

[54] **SPLIT-RATE METER CONSTRUCTION**

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[22] Filed: **July 7, 1971**

[21] Appl. No.: **160,315**

[52] U.S. Cl. .... **194/84, 58/141, 194/72, 194/DIG. 22**

[51] Int. Cl. .... **G07f 5/00**

[58] Field of Search. .... **58/141, 194/72, 83, 84, Dig. 21, Dig. 22, 194/DIG. 22**

[56] **References Cited**

**UNITED STATES PATENTS**

|           |        |                    |          |
|-----------|--------|--------------------|----------|
| 3,262,540 | 7/1966 | Sollenberger ..... | 194/72   |
| 2,603,288 | 7/1952 | Sollenberger ..... | 194/72 X |

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*Assistant Examiner*—Thomas E. Kocovsky  
*Attorney*—McDougall, Hersh & Scott

[57] **ABSTRACT**

A meter construction wherein purchased time is ob-

tained through engagement of pawl means with a winding means attached to a timing mechanism, the pawl means being moved into engaging position by a coin employed for purchasing time. The improvement involves the use of a pair of rotatable members operatively connected to the winding means. A first rotatable member is directly tied to the winding means whereby driving engagement of the pawl with the first rotatable member will result in the purchase of time. The second rotatable member is maintained in spaced relationship with respect to the first rotatable member, and the subsequent insertion of a coin results in engagement of the second rotatable member, and movement of this member relative to the first rotatable member. Driving engagement with the first rotatable member follows this initial movement and the purchase of time only begins at this point. This results in a lower ratio of purchased time to coin value. Additional delay of movement of the first rotatable member and operation of the associated time mechanism is accomplished through the use of a blocking member which holds the pawl out of an engaging position when a coin is inserted after a certain amount of purchased time is already on the meter.

