

July 15, 1952

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2,603,288

COIN-CONTROLLED TIMING APPARATUS

Filed Sept. 5, 1951

4 Sheets-Sheet 1

Fig. 1

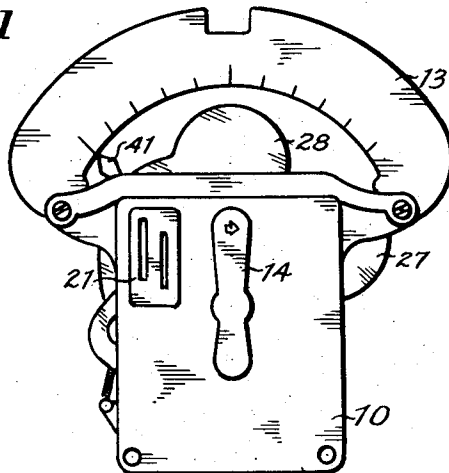
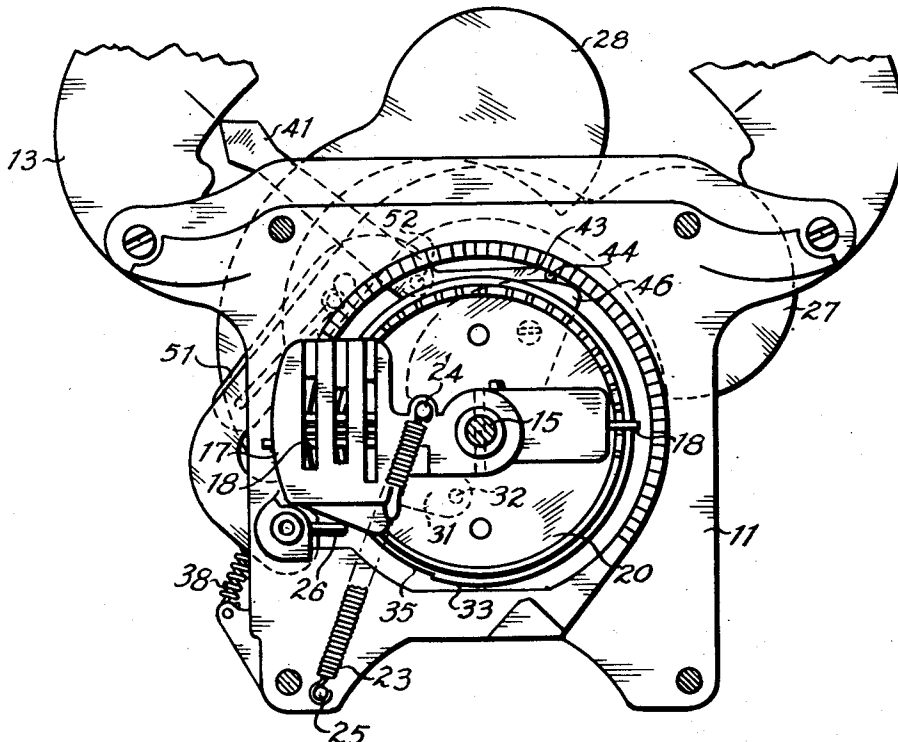


