

[54] DEFERRED TIME METER

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[58] Field of Search 174/72, 83, DIG. 2, DIG. 22

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UNITED STATES PATENTS

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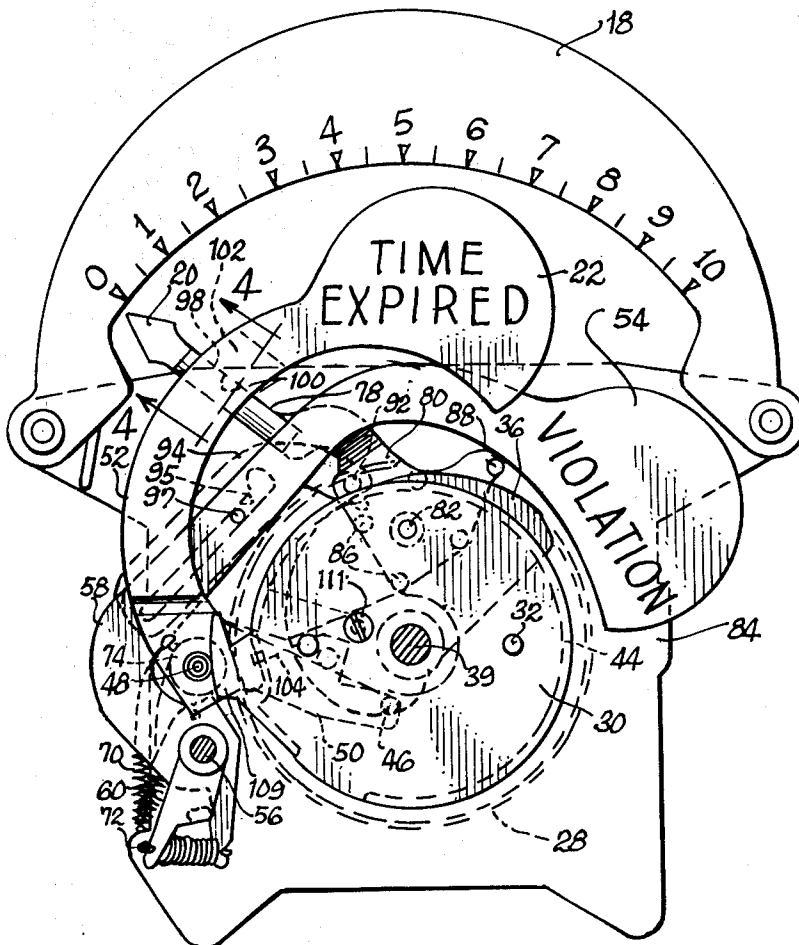
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[57] ABSTRACT

A meter construction, such as a parking meter, wherein a clock mechanism is provided along with means for winding the clock mechanism in response to the insertion of coins. The meter includes indicator means to visually indicate the amount of time purchased, and retaining means are employed to engage the indicator means for preventing movement thereof to an indicating position. A contacting mechanism is associated with release means for the retaining means. Upon the insertion of a sufficient number of coins to accomplish the purchase of a pre-selected amount of time, the contact means engage the retaining means whereby the indicator means are permitted to move to provide a visual indication of the time purchased. The meter thus avoids any display of time purchased until the minimum legal amount of coins have been inserted in the meter.