**7 Claims, 11 Drawing Figures**

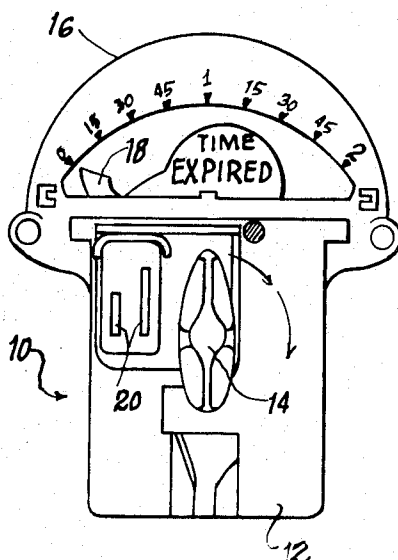


FIG. 1

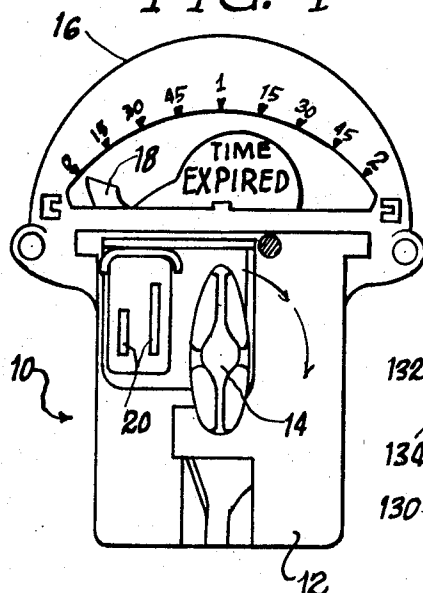


FIG. 2

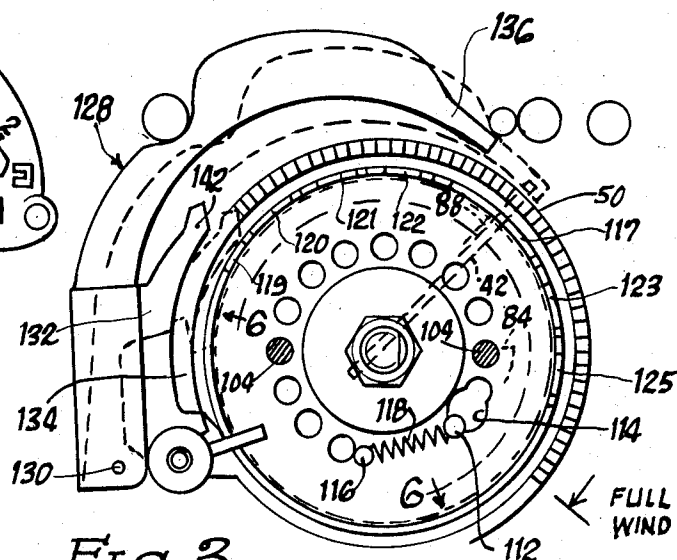


FIG. 3

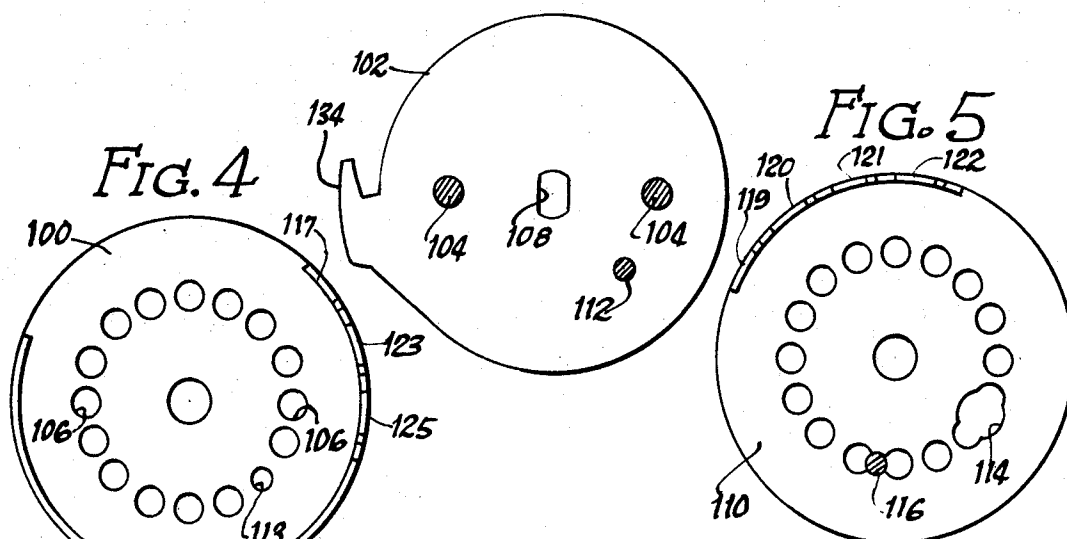


FIG. 5

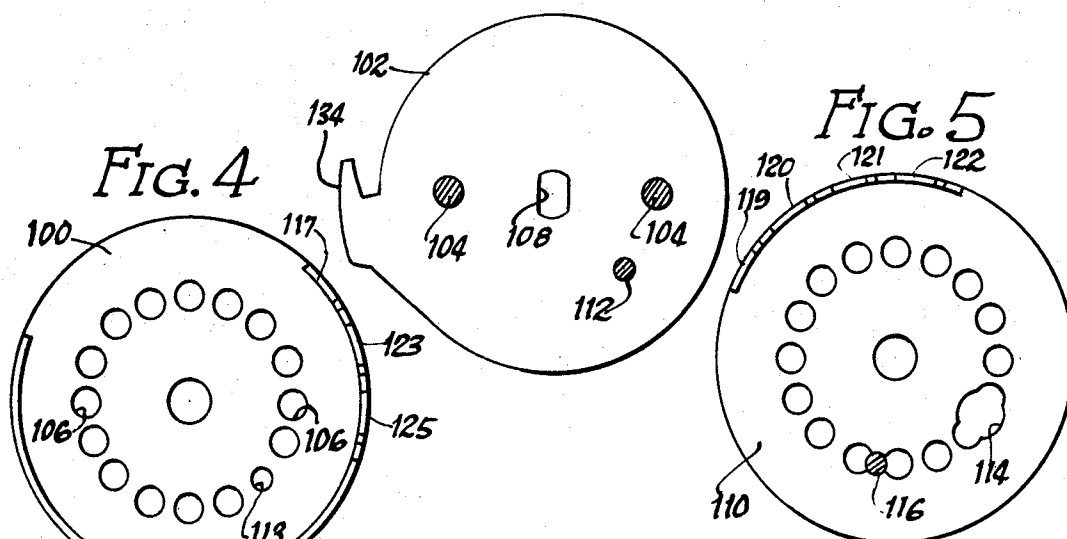


FIG. 6