Fig. 2



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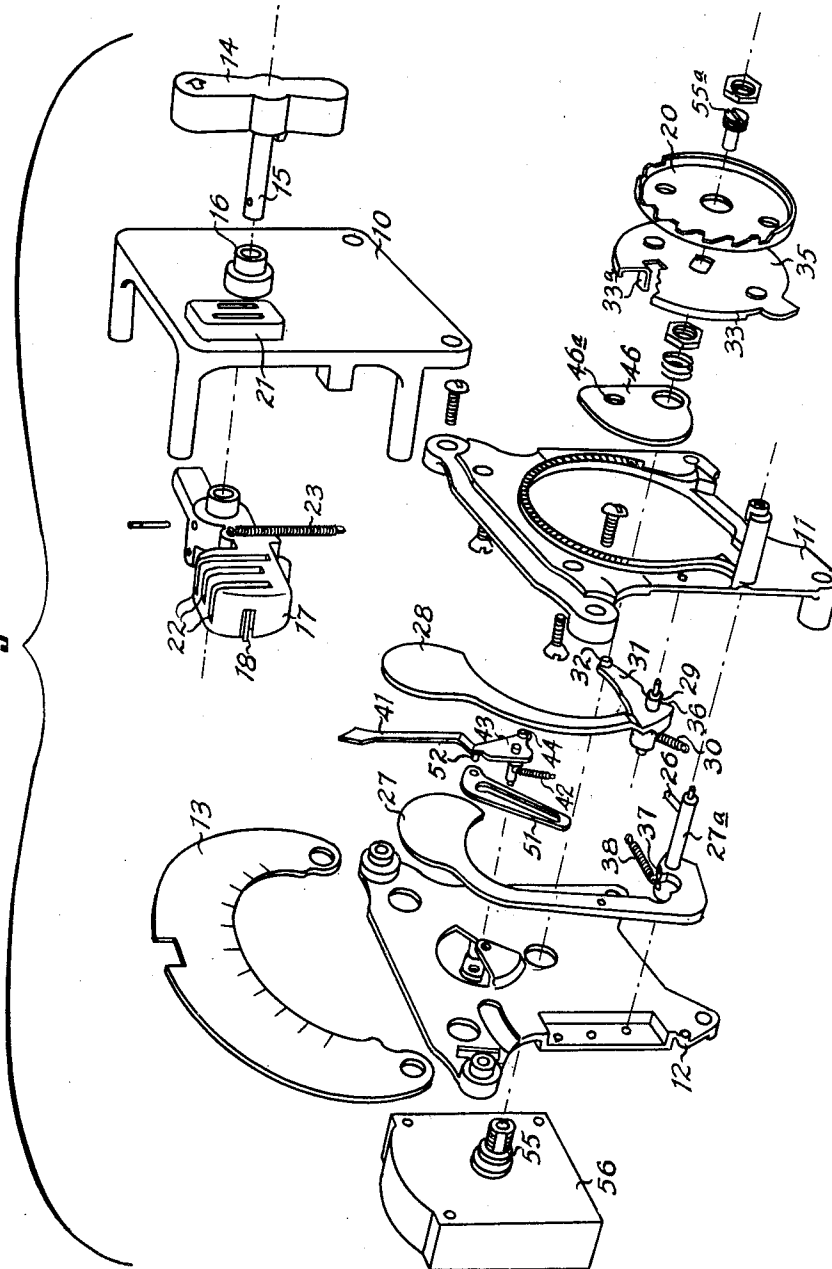
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Fig. 3



