig. 4 is a front elevation of the period timing mechanism of Figs. 2 and 3 with portions broken away; Fig. 5 is a wiring diagram for the period timing mechanism; Fig. 6 is a view similar to Fig. 4 but showing a second embodiment of the invention; Fig. 7 is a view similar to Fig. 5 showing the wiring diagram of the embodiment of Fig. 6, with a portion of the control means broken away; Fig. 8 is an elevation of the lever system used in turning the control means with the lever being in partially raised position; Fig. 9 is a sectional plan view of an indicator operated by the period timing mechanism and showing when said machine is operating; Fig. 10 is a partial elevation of a parking meter using the period timing mechanism of this invention and partially in section to show the construction of the indicator of Fig. 9; and Fig. 11 is a partial elevation of a parking meter showing a second embodiment of an indicator system.

The period timing mechanism shown in the drawings is similar to those disclosed in my prior patents; for example, U. S. Patent No. 1,970,412, dated August 14, 1934, and No. 2,214,654 dated September 10, 1940. In the present invention this timing mechanism has various improvements incorporated therein and may be used as a parking meter. The period timing mechanism includes a magnetically operated motor with the motor being so constructed that the electric energy required to operate it constantly is so minute that a small pocket battery may be used for the purpose. When an ordinary flash light battery is used, the motor and indicator will operate for several months without requiring replacement of the battery. Because the parking meter is self-contained and all-electric, it can be hermetically sealed so that rain, dirt, and the like cannot enter. This is a very important feature as parking meters along a street are subjected to all conditions of weather as well as the dust in the atmosphere. A pointer is used with the period timing mechanism and preferably operates against a scale to show how much time remains while the timing mechanism is operating. In order to make the parking meter adaptable for any location, it may be set in

operation by either of two different types of coins such as nickels and pennies. The maximum time may be set with a nickel and then a small increment of this time may be set by using a penny. When a series of pennies is used, the total number will move the operating time to the maximum permitted by the nickel. For example, if 90 minutes' parking is allowed for a nickel, 18 minutes may be allowed for a penny. The penny mechanism will keep repeating by insertion of successive pennies until 90 minutes have been set. Means are provided for positively controlling the operation of the penny mechanism so that each penny used will set the time at 18 minutes and the mechanism cannot be jarred or shaken so as to set a time greater than 18 minutes. Means are also provided for varying the predetermined maximum time. Thus, when the parking meter is used on a side street, the maximum time available may be 90 minutes, 60 minutes, or the like. When the meter is to be used in front of a bank, post office or the like the maximum time may be set much smaller.

The parking meter will be described as related to the embodiments shown in the accompanying drawings. The motive portion, sometimes hereinafter termed the "clock" portion, of the period timing mechanism shown here is shown and described in my prior U. S. Patent No. 1,970,412. It is not necessary, therefore, to give a detailed description of the clock mechanism here. However, the mechanism shown in Figs. 2 and 3 comprises an interrupted steel ring 20 magnetized so as to have a like pole at each end, as a south pole and an opposite pole, as a north pole, in the center as shown in Fig. 2, and an electromagnetic winding 21 around the middle portion of the ring when the ring is at rest. The ring 20 is held by a cross arm 22 below its center of gravity with the cross arm provided with a downwardly extended portion 23 to which is fastened an adjustable threaded weight 24. This weight makes the center of gravity of the entire assembly very low. The cross arm 22 holds an axle 25 located at right angles to the plane of the cross arm 22 and the downwardly extending portion 23. Each end of the axle 25 is provided with a knife 26 extending from the axle with the edges of the knives being co-axial with the axle 25. The steel ring 20, cross arm 22, and axle 25 are arranged to oscillate back and forth and are supported on an inverted U-shaped supporting member or bridge 27 which in turn is mounted on a rear plate 28. The rear plate 28 is spaced from a main plate 29 and is mounted thereon. The rear plate 28 also serves as a mounting member for the winding 21. A smaller plate 30 is arranged between the rear plate 28 and the main plate 29 with all three plates being substantially parallel to each other.