10 Claims, 11 Drawing Figures



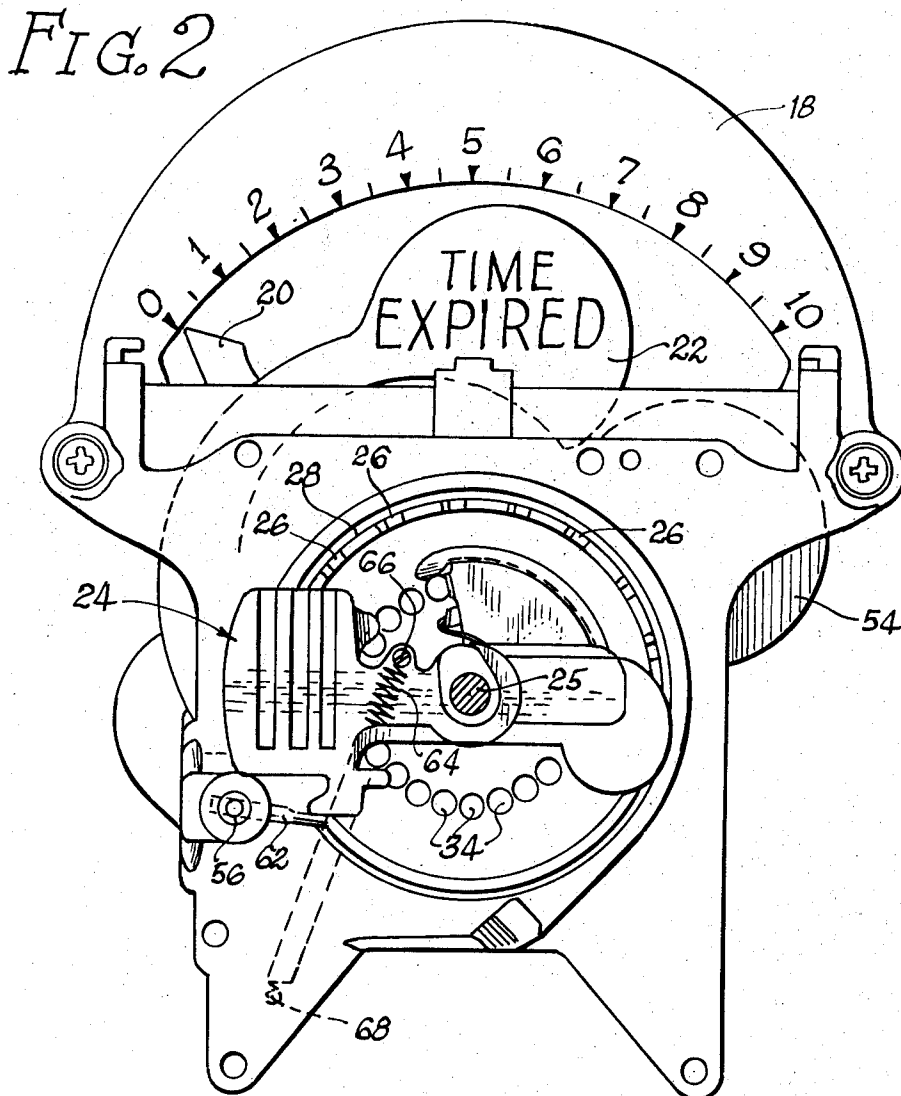
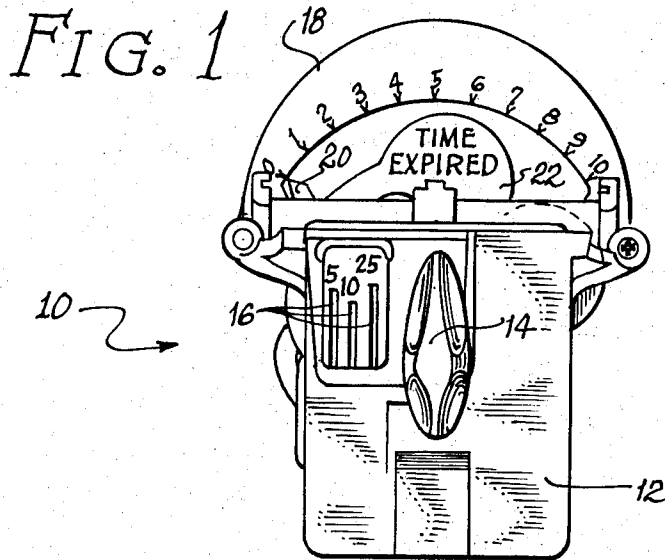