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Fig. 4

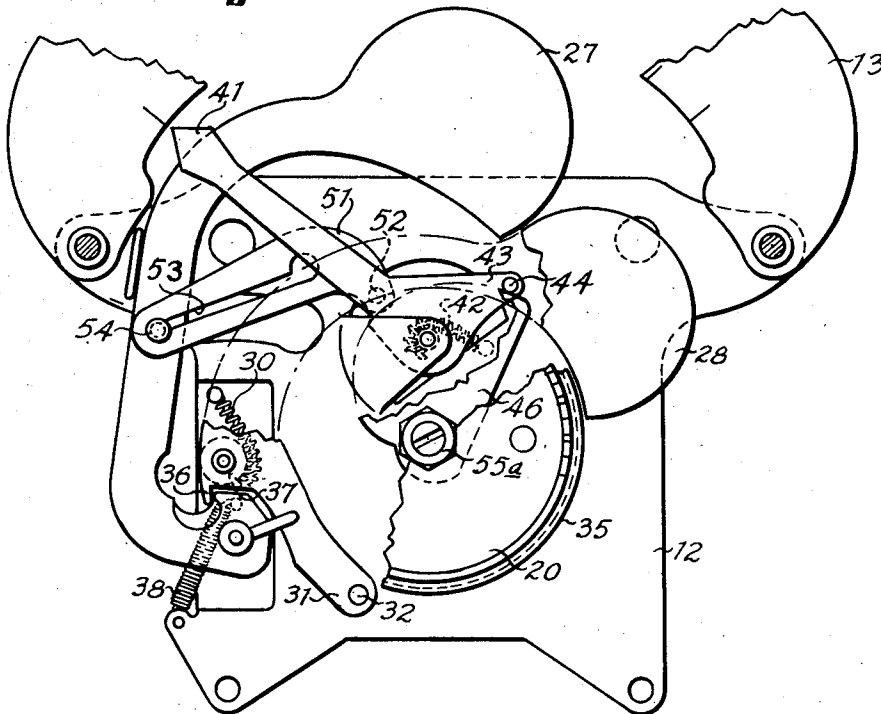


Fig. 5

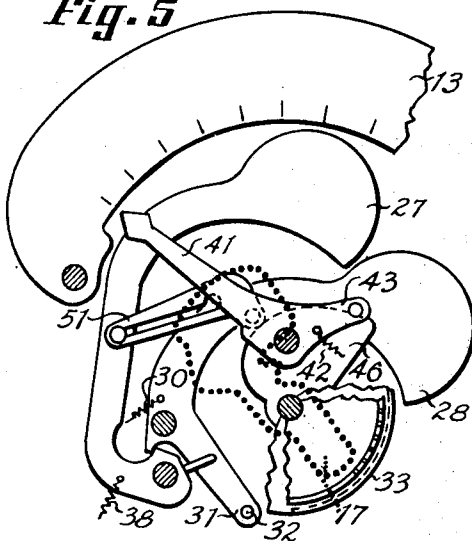
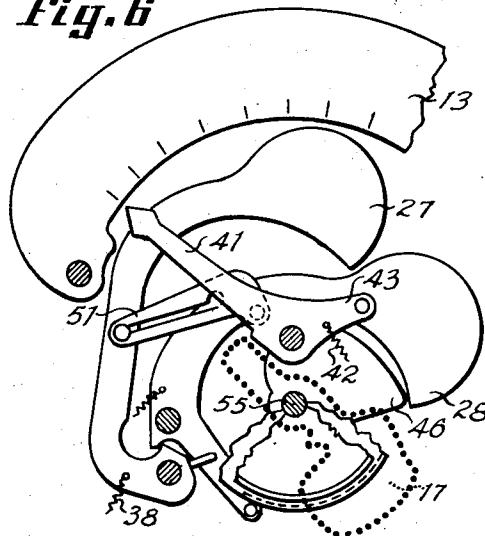


Fig. 6



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Fig. 7

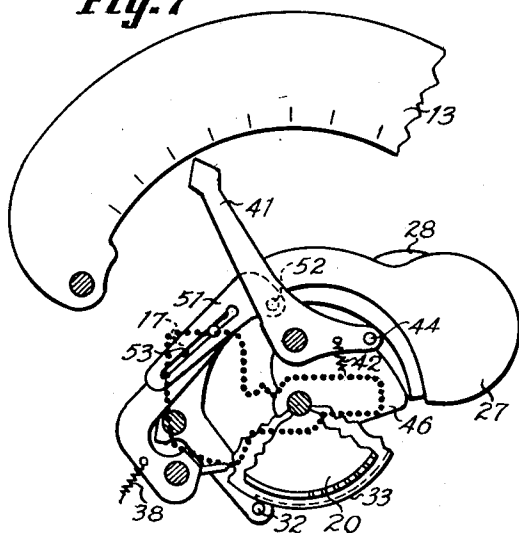


Fig. 8

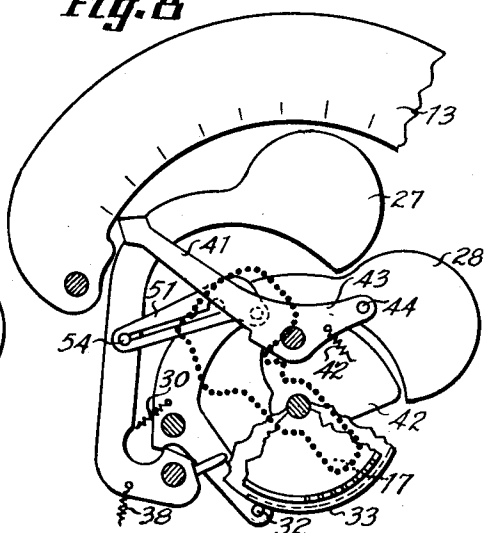


Fig. 9

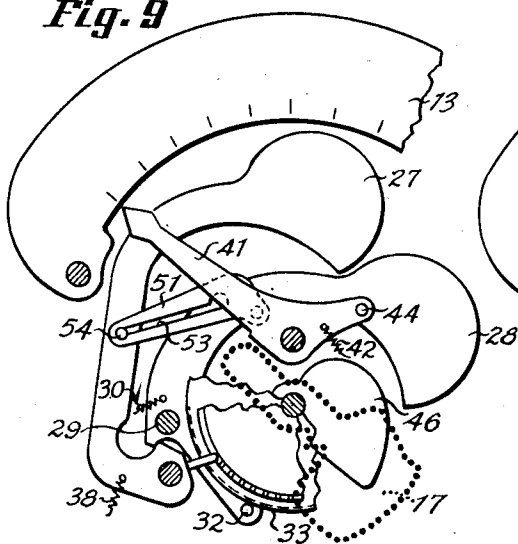
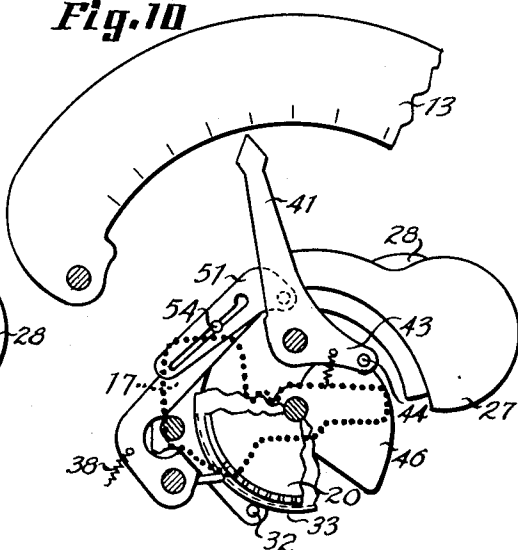