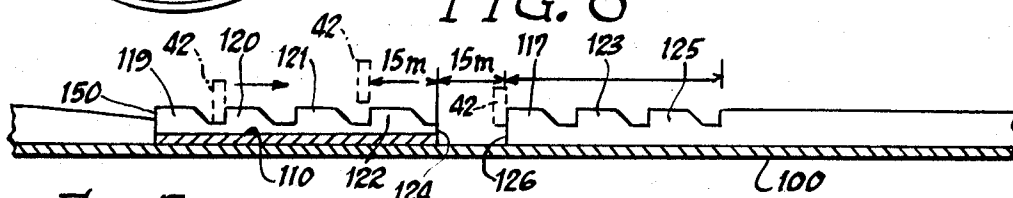


FIG. 7<sub>48</sub><sup>130</sup>

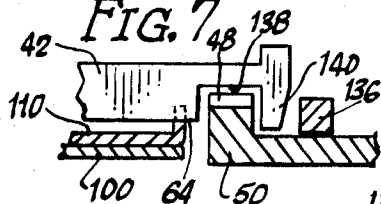
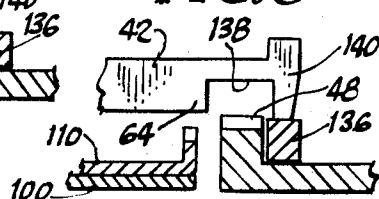
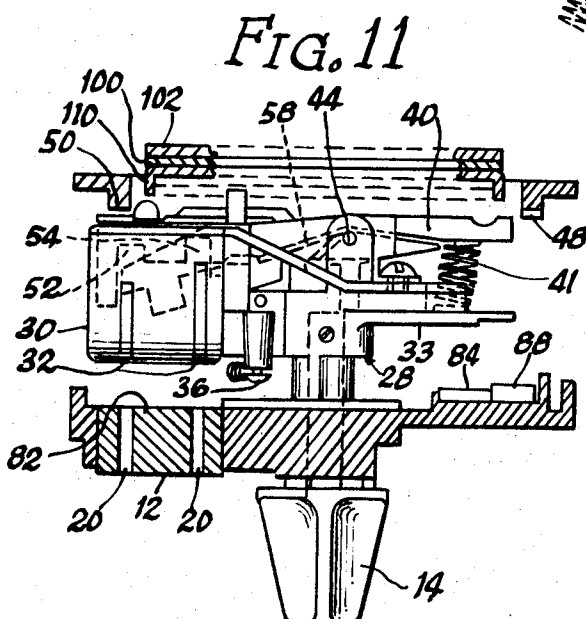
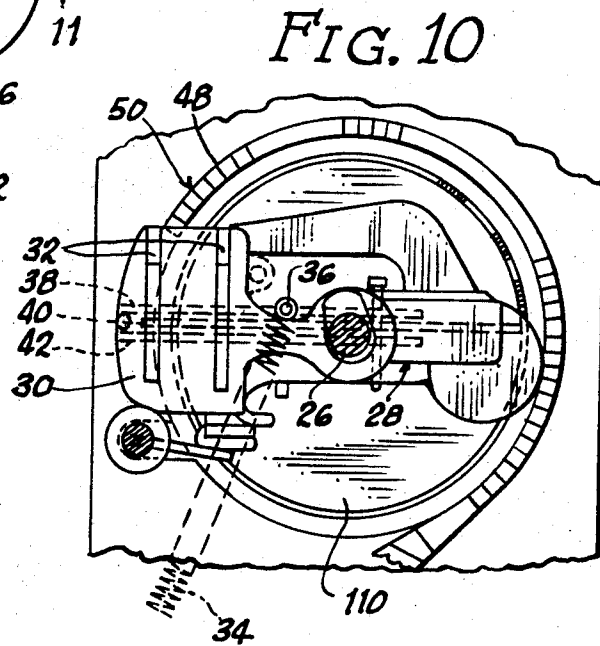
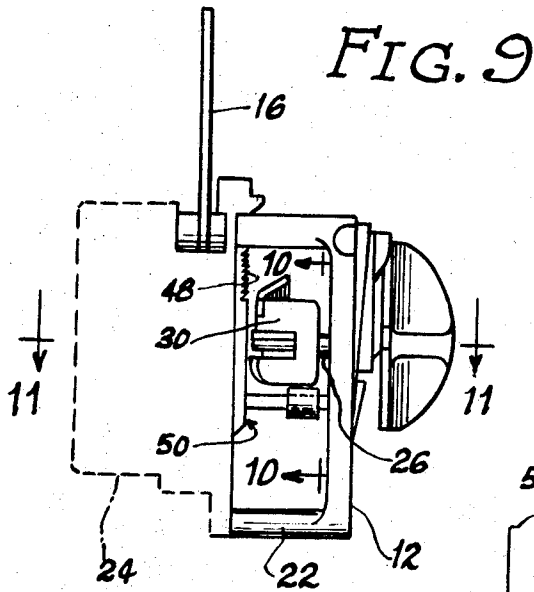