FIG. 3

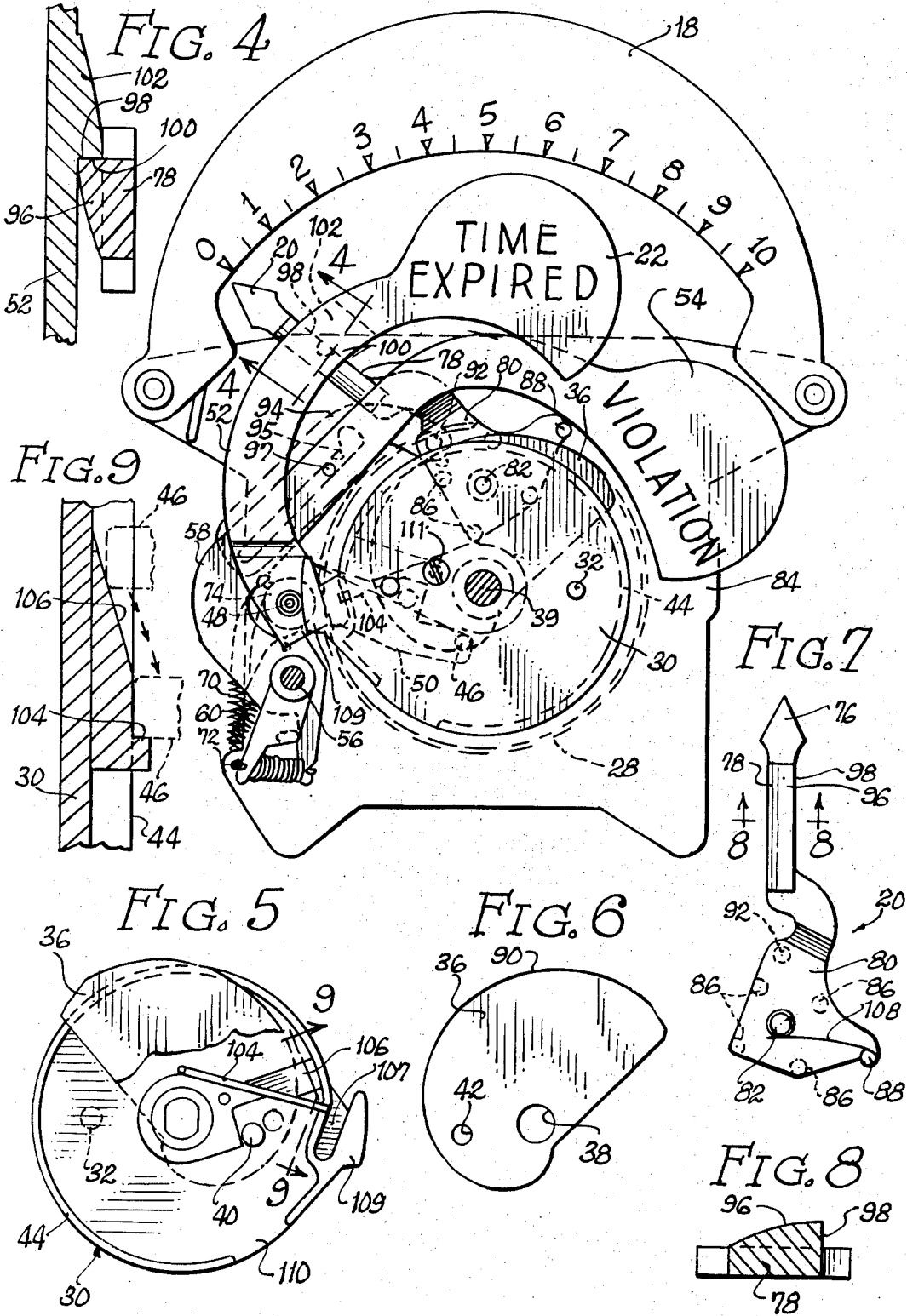


FIG. 10

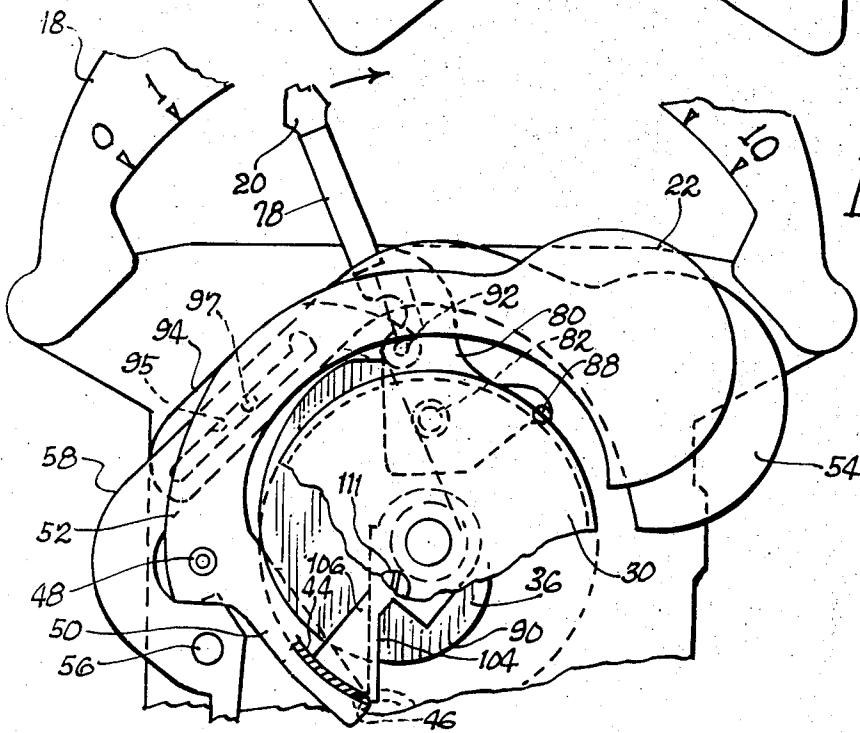
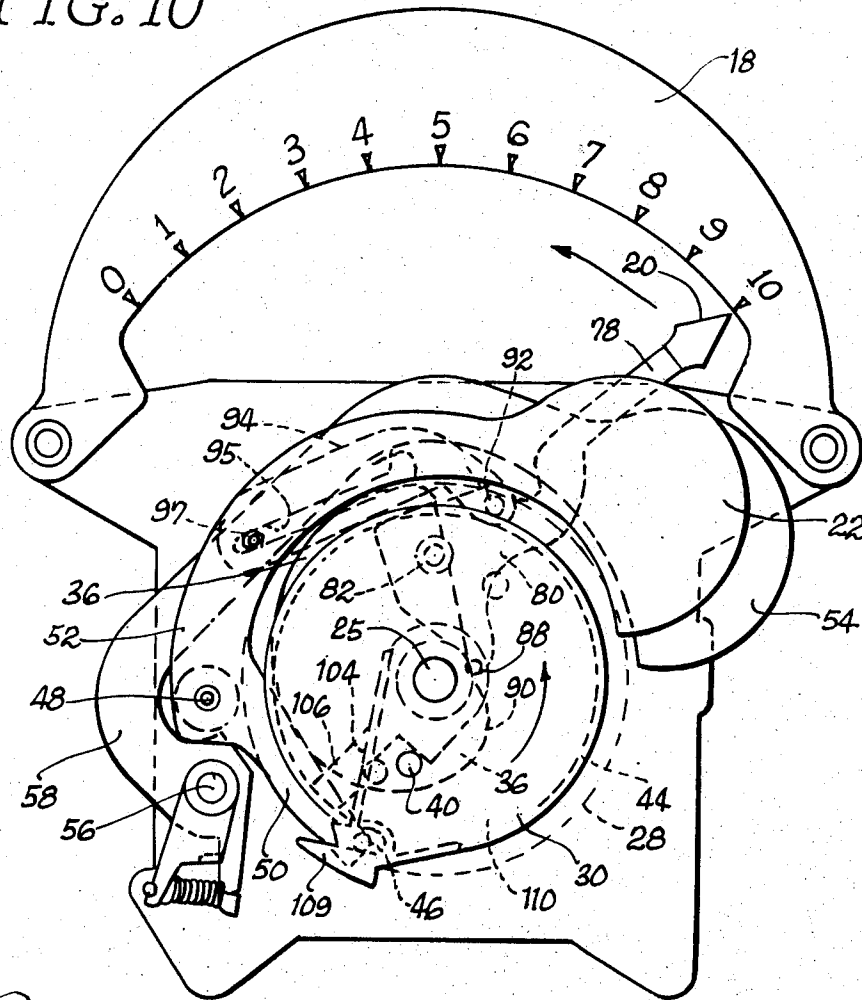


FIG. 11

DEFERRED TIME METER

This invention relates to meter constructions of the type providing for the purchase of time. A prominent example of such constructions comprise parking meters wherein the legal use of a parking space is permitted if the operator of a vehicle pays for the use by inserting money in a parking meter. In the subsequent discussion, reference will be made to coins being inserted into a meter, and it will be understood that this includes tokens or other means utilized for obtaining operation of the meter.

In a typical parking meter operation, the meters are designed to accept a plurality of coins, often coins of different denominations. The meters will thus allow for the purchase of a certain increment of time upon insertion of a coin with additional increments of time becoming available if more coins are inserted.

The typical meter operation is fully acceptable in situations where the driver of the vehicle is to be permitted use of a parking space for any desired length of time. Thus, in a shopping area, for example, meters may be set to permit use of a space for a few minutes upon insertion of a single coin of small denomination, while also permitting use for a few hours if a shopper inserts a sufficient amount of money.

In other situations, however, authorities do not wish to give a driver the option of using a parking space for only a short period of time. For example, in a commuter parking lot, the operation of the lot would be disrupted if drivers were permitted to purchase short parking periods during the morning rush hour. These drivers would occupy spaces while commuters were attempting to park, and then these drivers would leave after the commuter rush hour, in which case the lot would be unused for the major portion of a day. In addition to creating inconvenience for the commuters, the revenue producing ability of the lot would be impaired.