Fig. 10



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UNITED STATES PATENT OFFICE

2,603,288

COIN-CONTROLLED TIMING APPARATUS

Lester D. Sollenberger, Oak Park, Ill.

Application September 5, 1951, Serial No. 245,234

4 Claims. (Cl. 161-15)

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This application relates to coin controlled timing devices; in particular, it concerns an improved apparatus particularly adapted for service as a parking meter.

The particular invention herein described and claimed constitutes an improvement on the apparatus disclosed in U. S. Patent No. 1,799,056, issued to S. L. Miller, et al. on March 31, 1931.

While the principal field of application for the present invention is as a parking meter, the apparatus, it will be understood, may be usefully applied in many other situations, such as in coin-operated radio receivers, etc. Therefore, while the present invention will be discussed herein primarily with reference to its application as a parking meter, it is to be understood that it has other uses as well.

Parking meters have in recent years come into extremely general use, partly as a revenue-raising means and partly to prevent unreasonable use of automobile parking space in congested areas.

The parking meters found in the prior art, of which the instrument described in said U. S. Patent No. 1,799,056 is typical, had an important disadvantage, the correction of which is the primary object of the present invention. That disadvantage consisted in the fact that with such instruments it was possible for an unscrupulous motorist to insert a coin in the parking meter and manipulate the handle through only a part of its cycle of rotation, so as to leave unexpired time indicated on the dial with the clockwork stopped. Such conduct did not give the motorist any legal rights, since the dial showing unexpired time would also display a red flag, which denotes an ordinance violation. Judges, however, have been reluctant to impose fines for parking violations in situations where unexpired time showed on the meter, even though it were accompanied by a red flag, since the motorist could always plead that he had acted in good faith in failing to turn the meter handle through its full cycle.

As a result of the situation just described, policemen as a rule have not attempted to assess fines for meters thus mishandled by motorists but instead have simply turned the handle to complete the cycle of operation when the maladjustment is first observed. That results, of course, in the motorist's receiving free parking privileges until the condition of the meter has been noticed and corrected by a policeman.

The present invention is directed to the correction of the situation just described, and it has, as its outstanding feature, the characteristic that at no time can the meter be caused to

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show unexpired time on the dial except after the handle has been turned through its full operating cycle. In other words, it is impossible for the present invention to show unexpired time and at the same time have either a red flag showing or have the clockwork stopped.

With the present invention, therefore, it is impossible for an unscrupulous motorist to "cheat" the meter. Unless he has deposited his coin and turned the handle through the complete operating cycle, the meter dial shows a violation flag and a zero time reading. Thus, unless the meter is properly used by the motorist, he is exposed to punishment for violation without his having any excuse based on a claim of good-faith error.

In addition to the principal object of my invention, just described, other objects and advantages reside in the novel mechanical configuration and arrangement of parts, which will be more fully brought out in the detailed description which follows.

I have shown, in the accompanying drawing, an illustrative embodiment of my invention.

Fig. 1 is a front elevation view of my novel parking meter as it appears when removed from its case.

Fig. 2 is a front view, partly in section, of a parking meter made according to my invention, the view being generally similar to that of Fig. 1 except that the instrument is shown with its front panel cut away to show the mechanism behind it.

Both Fig. 1 and Fig. 2 show the instrument with its moving parts in the position which they occupy when the parking time has expired and the "overtime" or "expired" flag is showing.

Fig. 3 is an exploded perspective view showing the various parts of the meter and bringing out clearly the manner in which they are interrelated.

Fig. 4 is a fragmentary view of certain moving parts of my invention showing their relative positions just after a coin has been deposited and the operator has commenced to move the handle of the parking meter through its cycle of rotation.

Fig. 5 is a view similar to Fig. 4 except that the parts are shown in the position indicating slight additional movement of the handle by the operator.