The rear end of the axle 25 extends through a hole 31 in the rear portion of the supporting member 27. This hole is provided with an annular member 32 whose internal diameter is slightly larger than the diameter of the corresponding end 25. Extending across this annular member 32 is a supporting plate 33 of hardened steel or the like upon which the knife 26 rests. Beyond this supporting plate 33 is located a closure member 34. The other end of the axle 25 extends through a similar hole in the smaller plate 30 with this hole being provided with a similar annular member 35, supporting plate 36, and closure member 37. As the ends of the axle extend into the annular members 32 and 35 and have diameters only slightly smaller than the internal diameters of the annular members, protection is provided for the knife edges 26. In case the clock member is jarred or otherwise agitated, the ends of the axle 25 will be held against excessive movement and thus protect the knife edges. The axle will also absorb any stresses and strains.

Mounted on the rear plate 28 there is located a hermetically sealed glass tube 19. This tube contains a pivotally mounted permanent magnet 38 having a south pole at its upper end and a north pole at the lower end, as shown in Fig. 2. The tube 19 is provided with three lead-in wires 39, 40, and 41. Wire 39 is connected to a source of electric current while wire 40 is connected to the electromagnetic winding 21 and wire 41 is connected to an indicating device to be described in detail hereinafter. Wire 40 has its inner end connected to a contact point 42 on the side opposite the ring 20 while wire 41 is connected to a similar contact point 43 on the side adjacent the ring 20. The permanent magnet 38 which is rotatably mounted on a supporting structure 45 is provided with a contact member 46 having an upper end 46*a* located between the contact points 42 and 43. When the ring 20 is at rest the end 46*a* is against contact point 42. As the ring 20, during its oscillation, causes the south pole to move to the left as shown in Fig. 2, the permanent magnet 38 will move toward the ring and break the contacts to the electromagnetic winding and close the contacts to the indicating device. When the ring is in the position shown in Fig. 2 the contacts to the winding will be closed.

As the ring 20 oscillates back and forth, it turns a ratchet wheel 47 that is mounted between the plates 28 and 30. This turning is caused by a pawl 48 carried by the axle 25 and having a downwardly extending portion 48*a* adapted to engage one tooth at a time on the ratchet wheel 47. The ratchet wheel is prevented from turning in the opposite direction by means of a rotatably mounted dog 49 also located between the plates 28 and 30. With this construction the moving parts are kept to a minimum. Each time the ring 20 oscillates it feeds a tooth on the ratchet 47. The only constantly moving part, therefore, is the ring 20 and its supporting structure which is supported on the knife edges 26. All other pivots move only momentarily and have no main spring force on them to create friction and wear. The intermittent movement of the ratchet wheel 47 is transferred through a series of gears 50, 51, 52, 53, 54, 55, 56 and 57 with these gears all being rotatably mounted between the plates 28, 29 and 30. The last gear operates through an axle 58 on a pointer 59 arranged in indicating relationship against a scale 60. None of the parts, therefore, require oil; and the parking meter disclosed operates well at below freezing temperatures where the oil of other meters congeals.

Mounted on the front end of the axle 58 behind the pointer 59 there is located a control means in the form of a plate 61. This control means is connected to the axle 58 to be rotated by the clock mechanism previously described. The plate 61 is provided with an arcuate edge 61*a* whose center of curvature is substantially at the center of the axle 58, a gradually increasing raised cam surface 61*b*, an extended portion 61*c*, and a series of indentations 61*d*. Mounted adjacent the plate 61 there is located a switch 62 having central arm 62*a*, an upper arm 62*b*, and a lower arm 62*c*. The central arm 62*a* is provided at its lower end with a spring member