Attempts have been made to solve the problems by utilizing meters which would only accept coins of higher denomination. For example, if only quarters could be used in a meter, the short term parker is discouraged; however, this creates an additional burden for the commuter since he must then be sure to have an adequate supply of quarters.

It is a general object of this invention to provide a parking meter construction which overcomes certain difficulties inherent in existing meter constructions.

It is a more specific object of this invention to provide a parking meter construction which may include mechanisms for accepting coins of various denominations, including lower denominations, while also operating to provide legally purchased time only for long term parking.

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 housing suitable for incorporation of the novel mechanisms of the invention;

FIG. 2 is an elevational view illustrating mechanisms located in the interior of the meter housing, particularly the coin carrier and winding mechanisms;

FIG. 3 is an elevational view illustrating additional mechanisms located in the interior of the construction,

particularly the operating and support means for the "Time Expired" and "Violation" flags utilized in the construction;

FIG. 4 is an enlarged fragmentary cross-sectional view taken about the line 4-4 of FIG. 3;

FIG. 5 is a detail view illustrating a ramp structure employed in the construction for controlling the operation of the "Time Expired" flag.

FIG. 6 is a detail view of the cam element employed for controlling the operation of the meter indicating needle;

FIG. 7 is a detail view of the indicator needle;

FIG. 8 is an enlarged cross-sectional view taken about the line 8-8 of FIG. 7;

FIG. 9 is an enlarged fragmentary cross-sectional view taken about the line 9-9 of FIG. 5;

FIG. 10 is an elevational view illustrating the mechanisms shown in FIG. 3 after the completion of a time purchase operation; and,

FIG. 11 is a fragmentary elevational view illustrating the same mechanisms in the positions occupied just prior to the conclusion of the time purchase operation.

The construction of this invention generally relates to a meter employing means for achieving the purchase of time, and for indicating the amount of time purchased. The meter, which may be utilized for controlling the use of a parking space, is adapted to receive a series of coins, with the receipt of each coin being followed by a winding operation. The indicator means for visually indicating the amount of time purchased is held in position by a retaining means whereby the indicating function will not occur until a sufficient amount of money has been inserted to achieve the purchase of a preselected amount of time.

The retaining means employed is associated with a release means which is connected to the means for winding the clock mechanism of the meter. A contact structure is operated during the wind for movement into contact with the retaining means to disengage the retaining means relative to the indicator means. This operation is carried out automatically when the predetermined amount of time has been purchased, and the user of the meter does not have to perform any special operating steps in order to operate the meter.

The drawings illustrate a construction 10 including a housing 12 of the type used for a parking meter. The housing includes a front face carrying a manually operable handle 14 and defining coin slots 16. As indicated, these slots are adapted to receive nickels, dimes and quarters; however, it will be appreciated that the concepts of the invention are usable in connection with coins of different denominations as well as tokens or other coin substitutes.

A dial 18 is supported on the meter housing, and an indicator needle 20 is adapted for movement adjacent the dial to indicate various amounts of unexpired time. For purposes of illustration, it will be assumed that the meter is a 10-hour meter of the type commonly used for extended period parking. In the condition shown in FIGS. 1, 2 and 3, a "Time Expired" flag 22 is displayed in the open area defined beneath the dial 18. This flag indicates that the winding mechanism for the clock has wound down, and it simplifies visual inspection by law enforcement personnel. A transparent cover for the meter (not shown) is normally provided to protect the meter mechanisms.

As best illustrated in FIG. 2, a coin carrier 24 is positioned for receiving coins inserted through the slots 16. This coin carrier is mounted on shaft 25 which also supports the handle 14 whereby rotation of the handle imparts corresponding rotation to the coin carrier. In accordance with known mechanisms, and as described for example in Sollenberger U.S. Pat. No. 2,603,288, the coin carrier is provided with a pawl mechanism. The coins inserted are adapted to engage camming segments whereby the coins serve to move the pawl mechanism for engagement with the teeth 26 on a winding ring 28. This winding ring is tied to a clock mechanism so that the clock will be wound in accordance with the number of coins inserted. The denomination of the coins effects the degree of winding since the coins of higher value engage longer camming segments whereby a greater degree of movement of the winding wheel is accomplished with these coins of larger denomination.