Fig. 6 is like Figs. 4 and 5 except that it shows the parts in the position which they assume when the handle has been turned almost to the end of its cycle of rotation.

Fig. 7 is a view similar to Fig. 6 showing the position of the parts after the handle has com-

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pleted its cycle of rotation and has been restored to its normal position of rest.

Fig. 8 shows the beginning of an operation in which an additional coin has been inserted for the purpose of increasing the unexpired time on the meter. Fig. 8 shows the position of the parts when the handle has been moved through a few degrees of its cycle of rotation.

Fig. 9 continues the illustration of the operation started in Fig. 8; in Fig. 9, the parts are shown as they appear when the cycle of rotation has been completed but the handle not yet released.

Fig. 10 shows the position of the parts after the handle has been released and has returned to its normal rest position. The indicator position in Fig. 10 shows that the meter has registered and "given credit" for the additional coin.

Referring now to the drawing, and particularly Figs. 1-4, it will be noted that my meter is provided with a rigid framework comprising a front panel 10 and a pair of supplementary panels or chassis supports denoted 11 and 12 respectively. Those elements together constitute a rigid framework which provides support for the moving parts of my invention; elements 10, 11 and 12 are suitably secured together in rigid relationship by bolts. A time indicator dial 13 is supported by the frame between members 11 and 12.

A handle 14 is carried on the outside or forward face of front panel 10 and is keyed by a set screw, pin, or other suitable means to a shaft 15, journaled in a suitable bearing 16 carried by front panel 10. At its rear extremity, shaft 15 carries, and is keyed to, a coin carrier member 17 equipped with coin-operated cam fingers 18, designed for cooperation with winding wheel 20. Front panel 10 is also provided with a coin-receiving device 21 containing slots through which coins of suitable denominations may be introduced into corresponding slots 22 in coin carrier 17.

The mechanism of the present invention employed to accomplish rotation of winding wheel 20 through varying degrees of rotation responsively to deposit of coins of different denominations is substantially identical to that described in detail in said U. S. Patent No. 1,799,056. Accordingly, no detailed description of its manner of operation is believed necessary here, since it forms no part of the present invention and is not claimed herein. The reader, therefore, is referred to said U. S. Patent No. 1,799,056 for a full description of said coin-operated mechanism including the cooperative action of said coin carrier 17 and said winding wheel 20.

To the extent that movement of the coin carrier 17 affects the operations of the other moving parts of the present invention, it will of course be treated in detail herein. Coin carrier 17 is held normally in a horizontal position by a strong coil spring 23 seated between a seat 24 on coin carrier 17 and a seat 25 carried by frame member 11. Spring 23 is the strongest of the biasing springs employed in my invention.

When it is in its rest position, as shown in Fig. 2, coin carrier 17 rests upon a lever pin 26 carried by a pivoted shaft 27a, the ends of which are respectively journaled into bearings carried by frame members 11 and 12 respectively. Rigidly joined to, or integrally cast with, shaft 27a is an elongated "flag" element 27, normally colored red, and having an elongated vertical arm portion and an enlarged tab or flat rounded por-

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tion at its upper extremity. Member 27 will sometimes be referred to herein as the "trouble flag." As will be more fully understood when the description has progressed further, trouble flag 27 does not appear in the space immediately below indicator dial 13 except when coin carrier 17 is at a position other than its rest position. Normally, therefore, trouble flag 27 is retracted and is not visible externally of the meter except during the period in which handle 14 is being rotated following a coin insertion.

A second flag member 28 is keyed to a short shaft 29 pivoted in suitable bearings on members 11 and 12 immediately above the bearings which receive shaft 27a. Flag 28, which will herein sometimes be called the "expired-time" flag, is also provided with a flat tab-like upper extremity and an elongated shank portion. The shank portions of flags 27 and 28 are so formed that when both flags are in their retracted positions, as shown in Figs. 7 and 10, their tab portions are substantially in registration. Extending inward from shaft 29, at substantially right angles to the lower end of the shank portion of flag 28 is an arm 31 which carries at its extremity a small pin 32 which functions as a cam follower, in cooperation with cam surface 33 on control wheel 35. Control wheel 35, as may be clearly seen from Fig. 3, is pinned, riveted, or otherwise secured to winding wheel 20 so as to turn therewith. Cam surface 33 comprises a narrow flange extending around most of the circumference of control wheel 35 but having at least one gap therein. The relative positions of wheel 35 and flag 28 are such, when the apparatus has been assembled, that follower 32 will ride on cam surface 33 when flag 28 is retracted, and when follower 32 reaches the gap in cam surface 33, flag 28 will thereupon turn on its pivot, unless otherwise prevented, and rise to the position shown in Fig. 2, from which it is visible externally of the meter. Coil spring 30 joins flag 28 and frame member 11, urging flag 28 upward toward its advanced or externally visible position.