63 adapted to be held adjacent to but out of contact with the arcuate surface 61*a* (Fig. 7) and, successively, against the raised cam portion 61*b* (Fig. 5). The upper arm 62*b* is provided with a contact portion 64 adapted to bear against the central arm 62*a* while the lower arm 62*c* is provided with a contact point 65. The central arm 62*a* is provided with an upwardly extending post 66, and a downwardly extending post 67. The post 66 is adapted to bear against a contact button 68 on the upper arm 62*b* while the other post 67 is adapted to bear against the contact point 65. When the plate 61 has been turned to where the spring member 63 leaves the raised cam surface 61*b* contacts 65 and 67 and 66 and 68 will be closed and the contact arm 64 will bear against the backing 69. The upper arm 62*b* is electrically connected to the winding 21, the lower arm 62*c* is connected to the indicating mechanism while the central arm 62*a* is grounded, as is shown in Fig. 5. When the clock mechanism turns the plate 61 to where the spring member 63 first bears against the raised cam portion 61*b*, the contacts 65 and 67 open thus stopping the operation of the indicating device. This point is correlated with the pointer 59 and the scale 60 so as to be the point where the allowable time is exhausted. In order to provide for a small overtime the clock continues to operate until the contacts 66 and 68 are opened by the spring member 63 riding up higher on the raised cam surface 61*b*. This stops the operation of the clock mechanism and shows that the period of overtime is exhausted. The overtime period is provided so that an inspector, such as a policeman, can see from the indicating device that the actual time is up and then can also see how much of the overtime has been used. The switch 62 is mounted on a rotatable plate 70 and may be adjusted toward or away from the rotatable plate 61 by means of a screw 71 held in a mounting 72 and bearing against an angular portion 70*a* of the plate 70.

After the operation of the clock has stopped, the operation may be started again by turning the plate 61 so that the spring member 63 leaves the raised cam surface 61*b*. This may be done in any manner desired. However, as shown in Figs. 4 and 5, it may be accomplished by either a five cent coin or a one cent coin. When a nickel is dropped in a slot (Fig. 1) it closes a switch 73 (Fig. 5) and energizes a solenoid 74. The solenoid armature is then raised. The lower end of the armature is provided with a downwardly extending portion 76. Mounted adjacent this post is a rotatably mounted lever 77 rotatable about a fulcrum 77*a*. The other end of the lever is provided with an arcuate portion 77*b* whose center is substantially at the center of the fulcrum 77*a*. This arcuate portion is provided with teeth which engage a gear wheel 78 attached at the rear of plate 61. The post 76 extends through a hole 77*c* provided in the lever 77 with the bottom of the post being threaded and provided with an adjustable nut 76*a*. The nut 76*a* has an outer diameter larger than the diameter of the hole 77*c*. When the solenoid has been energized, as discussed above, the armature 75 is raised and this serves to turn the lever 77 about its fulcrum 77*a* and turn the plate 61 until the extended portion 61*c* bears against a pin 79, adjacent the plate 61. The spring member 63 is then off the raised cam surface 61*b*. The distance of the spring member from the raised cam surface 61*b* determines the period

of operation of the clock mechanism and this period may be changed by changing the location of the pin 79. As shown in Fig. 4, the pin is set for a 90 minute maximum operation. In order to change this period, the pin may be removed from its hole and inserted in another hole 80 which is equivalent to a shorter time, such as 60 minutes, or into another hole 81 which is equivalent to a still shorter time, such as 18 minutes. As many holes may be provided as desired with the period of operation being equivalent to any desired time.