FIG. 8



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**SPLIT-RATE METER CONSTRUCTION**

This invention relates to parking meters or similar constructions which employ mechanisms designed for the purchase of time.

In a typical parking meter construction, coins are inserted in the meter, and an amount of time proportional to the monetary amount is purchased. The amount of time available on a particular meter can be varied considerably. For example, on busy streets, it may be desirable to limit time purchases to 1 hour or some other appropriate short duration. In lots designed for commuter parking, the meter may be designed for purchase of time up to 12 hours or some other period of similar length.

It has been found desirable in some instances to provide a meter which will allow different ratios of monetary amounts and purchased time. These so-called "split-rate" meters may, for example, provide the hour's time for 10 cents. If the purchaser of time wishes to secure a greater amount of purchased time, then he may insert an additional dime which will give him two hours. On the other hand, the meter may be set so that the additional dime will only provide one-half hour.

It is a general object of this invention to provide an improved mechanism for use in "split-rate" meters.

It is a more specific object of this invention to provide a parking meter construction which includes a "split-rate" mechanism having extremely reliable and efficient operating characteristics.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of the invention are shown in the accompanying drawings in which:

FIG. 1 is a front elevational view of a parking meter construction of the type adapted for use with the mechanisms of this invention;

FIG. 2 is a plan view illustrating the time setting winding disc assembly and associated mechanisms utilized in the construction;

FIG. 3 is a plan view of a drive plate associated with the time setting assembly;

FIG. 4 is a plan view of an inner disc utilized in the assembly;

FIG. 5 is a plan view of an outer disc utilized in the assembly.

FIG. 6 is a cross-sectional view of the disc structures taken about the curved line 6—6 of FIG. 2;

FIGS. 7 and 8 are fragmentary sectional views illustrating the operating positions of a blocking arm employed in the construction;

FIG. 9 is a side elevational view of the meter construction shown in FIG. 1 with the outer housing removed;

FIG. 10 is an enlarged cross-sectional view taken about the line 10—10 of FIG. 9; and,

FIG. 11 is an enlarged horizontal, sectional view taken about the line 11—11 of FIG. 9.