At a point immediately below shaft 29, flag 28 is provided with a mating surface 36 adapted for cooperation with a corresponding surface 37 formed into flag 27 immediately adjacent shaft 27a. Flags 27 and 28, as assembled, interrelate surfaces 36 and 37 so as to prevent expired-time flag 28 from being raised at the same time as trouble flag 27. That is, when trouble flag 27 is raised, surface 37 engages surface 36 and forces flag 28 to rotate on its shaft to its retracted position. Trouble flag 27 is urged toward its raised or visible position by a coil spring 38 which is considerably stronger than the coil spring 30 which governs flag 28. Coil spring 38, however, is not as strong as the spring 23 which urges coin carrier 17 toward its rest position.

From the foregoing, taken in connection with the drawing, it will be observed that whenever handle 14 is in its normal position, as shown in Fig. 1, coin carrier 17 will be resting in its normal position and forcing lever 26 downward as shown in Fig. 2. Thus trouble flag 27 will at all such times be retracted despite spring 38, since spring 23 is a substantially stronger spring than spring 38. Under the conditions just described, expired-time flag 28 may or may not be retracted, depending on whether follower 32 is riding on cam surface 33. If it is, flag 28 will be retracted, as shown in Figs. 7 and 10. If follower 32 has run off of cam surface 33, however, flag 28 will be up in exposed position under the urging of spring 30.

Should handle 14 be moved from its normal po-

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sition, however, coin carrier 17 will be moved away from lever 26 and spring 38 and thus be free to move trouble flag 27 upward. Rise of trouble flag 27 will cause surfaces 36 and 37 to engage and thus immediately compel retraction of expired-time flag 28.

From the foregoing it will be seen that flags 27 and 28 can never be in advanced position at the same time, although they can be retracted simultaneously.

An indicator needle 41 is pivoted at its lower end in bearings provided by the frame members. Its orientation, of course, is such that the point of the needle appears immediately under and in the same plane with the scale on indicator dial 13. Indicator dial 13 will normally be calibrated in minutes, and a light coil spring 42 urges needle 41 in the direction of full-scale reading. That is, in the absence of some other restraining force, needle 41 will normally read the maximum number of minutes marked on the scale.

Indicating needle 41 carries an arm 43 extending at an obtuse angle to the main shank of the indicating needle and carrying near its extremity a cam follower 44. Follower 44 is adapted to cooperate with a cam 46 mounted for rotation coaxially with control wheel 35 and pinned to wheel 35 by means of an axially projecting pin 33a passing through an aperture 46a in cam 46. Cam 46 presents to follower 44 a gently-curved surface so formed that counterclockwise rotation of cam 46 forces counterclockwise rotation of indicating needle 41, the direction of rotation being taken as observed in Fig. 2, and the curved surface of cam 46 extends over sufficient arc that follower 44 remains in contact with such surface even when needle 41 has been moved to its extreme counter-clockwise position—that is, to the position at which it indicates zero time.

A slotted link 51 is pivoted at one end to the shank of indicating needle 41, at a point 52 intermediate the indicator pivot and the arrow terminal. The elongated slot 53 in link 51 rides on a pin 54 carried by the shank of flag member 27.

The lengths of link 51 and slot 53 are so proportioned that whenever flag 27 is raised to its advanced, visible position, as shown in Figs. 4, 5, 6, 8 and 9, indicator 41 is pulled to the extreme left-hand side of scale 13 (as viewed in Fig. 4). Thus indicator 41 always shows zero time whenever trouble flag 27 is up.

Whenever flag 27 is down, (for example, see Figs. 7 and 10), link 51 is free to slide back and forth on pin 54, with the result that the movement of indicator 41 is substantially unimpeded by link 51 and flag 27.

Since the force exerted by spring 38 is much greater than that exerted by spring 42, flag 27 can always control the motion of indicator 41; that is, whenever coin carrier 17 is not resting on lever 26, flag 27 will always rise and at the same time will pull indicator 41 back to zero-time position.

Control wheel 35, winding wheel 20, and cam 46 are all carried on a shaft 55 which is journaled into the frame of a conventional clockwork mechanism 56. Shaft 55, it will be understood, is coupled to the clockwork mechanism by a suitable friction coupling which can slip to permit manual setting of the control wheel 35 but which will transmit more than adequate torque to drive control wheel 35 and its associated parts. Such friction couplings are conventional in clockwork mechanisms (to permit manual setting of hands,

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etc.) and will not be shown or described herein in detail.