In order that the clock mechanism may be set by another coin such as a penny, a second solenoid 82 is provided that may be operated by a penny or the like. The penny may be inserted through a second slot to close its switch 83 (Fig. 5). The armature 84 of the second solenoid is also provided with a downwardly extending post 85 which is similarly engageable with a second lever 86 mounted for rotation about a fulcrum 86*a*. The opposite end of the second lever 86 is provided with an upwardly extending portion 86*b* adapted to engage the extended portion 61*c* of the plate 61, and a portion 86*c* adapted to engage one of the indentations 61*d*. The lever portion 86*c* is rotatably mounted on the lever 86 and has an end portion 86*d* extending toward the fulcrum 86*a* and weighted. A stop portion 86*e* on the main part of the lever prevents the rotatable portion from rotating too far. The rotatable portion 86*c* also has an upwardly extending portion 86*f* whose upper end is adapted to engage an indentation 61*d*. When the lever 86 is rotated about its fulcrum 86*a* by energizing the solenoid 82, the first upwardly extending portion 86*b* engages the extended portion 61*c* of the plate 61 and moves the plate a distance equivalent to the overtime period and moves an indentation 61*d* into position to be engaged by the lever portion 86*f*. This turns the plate 61 one-fifth of the total maximum period of operation available, as shown. Further energizing of the solenoid 82 causes engagement of the lever portion 86*f* with a succeeding indentation 61*d* to turn the plate an equal increment of time. The total increments will place the extended portion 61*c* of the plate 61 against the pin 79 with this position of the plate 61 being equivalent to the maximum time of operation of the period timing mechanism.

In order that the indentation-engaging portion 86*f* of the lever may not be jarred out of position after it has engaged an indentation, it is arranged to abut against a stop member 86*g* on the upwardly extending portion 86*b* (Fig. 8). Thus the plate 61 cannot be jarred up further.

In the embodiment shown in Figs. 6 and 7 the nickel operated solenoid 74 operates a different type of lever 87. This lever is also mounted for rotation about a fulcrum 87*a* and has a rotatably mounted portion 87*b* at its lower end provided with an upwardly extending portion 87*c* adapted to engage a notch 88 in a second plate 89 attached to the control plate 61. This plate 89 is provided with two notches 88 adjacent each other so that two nickels may be used to operate the solenoid 74. The first nickel will turn the control plate 61 one-half the total distance equivalent to the maximum time available while the second nickel will turn the plate the additional distance. The lever portion 87 is also locked into position so as to prevent jarring from disengaging the notch-engaging portion 87*c*. This is accomplished by means of an abutment 87*d* against which the por-

tion 87c bears when the second plate 89 is being turned (Fig. 7). The portion 87b is prevented from turning to a position where it will be unable to engage a notch by means of a stop member 87e on the main lever 87 and against which a portion 87f of the movable portion 87b will bear (Fig. 6).

In the embodiment shown in Figs. 6 and 7 only one contact point 98 is used for the permanent magnet 91. This contact closes the circuit to the electromagnetic winding 24.

One form of indicating device which shows that the clock mechanism is operating is shown in Figs. 9 and 10. This is a motive mechanism similar to that described for use in the parking meter. It comprises a ring 92 like ring 20, an electromagnetic winding 93, and a weight 94. The ring 92 is mounted in a horizontal plane and is supported on a vertical axle 95. The axle is connected by means of a yoke 96 to a cylindrical sleeve 97. Surrounding this cylindrical sleeve is a second cylinder 98 having spaced cut-out windows 99 therein. In order to show that the indicating mechanism is operating, it is preferred that the sleeve 97 be painted in spaced stripes of a bright color, such as red. The operation can then be observed through the windows 99. The indicating mechanism is covered by an inverted glass bowl 100 which is bolted to the top of the parking meter housing 101 and held in place by means of an annular rim 102. The bowl 100 is sealed by means of a gasket 103.

Fig. 11 illustrates a different type of indicating device. In this embodiment the indicating device is merely a lamp 104 which will flash on and off as the parking meter is operating.