This invention generally relates to a meter construction providing for the purchase of time upon insertion of proper coins. The invention is particularly adapted to meters, such as parking meters, which include pawl means and a winding mechanism which is attached to a clock structure. When an appropriate coin is inserted, the coin operates to locate the pawl means for engagement with the winding ring so that the winding ring can set the clock mechanism.

In the construction of this invention, the winding ring comprises an assembly formed of inner and outer discs mounted on a drive plate. Coin actuated pawl means are adapted to engage the disc assembly whereby the disc assembly rotates with the pawl means. This, in turn, provides for rotation of the drive plate which is tied to the clock mechanism. The inner and outer discs are rotatable relative to each other, and engagement of the inner disc in preference to the outer disc leads to a degree of lost motion before driving action of the time setting drive plate occurs. By the use of an appropriate blocking arm, this lost motion can be further delayed whereby a different amount of purchased time will be available depending upon the position of the drive plate relative to the blocking arm. Thus, this blocking arm may be maintained in an inoperative position when a first coin is inserted but then moved into blocking position upon the insertion of a second coin thereby affecting the amount of time that can be purchased with the second coin.

FIGS. 1 and 9 through 11 illustrate a typical parking meter construction which can be modified to include the features of this invention. It will be understood that this construction is only one example of the type of meter which may include this invention since the concepts described herein are readily adaptable to a variety of other meter designs.

The meter 10 shown in FIG. 1 includes a front panel 12 which carries a handle 14 adapted to be rotated for the setting of time on the meter. The time set on the meter is recorded on an indicator dial 16 by means of the pointer 18. Openings 20 are provided on the face of the meter for receiving coins of different denominations.

Behind the front panel 12 there are provided support posts 22 for carrying a timer mechanism 24. Intermediate the timer mechanism and the front panel, there are provided the elements which are operated by the handle 14 for setting the time on the meter. It will be appreciated that these elements have been previously employed. A description of the operation of these elements will be provided herein in only general terms and reference can be made to U.S. Pat. Nos. 1,799,056, 2,070,445 and 3,262,540 for a more specific description.

A handle 14 is tied to a shaft 26 whereby rotation of the handle will provide for rotation of this shaft. Also tied to the shaft on the inside of the front wall is a member 28 which includes a coin carrier 30 extending in one direction from the shaft, and an arm 33 extending in the opposite direction. The coin carrier 30 defines a pair of coin slots 32 which are aligned with the openings 20 when the shaft 26 is in its normal position. A spring 34 is secured at one end to the panel 12, while the other end is attached at 36 to the member 28 whereby the member is normally at the position shown in FIG. 10.

A pawl member 38, element 40, and pawl member 42 are pivotally attached to the member 28 by means of a pivot pin 44. The pawl member 38 includes an end portion which is provided for engagement with the teeth 48 of a stationary ratchet 50. Recessed points 52 and 54 defined on the inner edges of the pawl member 38 are provided so that the pawl will not interfere with coins inserted into the meter. The pawl member 42 in-

cludes an engaging end 64 (FIG. 7) which is adapted to engage the teeth of the timer winding discs.

As described in the previously mentioned patents, element 40 functions as a means for controlling the positions of the pawl members during the meter operation. A spring 58 associated with the element 40 engages the pawls 38 and 42 and normally urges the pawls upwardly relative to the element 40.

The element 40 is adapted to be engaged by an inserted coin, and the pawls 38 and 42 are adapted to move when the element 40 is so engaged. The element 40 is normally urged downwardly by a compression spring 41 which has one end located on the arm 33 while the other end fits around a protuberance formed in the element 40. When a coin is inserted, the element 40 is moved upwardly in opposition to the spring 41.

In the meter operation, a coin is inserted and the handle 14 is then rotated. During this rotation, the pawl member 38 rides over the teeth 48, and this pawl member is urged against these teeth by means of spring 58. The teeth 48 are designed whereby they will hold the shaft against return movement due to action of the spring 34 as long as the pawl 38 is forced into engagement with these teeth.