Driving wheel 33, winding wheel 20, and cam 46 may be secured to the end of shaft 55 by means of a locking screw 55a.

Operation

In describing the operation of my invention, I shall first assume that it has been allowed to "run down"—that is, that the previous user has exhausted the parking time for which he paid and that the newly arrived motorist finds the meter showing zero time.

Under those conditions, the meter will have the external appearance indicated in Fig. 1, needle 41 indicating zero time and expired-time flag 28 being up.

Fig. 2 shows in greater detail the position of the parts under those conditions. Control wheel 35 will be at its zero time position, whereat follower 32 will have overrun the edge of cam surface 33. Under those conditions, spring 30 will have pulled flag 28 upward into view as shown in Fig. 1. Flag 27 will of course be down, since coin carrier 17 will be resting on lever 26, and powerful spring 23 will force flag 27 into retracted position despite the counter-force of spring 38. When the motorist deposits a coin into slot 21, it will drop into the appropriate slot in coin carrier 17. The motorist will then grasp handle 14 and rotate it in a clockwise direction. As soon as coin carrier 17 moves off of lever 26, spring 38 will cause flag 27 to rise, and simultaneously therewith surface 37 will engage surface 36 and force flag 28 down. When that occurs, follower 32 is immediately moved outward to a point beyond the rim of control wheel 35, so that when flag 28 is released following clockwise rotation of wheel 35, follower 32 will press upon cam surface 33, which will then hold flag 28 down in retracted position so long as unexpired time remains on the meter.

As clockwise movement of the handle continues, coin carrier 17 will "pick up" winding wheel 20 at a predetermined point, depending on the denomination of the coin inserted, and will thereupon carry with it winding wheel 20, control wheel 35, and cam 46 through the remainder of the cycle of clockwise rotation. (The details of the structure by which coin carrier 17 actuates winding wheel 20 are, as heretofore noted, fully disclosed in U. S. Patent No. 1,799,056.)

When the meter was in "time-expired" position, indicator 41 was, it will be understood, held in zero-time position by the pressure of cam 46 against the follower 44. (See Fig. 2.) As handle 14 is rotated by the motorist, cam 46 is moved in a clockwise direction through a predetermined arc, depending upon the denomination of the coin inserted, and as a result is moved out of engagement with follower 44. So long as handle 14 is away from its normal position of rest, however, indicator 41 will remain at zero-time position despite the movement of cam 46, however, because flag 27 will be up and link 51 will under those conditions hold indicator 41 against movement.

Should the motorist fail to rotate handle 14 through its full cycle, the meter will show zero time and will also display red flag 27.

When the handle 14 has been rotated to the limit of its clockwise movement, the coin will drop from the coin carrier into the coin receptacle (not shown) and handle 14 will thereupon be free to return to its rest position as soon as it

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is released by the motorist. When the handle has thus returned to its normal position, as shown in Fig. 1, coin carrier 17 will rest upon lever 26 and force flag 27 back to its retracted position. Lowering of flag 27 will release indicator 41, since pin 54 will ride up slot 53. Spring 42 will then cause indicator 41 to move clockwise until follower 44 comes into engagement with cam 46. The number of minutes indicated by needle 41 under those conditions will depend, of course, on the magnitude of the arc through which cam 46 has moved, and that arc, in turn, will depend on the denomination of the coin inserted.

Clockwork 56 will thereupon cause counter-clockwise rotation of shaft 55 and control wheel 35. Wheel 35, by means of pin 33a, will carry cam 46 with it as it turns. As time passes cam 46 will force indicator 41 steadily to the left until, when the number of minutes purchased has elapsed, the needle will be forced back to zero. The relative positions of control wheel 35 and cam 46 are such that shortly after needle 41 has returned to zero cam surface 33 will move beyond follower 32, leaving spring 30 free to pull expired-time flag 28 upward into the position shown in Figs. 1 and 2.

The operation just described is shown in some detail in Figs. 5-7 inclusive. Fig. 5 shows the parts in the position they occupy when coin carrier 17 has just started on its cycle of movement; Fig. 6 shows the position of the parts as coin carrier 17 has neared the extreme limit of its movement; and Fig. 7 shows the position of the parts after coin carrier 17 has completed its cycle and has been allowed to return to its rest position. It will be noted from Fig. 7 that indicator 41 has moved to the right from its zero position and indicates unexpired time.