Having described my invention as related to the embodiments shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description unless otherwise specified but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A period timing mechanism, comprising; a clock; a rotatable control means operatively connected to the clock to be rotated thereby, said control means having an extended portion and a series of spaced indentations; a lever mounted for rotation about a fulcrum and having a first portion adapted to engage said extended portion and a second portion adapted to engage at least one indentation; means for operating the lever to cause said first portion to engage the extended portion and turn the control means to a position where said second portion engages said indentation to turn the control means further; means for again operating the lever to cause the second portion to engage a succeeding indentation and turn the control means an increment of the first distance; and means coacting with the control means for stopping the effective operation of the clock at the end of a predetermined time.

2. A period timing mechanism, comprising; an electrically operated clock mechanism; a rotatable control means operatively connected to the clock mechanism to be rotated thereby and having a portion of its surface raised and arranged as a cam, and a second portion of its surface arranged with spaced indentations; a switch in the electrical circuit to said clock mechanism with an arm on said switch, said clock mechanism serving to turn the control means to a point where the arm contacts the raised cam portion; an auxiliary electrical circuit intermittently operated at regular intervals by the clock mechanism; a second switch in the auxiliary circuit operatively connected to said arm with the second switch being closed when the arm is out of contact with said cam surface, said raised cam surface serving to open the switch to the auxiliary circuit first and then, after a predetermined time, serving to open the switch to the clock mechanism; a lever mounted for rotation about a fulcrum and having a portion adapted to engage the control means and rotate it from where said arm contacts the raised cam surface at the point where the clock mechanism switch is first opened to the point where the auxiliary circuit switch is first opened and a second portion on the lever adapted to engage the first indentation to turn the control means to where the arm is out of contact with the cam surface, with the control means being similarly turned additional equal distances by successive engagement of said second portion with successive indentations; and means for limiting the total distance of turning to a predetermined maximum.

3. A period timing mechanism, comprising; a clock; a rotatable control means operatively connected to the clock to be rotated thereby, said control means having an extended portion and a series of spaced indentations; a lever mounted for rotation about a fulcrum and having a first portion adapted to engage said extended portion and a second portion adapted to engage at least one indentation; means for operating the lever to cause said first portion to engage the extended portion and turn the control means to a position where said second portion engages said indentation to turn the control means further; means for again operating the lever to cause the second portion to engage a succeeding indentation and turn the control means an increment of the first distance; and means locking the second portion of the lever in place after it engages an indentation to prevent accidental displacement of said portion from said indentation.

4. A period timing mechanism, comprising; a clock; a rotatable control means operatively connected to the clock to be rotated thereby, said control means having an extended portion and a series of spaced indentations; a lever mounted for rotation about a fulcrum and having a first portion adapted to engage said extended portion and a second portion adapted to engage at least one indentation; means for operating the lever to cause said first portion to engage the extended portion and turn the control means to a position where said second portion engages said indentation to turn the control means further; means for again operating the lever to cause the second portion to engage a succeeding indentation and turn the control means an increment of the first distance; and means coacting with the control means for stopping the effective operation of the clock at the end of a predetermined time, said second portion abutting against the first portion when in engagement with an indentation to prevent accidental displacement of said second portion from said indentation.

5. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control means having one portion of its marginal surface raised, and another portion of its surface having a series of equally spaced indentations therein; an arm on said switch so positioned that when the arm contacts the raised

portion the switch will be opened, said clock mechanism serving to turn the control means to a point where the arm contacts the raised portion; a lever rotatable about a fulcrum and having a portion adapted to engage the first indentation to rotate said control means when the lever is rotated to turn said control means from where the arm contacts the raised portion, with the control means being similarly turned additional equal distances by successive engagement of the engaging portion with successive indentations and the total distance being equivalent to the period of operation of the timing mechanism; and means for limiting the total number of increments to limit said period of operation to a predetermined maximum; said engaging portion being rotatably mounted on the lever with means being provided on said lever for limiting the rotation of the engaging portion to a definite arc, with one end of the arc serving to place the engaging portion in position to engage an indentation and the other end of the arc serving to limit further outward movement of the engaging portion to prevent its being disengaged from the indentation during movement of the control means.

6. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control means having one portion of its marginal surface raised and another portion of its surface having a series of equally spaced indentations therein; an arm on said switch contacting said surface and so positioned that when the arm contacts the raised switch portion the switch will be opened, said clock mechanism serving to turn the control means to a point where the arm contacts the raised portion; a lever rotatable about a fulcrum and having a portion adapted to engage the first indentation to rotate said control means when the lever is rotated to turn said control means from where the arm contacts the raised portion, with the control means being similarly turned additional equal distances by successive engagement of the engaging portion with successive indentations and the total distance being equivalent to the period of operation of the timing mechanism; means for limiting the total number of increments to limit said period of operation to a predetermined maximum; an electrically operated solenoid; an armature for said solenoid operatively attached to said lever to operate the same; and a switch in the solenoid circuit to energize the solenoid and operate the lever; said engaging portion being rotatably mounted on the lever with means being provided on said lever for limiting the rotation of the engaging portion to a definite arc, with one end of the arc serving to place the engaging portion in position to engage an indentation and the other end of the arc serving to limit further outward movement of the engaging portion to prevent its being disengaged from the indentation during movement of the control means.

7. A period timing mechanism, comprising; a clock including a rotatable shaft; a rotatable control means mounted on said rotatable shaft of the clock to be rotated thereby and having an extended portion extending outwardly from the periphery of said control means; means for starting the operation of the clock by turning the control means; means for turning the control means a substantial distance; adjustable stop means

comprising a removable pin adjacent to the periphery of said control means and adapted to be engaged by said extended portion for limiting the total distance of turning to a predetermined maximum to regulate the period of operation of the clock, said pin being movable to different locations in each of which the pin is adapted to be engaged by the extended portion for varying said distance; and means coacting with the control means for stopping the effective operation of the clock after the clock has rotated the control means a distance equivalent to said period.

8. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control means having one portion of its marginal surface raised, a second portion extended, and other portions arranged with substantially equally spaced indentations; an arm on said switch so located that when the arm contacts the raised portion the switch will be opened, said clock mechanism serving to turn the control means to a point where the arm contacts the raised portion; means for turning said control mechanism to a predetermined position where the arm is out of contact with the raised portion to start the clock mechanism, the distance between said position and the raised portion determining the period of operation of the timing mechanism; a stop member comprising a removable pin in a hole against which the extended portion abuts to determine said period; at least one other hole into which said pin may be inserted with the extended portion also abutting against the pin in this new position to determine a new period of operation; and separate means engageable with one of said indentations to turn said control means a small increment of said distance, and also engageable with successive indentations to turn the control means successive increments until the total increments places said arm in said predetermined position.

9. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control means having one portion of its marginal surface raised, a second portion extended, and other portions arranged with substantially equally spaced indentations; an arm on said switch so located that when the arm contacts the raised portion the switch will be opened, said clock mechanism serving to turn the control means from a point where the arm is out of contact with the raised portion to a point where the arm contacts the raised portion; with the distance between the points being equal to the period of operation of the clock mechanism; a lever rotatably mounted about a fulcrum and having a toothed end engaging a gear wheel attached concentrically to the control means and movable therewith; an electrically operated solenoid; an armature for said solenoid operatively attached to said lever for turning the lever; a switch in the solenoid circuit to energize the solenoid and operate the lever; a removable pin located adjacent the control means to be contacted by said extended portion and limit the movement of the control means to a predetermined maximum thereby imposing a predetermined period of operation; means for arranging said pin in other positions to change the predetermined period; a

second lever rotatable about a fulcrum and having a portion adapted to engage the first indentation to rotate said control means where the second lever is rotated, with the control means being similarly turned additional equal distances by engagement of the engaging means with successive indentations until the said extended portion contacts said pin, said engaging portion being rotatably mounted on the second lever with means being provided on said lever for limiting the rotation of the engaging portions to a definite arc, with one end of the arc serving to place the engaging portion in position to engage an indentation and the other end of the arc serving to limit movement of the engaging portion to prevent its being disengaged from the indentation during movement of the control means; a second electrically operated solenoid; an armature for said second solenoid operatively attached to the second lever to operate the same; and a switch in the second solenoid circuit to energize the solenoid and operate the second lever.

10. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control mechanism having one portion of its marginal edge raised; an approximately circular member mounted concentrically with the control means and having a pair of spaced indentations on its marginal surface; an arm on said switch so positioned that when the arm contacts the raised portion the switch will be opened, said clock mechanism serving to turn the control means from a point where the arm is out of contact with the raised portion to a point where the arm contacts the raised portion with the distance between these points being equal to the period of operation of the clock mechanism; a lever rotatably mounted about a fulcrum and having a portion adapted to engage the first of said indentations to turn the control means when the lever is rotated and to move the second indentation into position to be similarly engaged by said portion on a second movement of the lever to turn the control means further; means for limiting the extent of the two movements to a predetermined maximum; and means for varying the position of said limiting means to vary the period of operation.

11. A period timing mechanism, comprising; an electrically operated clock mechanism; a switch in the electrical circuit to said clock mechanism; a rotatable control means operatively connected to said clock mechanism to be rotated thereby, said control means having one portion of its marginal surface raised and a second portion extended, and other portions arranged with substantially equally spaced indentations; an arm on said switch so located that when the arm contacts the raised portion the switch will be opened, said clock mechanism serving to turn the control means from a point where the arm is out of contact with the raised portion to a point where the arm contacts the raised portion; an approximately circular member mounted concentrically with the control means and having a pair of spaced indentations on its marginal surface; a lever rotatably mounted on a fulcrum and having a portion adapted to engage the first of said indentations to turn the control means when the lever is rotated and to move the second indentation into position to be similarly engaged by said portion on a second movement of the lever to turn the control means further; said engaging portion being rotatably mounted on the lever with means being provided on said lever for limiting the rotation of the engaging portion to a definite arc, with one end of the arc serving to place the engaging portion in position to engage an indentation and the other end of the arc serving to limit further outward movement of the engaging portion to prevent its being disengaged from the indentation during movement of the control means; an electrically operated solenoid; an armature for said solenoid attached to said lever for turning the lever; a switch in the solenoid circuit to energize the solenoid and operate the lever; a removable pin located adjacent the control means to be contacted by said extended portion and limit the movement of the control means to a predetermined maximum thereby imposing a predetermined period of operation; means for arranging said pin in other positions to change the predetermined period; a second lever rotatable about a fulcrum and having a portion adapted to engage the first indentation to rotate said control means when the second lever is rotated, with the control means being similarly turned additional equal distances by engagement of the engaging means with successive indentations until said extended portion contacts said pin, said engaging portion being rotatably mounted on the second lever with means being provided on said lever for limiting the rotation of the engaging portion to a definite arc, with one end of the arc serving to place the engaging portion in position to engage an indentation and the other end of the arc serving to limit movement of the engaging portion to prevent its being disengaged from the indentation during movement of the control means; a second electrically operated solenoid; an armature for said second solenoid operatively attached to the second lever to operate the same; and a switch in the solenoid circuit to energize the solenoid and operate the second lever.

12. In a period timing mechanism comprising a permanent magnet mounted to oscillate, an electromagnetic winding surrounding the same, a sealed tube adjacent said magnet and having magnetically controlled contacts therein actuated by the oscillations of said magnet to control the energization of said winding and maintain said oscillations, and second magnetically controlled contacts in the tube also actuated by the oscillations to intermittently actuate an auxiliary electrical circuit; an electrically operated indicator in said auxiliary circuit for indicatng the operation of the period timing mechanism; a motion transmitting means operated by the oscillations of said magnet; a timing control means operated by said motion transmitting means; a switch in said auxiliary circuit; a second switch in the circuit to said winding; means operated by said timing control means to open the first switch at the end of a predetermined time; and means also operated by the timing control means to open the second switch after an additional predetermined time.