In accordance with this invention, and as best shown in FIGS. 3 through 11, the winding ring 28 is tied to a winding disc 30 which, as will be explained, functions as the release means of the invention. Fasteners, such as rivets 32, are employed for accomplishing the connection between these members so that rotation of the winding ring results in corresponding rotation of the disc 30. As shown in FIG. 2, a plurality of openings 34 are formed in the winding ring so that the relative position of the ring and disc can be changed depending upon the particular meter application involved. Thus, the relative positions of these members can be used to regulate the degree of wind for a given coin which accounts for the provision of different relative positions.

A cam plate 36 is supported on the disc 30 for movement therewith. As shown in FIG. 6, the cam plate includes an opening 38 which receives a shaft 39. This shaft supports at one end the winding ring 28 and extends through the disc 30 and cam plate 36 to the clock mechanism of the meter. Accordingly, the winding ring, disc, cam plate and clock mechanism are all simultaneously operated. The position of the cam plate relative to the disc is controlled by means of a post 40 which extends through a second opening 42 positioned in spaced relationship relative to the axis of the cam plate. The relative position of the cam plate on the disc affects the operation of the indicator needle 20 after a time purchase operation is concluded, and different positions for the post 40 may, therefore, be selected depending upon the operation desired. The configuration of the cam plate can also be varied for purposes of varying the meter operation.

The disc 30 defines a rim 44 which provides a bearing surface for a follower 46 defined by the "Time Expired" flag 22. This flag is pivotally connected to the meter housing at 48, and a short arm portion 50 of the flag supports the follower 46 which may take the form of a pin secured in an appropriate opening defined by the arm 50.

The "Time Expired" flag is positioned at the end of the longer arm 52, and this arm is curved to accommodate the other mechanisms illustrated.

The meter housing also supports a "Violation" flag 54 which is secured to pivoting rod 56. The rod 56 extends from the front wall of the meter housing to the rear wall behind the pivotal connection of the arm 58 which supports the flag 54. A first spring 60 normally

urges the arm 58 in a counterclockwise direction relative to the position shown in FIG. 3. The flag 54 is, however, normally maintained in the depressed position shown in this figure and in FIG. 2 due to the engagement of the coin carrier 24 and pin 62 carried by shaft 56. The coin carrier is normally urged in a counterclockwise direction by spring 64 which has one end attached at 66 to the coin carrier and the other end attached at 68 to the front wall of the housing 12. The spring 64 applies a superior force relative to the spring 60 to maintain the normally depressed position of the flag 54. When the coin carrier 24 is manually rotated, the engagement with pin 62 is removed whereby the shaft 56 will pivot in response to the action of spring 60. This operation raises the "Violation" flag which prevents a driver from partially rotating the coin carrier in an attempt to confuse law enforcement officials. The function of the "Violation" flag is more fully described in Sollenberger U.S. Pat. No. 2,603,288.

An additional spring 70 is also attached at one end to the meter housing at 72 with the other end being attached to a boss 74 defined by the "Time Expired" flag at the pivot axis 48. The spring 70 urges the "Time Expired" flag in the counterclockwise direction whereby this flag is normally maintained in the raised or visible position.

The indicator needle 20 is illustrated in detail in FIG. 7. This needle includes a pointer 76 at one end of arm 78 with the other end of the arm being secured to the support 80. This support includes an opening 82 which enables pivotal attachment of the pointer to the intermediate wall 84 of the meter housing.

A plurality of studs 86 are formed on the support, and these studs bear against the wall 84 to hold the pointer in spaced relationship relative to this wall thereby permitting free movement thereof. A cam follower in the form of pin 88 extends outwardly from the support 80 in a direction opposite the studs 86. This cam follower is adapted to engage the periphery 90 of the cam 36.

An additional stud 92 is formed on the support 80, and this stud pivotally supports link 94. The link 94 defines an elongated slot 95 which receives a pin 97 carried by the arm portion 58 which is connected to flag 54. As more fully explained in the aforementioned Sollenberger patent, this arrangement permits relative movement between the indicator 20 and the flag 54 whereby the flag can be raised while the indicator is in the zero position as shown in FIG. 3, and whereby the indicator can be moved to the full time purchase position of FIG. 10 with the flag 54 in the lower position. As indicated in the Sollenberger patent, the flag 54 is utilized during the winding portion of the meter operation to insure that a driver does not attempt to disrupt the meter function by failing to complete the winding operation.

The particular function of the meter of this invention is accomplished primarily due to the design of the "Time Expired" flag 22, the indicator needle 20 and the disc 30. Specifically, the indicator needle is provided with a built-up section 96 located on the arm 78 (FIGS. 4 and 8). This built-up section defines an engaging surface 98 which is adapted to be held against a corresponding engaging surface 100 defined by the arm 52 of flag 22. The surface 100 is formed by means of a built-up section 102 formed on the surface of arm 52.