Figs. 8-10 show the behavior of the apparatus when a coin is placed in the meter to purchase additional time when unexpired time still remains on the meter. Fig. 7 illustrates the starting condition—both flags down and unexpired time showing. When a coin is deposited and movement of handle 14 commenced, trouble flag 27 rises and indicator 41 immediately returns to zero. This condition is shown in Fig. 8. The zero indication by needle 41 continues until the full cycle of movement of the coin carrier 17 has been completed. Fig. 9 shows the position of the parts just before coin carrier 17 is allowed to return to its rest position. Rotation of coin carrier 17 through its entire cycle will, of course, have rotated winding wheel 20, control wheel 35, and cam 46 through a predetermined arc in the clockwise direction, the amount of arc depending on the denomination of the coin used. When coin carrier 17 has returned to its rest position, as shown in Fig. 10, needle 41 will immediately move to the right under the impetus of spring 42 and will show the original time plus as many additional minutes as have been purchased by the newly inserted coin, since cam 46 will have been rotated clockwise from its former position by the number of additional degrees consistent with the denomination of the coin.

The significant point, from the standpoint of the present invention, is that throughout the adjustment process the indicator 41 showed zero time, notwithstanding the fact that the meter actually had unexpired time "stored" in the position of cam 46. Thus with the present invention it is impossible in any situation to have unexpired time showing on the meter without having the handle in normal position and the clock-

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work free to move the indicator back towards zero in the regular manner.

While I have, for purposes of illustration, described in considerable detail a particular embodiment of my invention, it is to be understood that such embodiment is exemplary only, and that the scope of my invention is to be determined primarily with reference to the appended claims.

I claim:

1. In a timing device, an indicator mounted for movement through a predetermined path, said indicator carrying a follower, resilient means urging said indicator along said path in one direction, a cam mounted for movement adjacent said indicator, said cam being oriented sufficiently near said indicator to permit said cam to engage said follower throughout said path of movement of said indicator, engagement between said cam and said follower being operative to prevent said indicator from moving responsively to the force of said resilient means, clockwork means, means linking said clockwork means and said cam for moving the same at a predetermined rate in the direction to move said indicator along its path of movement against the force of said resilient means, a movable setting device for said cam for changing the relative positions of said cam and said clockwork means, said setting device having a quiescent normal position, and means operative responsively to movement of the setting device from its normal position to move said indicator to the limit of its path against the force of said resilient means and to hold the same there while said setting means is away from its normal position.

2. In a timing device, a calibrated scale having a zero position, an indicator mounted for movement along said scale in cooperation therewith, said indicator carrying a follower, resilient means urging said indicator away from said zero position, a cam mounted for movement adjacent said indicator, said cam being oriented sufficiently near said indicator to permit said cam to engage said follower at any position of said indicator along said scale, engagement between said cam and said follower being operative to prevent said indicator from moving away from the zero position responsively to the force of said resilient means, clockwork means, means linking said clockwork means and said cam for moving the same at a predetermined rate in the direction tending to maintain the cam in engagement with said follower and thereby to move said indicator toward the zero position, a movable setting device for said cam for changing the relative positions of said cam and said clockwork means, said setting device having a quiescent normal position, and means operative responsively to movement of the setting device from its normal position to force said indicator to the zero position and to hold the same there while said setting means is away from its normal position.

3. In a timing device, a calibrated scale having a zero position, an indicator pivoted for rotary movement along said scale, said indicator carrying a follower, a biasing spring seated on said indicator and urging the same away from said zero position, a cam mounted adjacent said indicator for rotary movement, said cam being oriented sufficiently near said indicator to permit said cam to engage said follower at any position of said indicator on said scale, engagement between said cam and said follower being operative to prevent said indicator from moving away from said zero position responsively to the force

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of said spring, clockwork means, means coupling said clockwork means and said cam for rotating said cam at a predetermined rate in the direction tending to maintain said cam in engagement with said follower and to move said indicator toward said zero position, a movable setting device for said cam for changing the relative angular positions of said cam and said clockwork means, said setting device having a quiescent normal position, and means operative responsively to movement of the setting device from its normal position to move said indicator to the zero position against the force of said spring and to hold the same there while said setting means is away from its normal position.

4. Apparatus according to claim 3 wherein the means last mentioned therein comprises a pivoted flag having an up position and a down position, spring means tending to urge said flag into its up position, a lever carried by said flag normally in engagement with said setting means

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when the setting means is in its normal position, the force of said setting means on said lever being operative to hold said flag in its down position against the force of said spring, and a lost-motion link connecting said flag and said indicator operative when said flag is in its down position to give said indicator full freedom of movement across said scale and operative when said flag is in its up position to pull said indicator to said zero position.

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

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