As the rotation of the handle continues the coin remains in the coin carrier and it rides on the inner surface 82 of the panel 12. Segments 84 and 88 are formed on this inner surface in alignment with each of the coin slots. Accordingly, each coin will engage one of these rises during movement of the coin carrier, and it will be appreciated that the coins are forced further into the coin carrier due to this action. This further movement of a coin will move the element 40 a corresponding distance to permit movement of the pawl 42 whereby the pawl engaging portion 64 will engage a tooth 66 of the winding wheel 102. Continued rotation of the handle 14 will therefore result in corresponding rotation of the winding wheel. The length of the rises 84 and 88 is such that the degree of rotation of the winding wheel will be proportional to the denomination of the coin inserted. Beyond the segments, the coins are released and fall into a collecting means for the meter. Once the coins drop, the pawl 38 disengages from the teeth 48 and the coin carrier returns in response to the action of spring 34. This action occurs at the "full wind" position shown in FIG. 2.

As indicated, the pawl 42 engages teeth of the winding discs to provide for setting of time on the meter. These winding discs comprise a first disc 100 which is attached to drive plate 102 by means of bosses 104 which extend into openings 106 defined by the disc 100. Because of this attachment, any movement of the disc 100 will result in corresponding movement of the plate 102. This plate defines a central opening 108 which receives the shaft of the clock mechanism whereby rotation of the plate 102 will result in the display of purchased time on the meter.

A second outer disc 110 is positioned on the disc 100; however, the disc 110 is movable relative to the disc 100. The relative movement is limited by means of a post 112 formed on the disc 102 which extends through an opening 113 in disc 100 and into the enlarged opening 114 of the disc 110.

A second post 116 is formed on the disc 110, and a spring 118 extends between the two posts. With this ar-

range, the outer disc 110 can move in opposition to the spring 118 only to the extent allowed by the opening 114. The spring 118 will return the discs to the normal position shown in FIG. 2 in the absence of any driving engagement with the discs.

As best shown in FIG. 6, the outer discs 110 defines a plurality of teeth 120. The inner disc 120 likewise is provided with a plurality of teeth 122. The respective rows of teeth are located the same distance from the axis of rotation of the discs. Accordingly, rotary movement of the disc 110 in a clockwise direction will result in the leading edge 124 of the disc moving into engagement with the edge 126 of the disc 100. The space defined between these edges of the discs therefore provides for a period of "lost motion" since only movement of the disc 100 will result in movement of the clock drive plate 102.

Also mounted on the wall of the meter supporting the timing mechanism 24 is a blocking arm 128. This blocking arm is pivotally connected at 130, and the blocking arm includes a first inwardly extending portion 132. The drive plate 102 carries an outwardly extending arm 134 which is adapted to engage the blocking arm portion 132 as best illustrated in FIG. 2.

The blocking arm also includes an end portion 136 which extends around the periphery of the stationary ratchet 50. In the position of the arm shown in FIG. 2, the end portion 136 of the blocking arm is spaced away from the ratchet wheel as best illustrated in FIG. 7. The drive pawl 42 includes a cut-out 138 adapted to fit around the downwardly extending finger 140 is formed in the pawl adjacent this cut-out portion.

The arm 134 on the drive plate 102 operates in the manner of a cam to hold the blocking arm 128 on the position shown in FIGS. 2 and 7. As time is set on the meter, however, the arm 134 is moved beyond the end 142 of the blocking arm position 132. At this point, the blocking arm drops into the position shown in FIG. 8 whereby the finger 140 will ride on the end portion 136 of the blocking arm instead of in the position shown in FIG. 7. This, of course, maintains the pawl 42 in a position out of engagement with the teeth of the discs.

For purposes of describing the operation of the construction illustrated, it will be assumed that the meter 10 is designed for receiving nickels and dimes. It will also be assumed that the first hour can be purchased for 1 dime or 2 nickels whereas the second hour will require 2 dimes or 4 nickels. It will also be assumed that the winding plate 102 must be moved through 90° for the purchase of 1 hour of time, through 45° for the purchase of one-half hour of time and through 22½° for the purchase of 15 minutes of time.