The normal engagement of the surface 98 and 100 is best illustrated in FIG. 3.

The disc 30 defines an interior wall 104 which extends from a position displaced from the axis of the disc outwardly to the rim 44 of the disc. A triangularly shaped ramp 106 is formed adjacent the intersection of this wall and the disc rim. As will be explained in discussing the operation of the meter, this wall and ramp are engageable with the follower pin 46 carried by the short arm portion 50 of the "Time Expired" flag 22.

The operation of the meter construction commences in the normal fashion upon insertion of a coin in one of the slot 16 with the coin then being received in one of the aligned slots 25 defined by the coin carrier 24. At this point, the condition of the meter is as shown in FIG. 2 with the "Time Expired" flag in the raised position and with the indicator 20 at the zero position. Upon rotation of the coin carrier, the rod 56 is pivoted by means of spring 60 whereby the "Violation" flag 54 is also moved to the raised position. As indicated, this movement is accomplished without affecting the position of the indicator 20 due to the fact that the pin 97 carried by the flag 54 moves within the slot 95 of the link 94.

Depending upon the denomination of the coin inserted, a pawl carried by the coin carrier 24 will engage one of the teeth 26 whereby the winding wheel and the associated disc 30 and clock mechanism will move through a certain number of degrees. Assuming that each dime will purchase 2 hours of time with the meter being legally used only upon the purchase of 10 hours, the degree of wind will be sufficient to set the clock mechanism for two hours. Although the disc 30 is rotated, this will have no effect on the "Time Expired" flag 22 since the wall 104 and ramp 106 are not moved sufficiently to engage the follower 46 of the flag 22. Since the "Time Expired" flag remains in position, the indicator 20 is also held in position due the continued engagement of the surfaces 98 and 100 defined by these members.

As each subsequent dime is inserted, the clock mechanism continues to be wound, and the position of the wall 104 and ramp 106 gradually moves toward the follower 46 of the flag 22. When the last dime is inserted, the wind causes engagement of the follower 46 with the wall 104 which drives the follower outwardly. This action causes the "Time Expired" flag to begin movement to the lower position which, in turn, commences releasing movement of the indicator 20. The follower 46 is eventually driven beyond the rim 44 of the disc 30 by which time the indicator needle is completely released. A light spring 108 is associated with the indicator to urge the indicator in a clockwise direction when released by the "Time Expired" flag.

The ramp 106 operates to impart an inward movement to the flag 22 at the same time that the wall 104 is imparting pivoting movement. This inward movement serves to insure passage of the indicator 20 beyond the flag 22 since the inward movement separates the surfaces 98 and 100 laterally. In addition, the ramp drives the follower 46 upwardly over the rim of the disc 30 and into the opening 107 defined by the hook-shaped member 109. This member also serves to stop the timer when the indicator reaches the zero position. The opening 107 prevents overwinding of the flag when the mechanism is wound to approximately 300°. The wall and ramp preferably comprises a separate ele-

ment, referred to as a "contact means," which can be mounted in different positions on the "release means" made up by the disc 30, the fastener 111 being suitable for this purpose.

Since the cam 36 is moved with the disc 30 during the time setting operation, the periphery 90 of the cam will be moved into position for engagement by the follower 88 of the indicator. As illustrated in FIG. 10, the follower 88 engages the cam at a point adjacent the axis of the cam in the maximum time position of the indicator. Since the cam moves with the disc 30 as the clock mechanism unwinds, the cam will gradually force the follower outwardly away from the axis resulting in gradual movement of the indicator toward the zero time position.

The follower 46 of the "Time Expired" flag 22 is maintained in engagement with the rim 44 of the disc 30 as the clock mechanism unwinds. As shown in FIG. 5, the rim is interrupted at 110, and this interruption is moved adjacent the follower 46 when the clock mechanism is at the end of the unwinding operation. Due to the action of spring 70, the "Time Expired" flag is pivoted to the raised position at this point. Since the pointer 20 will be at the zero position at this time, the respective surfaces 98 and 100 will move into engagement whereby retaining of the indicator is accomplished until the "Time Expired" flag is again driven to its lowered position. This, of course, can only be accomplished when sufficient coins are inserted to move the wall 104 and associated ramp 106 into engagement with the follower 46.