13. A period timing mechanism, comprising; an electrically operated clock mechanism; a rotatable control means operatively connected to the clock mechanism to be rotated thereby and having a portion of its surface raised and arranged as a cam; a switch in the electrical circuit to said clock mechanism; an arm on said switch adapted to bear against said raised portion when the switch is open, said clock mecha-

nism serving to turn the control means from a point where the arm is out of contact with the raised portion to a point where the arm contacts the raised portion; an auxiliary electrical circuit intermittently operated at regular intervals by the clock mechanism; and a second switch in the auxiliary circuit operatively connected to said arm with the second switch being closed when the arm is out of contact with the raised portion, said raised portion serving to open the switch to the auxiliary circuit first and then, after a predetermined time, serving to open the switch to the clock mechanism.

14. In a period timing mechanism such as a parking meter comprising a permanent magnet mounted for oscillation, an electromagnetic winding surrounding the same and contacts in the circuit of said winding, one of which is actuated by the oscillations of said magnet to de-energize said winding at intervals to maintain said oscillations; the combination, comprising; a pawl rotatable with the magnet; a ratchet adjacent the pawl with said pawl engaging successive teeth of the ratchet to turn the ratchet as the magnet oscillates; speed reducing gears operated by the turning ratchet; a rotatable control plate turned by the last of said gears, said plate having one portion of its peripheral surface extended from the plate, still another portion raised and providing a gradually increasing cam surface from the arcuate surface, and another portion provided with equally spaced indentations; a switch in the electrical circuit to the winding; an auxiliary electrical circuit to an indicating device periodically operated by oscillations of said magnet; a switch in said auxiliary circuit; an arm between said switches arranged to be out of contact when both switches are closed, to contact the first part of the gradually increasing cam surface and open the switch to the auxiliary circuit and to contact a higher part of the cam surface and open the switch to the winding, said ratchet and gears serving to turn the control plate from where the arm is out of contact with the raised portion to where the arm contacts the raised cam surface; a lever mounted for rotation about a fulcrum and capable of turning the control plate from where the arm contacts the cam surface at said higher part to a predetermined point where the arm is out of contact with the cam surface,

with the distance between the points being equal to the period of operation of the parking meter; a removable pin held in a hole adjacent the control plate to be contacted by the extended portion to determine said predetermined point on the arcuate surface; at least one additional hole adjacent the control plate into which the pin may be inserted to vary said period of operation; a first solenoid; an armature in said solenoid movable when the solenoid is electrically energized to rotate said lever and turn said control plate to said predetermined point; a switch in the electrical circuit to the solenoid adapted to close said circuit when the switch is struck by a coin such as a nickel; a second lever rotatable about a fulcrum and having a portion adapted to engage said extended portion and turn the control plate from where the arm contacts said higher portion of the cam surface to where the arm contacts said first part of the cam surface, and a second portion adapted to engage a first indentation and move the control plate to where the arm is out of contact with the cam surface, said second portion serving to engage successive indentations and turn the control plate additional equal increments on successive rotations of the second lever, with the total increments placing said extended portion against said pin; a second solenoid; an armature in said second solenoid movable when the solenoid is electrically energized to rotate said lever; and a switch in the electrical circuit to the second solenoid adapted to close said circuit when the switch is struck by a coin such as a penny.

CLIFFORD V. BATES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,367,782	Junghans	Feb. 8, 1921
1,816,526	Hall	July 28, 1931
1,943,046	Turney	Jan. 9, 1934
2,010,528	Schofield	Aug. 6, 1935
2,028,630	Stark	Jan. 21, 1936
2,230,191	Knight	Jan. 28, 1941
2,272,336	Colomb	Feb. 10, 1942
2,307,999	Eidmann et al.	Jan. 12, 1943
2,340,442	Toce et al.	Feb. 1, 1944