When a dime is inserted in a meter displaying zero purchased time, the teeth of the discs 100 and 110 will be located in the positions shown in FIG. 2. The coin carrier 30 holding the dime is rotated until the dime engages the segment 88 at which time the pawl 42 will be moved into engagement with the edge 126 of the disc 100. Continued rotation of the coin carrier will then result in movement of the disc 100 through 90° and movement of the drive plate 102 in the same manner thereby providing for the purchase of 1 hour's time on the meter.

If a nickel were inserted instead of the dime, the segment 84 would not be engaged until the pawl 42 had

moved into position for engagement with the tooth 125. This will result in a 45° rotation of the drive plate and the purchase of one-half hour of time. If a purchaser of time inserted a second nickel, the pawl 42 would engage the edge 126 of the drive plate for this second nickel since this edge would now be in the position normally occupied by the tooth 125. This would then result in the purchase of an additional one-half hour.

Since the disc 110 is carried along with the disc 100 during the purchase of the first hour, the teeth on this disc 110 will assume new positions after the purchase of the 1 hour of time. Specifically, the tooth 120 will have moved through 90° to the position initially occupied by the tooth 117 on the disc 100. Similarly, the teeth 121 and 122 will occupy the positions originally occupied by the teeth 123 and 125 on the disc 100.

If a nickel is now inserted, the segment 84 will cause the pawl 42 to engage the tooth 122. Continued rotation of the coin carrier will move the disc 110; however, the lost motion previously described will result in movement of this disc through 22.5° without any corresponding movement of the disc 100. Further rotation will then result in movement of the disc 100 through an additional 22.5° resulting in 15 minutes of purchased time. The insertion of three additional nickles will have the same result with the pawl then successively engaging the teeth 121, 120 and 119.

If after the first hour of time is purchased, a dime is inserted, one-half hour of additional time will be purchased. This would not be accomplished by the mechanisms already described since the segment 88 is located so that the pawl 42 would engage the tooth 120. Thus, the relationship of the leading edges of the segments 84 and 88, in terms of degrees, is 45° apart in order to provide the proper relationship for the purchase of the first 1 hour of time. If the 45° interval were maintained with respect to the purchase of the second hour, then a dime would result in the purchase of 45 minutes of time since the dime would cause the pawl 42 to engage the tooth 120 (the tooth located in the original position of the tooth 117 after the purchase of one hour). Considering the lost motion of 22½°, this would result in a wind of 67½°.

The pawl 42 must be operated to engage the tooth 121 when the second dime is inserted to provide a 45° wind and 30 minutes of purchased time. This is accomplished by means of the blocking arm 128. As shown in FIG. 8, this blocking arm moves to a blocking position (shown in dotted lines in FIG. 2) when the drive plate 102 has moved through about 75°. Thus, at this point, the arm 134 of the plate passes the portion 142 of the blocking arm to thereby release the arm.

The finger 140 on the pawl 42 rides on top of the blocking arm when it is in the blocking position. The end portion 136 is then located so that the finger 140 and associated pawl cannot move into the engaging position until after the pawl has passed the engaging edge of tooth 120. Accordingly, the pawl 42 is instead moved into engagement with the tooth 121. This results in the purchase of one-half hour of time since the plate 110 is first moved through 22½° and then engages the plate 100 for a further movement of 45°.

Essentially the same action occurs when a third dime is inserted. By this time, the tooth 119 has moved to the

position just vacated by the tooth 121. The blocking arm permits the pawl 42 to drop into the engaging position just prior to reaching the tooth 119 whereby rotation will again result in 45° turn of the drive plate and the purchase of one-half hour of time.

The arrangement will provide the same ratio of purchased time to coin value even where the coins are inserted in an order different than that described. For example, if the user inserts 1 nickel and then 1 dime, he is entitled to one-half hour for the nickel and 45 minutes for the dime. The total of 1 hour and 15 minutes is accomplished since the first nickel will drive the plate 100 through 45° by engaging the tooth 125. This movement brings the tooth 122 on disc 110 into the position originally occupied by the tooth 117 on disc 100. The drive plate 102 has not, however, been moved sufficiently to change the position of blocking arm 128 and, therefore, the dime inserted will cause the pawl 42 to engage the tooth 122. The continued wind action will then result in 22½° of lost motion and 67½° movement of the driving plate. This leads to the purchase of an additional 45 minutes.