It will be appreciated that with the construction illustrated, a driver cannot operate the meter for purposes of obtaining legal short term parking. Thus, when an insufficient amount of coins are inserted, the indicator 20 will remain in the zero time position and the "Time Expired" flag will remain in the visible position. Even though the clock mechanism may be wound, it will be clear to the driver that a violation will be indicated by the meter unless additional coins are inserted. This will, of course, discourage anyone except long term parkers from using a particular parking space.

In addition, the meters described can be operated without the necessity for limiting the type of coin which can be used. The meter operates in a completely satisfactory fashion when numerous coins of small denomination are utilized or when one or more coins of larger denomination are utilized. For example, if a quarter is required for purchasing the pre-determined time desired, the driver can readily use 5 nickels, 2 dimes and a nickel, or any other combination of nickels and dimes as well as a single quarter.

The advantages of the invention are achieved by making only a few critical changes when comparing the structure of the invention with prior art structures. Furthermore, the changes are made quite inexpensively whereby the advantages can be achieved without undue difficulty.

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

That which is claimed is:

1. In a meter construction including a housing, a clock mechanism located within the housing, means for receiving coins, means for winding the clock mecha-

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nism upon the insertion of coins, and indicator means comprising a pointer movable over a dial face for visually indicating the amount of time purchased, the improvement comprising retaining means normally engaging said indicator means for preventing movement thereof, said retaining means defining a pointer engaging surface normally in contact with said pointer, release means connected to said means for winding said clock mechanism, contact means associated with said release means for movement into contact with said retaining means upon movement of the release means during winding of said clock mechanism, the contact means of said release means comprising a ramp movable into contact with said retaining means for moving the engaging surface of said retaining means out of contact with said pointer, said contact means being thereby operative to disengage said retaining means relative to said indicator means upon movement of the clock mechanism through a predetermined distance whereby visual indication of the time purchased is achieved after said clock mechanism has moved through said predetermined distance.

2. A construction in accordance with claim 1 wherein an increment of movement of said clock mechanism is accomplished upon the insertion of a coin, and wherein a plurality of coins are required to provide sufficient increments of movement to achieve said predetermined distance whereby said pointer does not move to a time display position until said plurality of coins is inserted.

3. A construction in accordance with claim 2 wherein said ramp is adapted for location at different positions on said release means whereby the predetermined distance of movement of said clock mechanism can be varied.

4. A construction in accordance with claim 3 wherein said means for winding said clock mechanism comprises a time setting wheel, said release means comprising a disc attached to said wheel, and wherein said ramp is removably attached to said disc.

5. A construction in accordance with claim 4 wherein said retaining means is pivotally mounted in the construction, said ramp including a first portion for contacting said retaining means to pivot the retaining means away from said indicator means, and a second portion for moving the retaining means laterally out of the path of movement of said indicator means.

6. A construction in accordance with claim 1 wherein said meter is used for the purchase of parking space, a flag member for visually indicating that use of the space is not authorized, said pointer engaging surface being

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carried by said flag member, said ramp operating to move said flag member out of visual position to release said pointer for thereby visually indicating authorized parking.

7. A construction in accordance with claim 6 wherein said coins are adapted to be received and held in a coin carrier, pivotally mounted pawl means adapted to be engaged by a coin in the coin carrier for movement of the pawl means into driving engagement with the means for winding the clock mechanism, and a handle for rotating the carrier and associated pawl means for winding the clock mechanism, and wherein the amount of rotation allowed said handle is insufficient to move the clock mechanism through said predetermined distance whereby more than one winding of the handle is required to provide for movement of the pointer into a time display position.

8. A construction in accordance with claim 6 wherein said flag member is pivotally mounted in said meter, the contact surface of said release means operating to pivot said flag member away from its visual position.

9. A construction in accordance with claim 8 wherein said contact surface also operates to drive said flag member laterally out of its normal position to insure free movement of said pointer means to a time display position.

10. In a meter construction including a housing, a clock mechanism located within the housing, means for receiving coins, means for winding the clock mechanism in steps upon the successive insertion of coins, indicator means for visually indicating the amount of time purchased, and means normally urging the indicator means for movement in response to said winding a distance corresponding to the degree of wind, the improvement comprising retaining means normally engaging said indicator means for preventing movement thereof, release means connected to said means for winding said clock mechanism, contact means associated with said release means for movement into contact with said retaining means upon movement of the release means during winding of said clock mechanism, said contact means being thereby operative to disengage said retaining means relative to said indicator means upon movement of the clock mechanism through a predetermined distance whereby no movement of the indicator means occurs and no visual indication of the time purchased is achieved until after said clock mechanism has moved through said predetermined distance.

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