It has been found that the above described construction provides substantial improvements in the operation of parking meters, particularly of the type employing mechanisms for detecting slugs or coins of improper denomination. Thus, the detecting mechanisms described in the aforementioned U.S. Pat. No. 3,262,540 can readily be incorporated along with the constructions of this invention. Similarly, the so-called "grasshopper" features employed in prior art parking meters and designed to detect coins having a diameter slightly different than the diameter of coins of proper denomination can be readily used.

It will be understood that various changes and modifications may be made in the above described constructions which provide the characteristics of this invention without departing from the spirit thereof particularly as defined in the following claims.

That which is claimed is:

1. In a meter construction wherein purchased time is obtained through engagement of pawl means with winding means attached to a timing mechanism, the improvement wherein said winding means comprises a first rotatable member tied to means for operating the winding mechanism, a second rotatable means associated with said first rotatable member and movable relative thereto, teeth defined by each of said rotatable members for engagement by said pawl, a driving portion defined by said second rotatable member for engaging said first rotatable member, and means normally holding said driving portion in spaced relationship relative to said first rotatable member, initial insertion of coins resulting in engagement of said pawl with said first rotatable member for purchase of time upon movement of said first rotatable member by said pawl, and subsequent insertion of coins resulting in engagement of said pawl with said second rotatable member for movement of said second rotatable member through the space between said rotatable members and then resulting in driving engagement of said second rotatable member with said first rotatable member for purchase of time upon movement of said first rotatable member by said second rotatable member.

2. A construction in accordance with claim 1 wherein said rotatable members comprise discs mounted coaxially, and a spring normally holding said discs in said spaced relationship.

3. A construction in accordance with claim 2 wherein rows of teeth are defined on the periphery of each of said discs, said rows being in circumferential alignment with each other, the leading tooth of the row of teeth on said second disc comprising said driving portion for engagement with the trailing tooth of the row of teeth of said first disc.

4. A construction in accordance with claim 1 wherein the subsequent insertion of a coin results in a reduced ratio of purchased time to the value of the coin inserted due to the relative movement of the second rotatable member and first rotatable member without operation of the timing mechanism, and including blocking means for retaining said pawl out of engagement with the second rotatable member upon subsequent insertion of a coin for thereby delaying engagement with the second rotatable member beyond the normal position of engagement for further reducing said ratio.

5. A construction in accordance with claim 4 wherein said blocking means comprises an arm pivotally mounted outside the periphery of said discs, a finger on said pawl means adapted to engage said arm whereby said arm holds said pawl means out of position for engagement with a rotatable member, and means for holding said blocking means out of blocking position during initial insertion of coins.

6. A construction in accordance with claim 5 wherein said holding means comprises a cam member rotatable with said first rotatable member, a portion of said arm engaging said cam member until movement of the cam member beyond said arm portion during the initial purchase of time, said cam member moving beyond said arm portion for thereby releasing said arm portion to move the arm into blocking position after such initial purchase of time.

7. A construction in accordance with claim 6 including a third rotatable member tied to said first rotatable member, said cam member extending outwardly from the periphery of said third rotatable member.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,708,049 Dated January 2, 1973

Inventor(s) Leonard J. Weber

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 6, change "discs" to "disc"  
line 7, after "teeth" insert --119,--; after  
"120", first occurrence, insert  
--, 121, 122--; change "120", second  
occurrence, to --100--;  
line 8, cancel "122" and insert --117, 123, 125--.

Column 6, line 48, change "means" to --member--.

Signed and sealed this 9th day of July 1974.

(SEAL)  
Attest:

McCOY M. GIBSON, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents

UNITED STATES PATENT OFFICE  
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