

[54] ROTARY COIN METER

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[52] U.S. Cl..... 194/84, 194/9 T, 194/DIG. 20

[51] **Int. Cl.**..... **G07t 5/00**

[58] **Field of Search**..... 194/3, 9 T, 84, 87,
194/10, 13, 15, 16, DIG. 20

[56] **References Cited**

UNITED STATES PATENTS

3,110,385	11/1963	Eickhoff	194/84
3,172,520	3/1965	Greenwald	194/9 R

FOREIGN PATENTS OR APPLICATIONS

10,852	1911	Great Britain	194/87
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Primary Examiner—Samuel F. Coleman
Attorney—Irving Seidman et al.

[57] **ABSTRACT**

A coin meter having a rotary coin carrier that accepts and deposits coins of different denominations, one at a time, and is coupled to a time-setting member that establishes the operating cycle duration of a controlled device according to the value of the coins deposited. Initiation and termination of the operating cycle is effected by switches controlled by a timer cooperating with the time-setting member.

2 Claims, 21 Drawing Figures

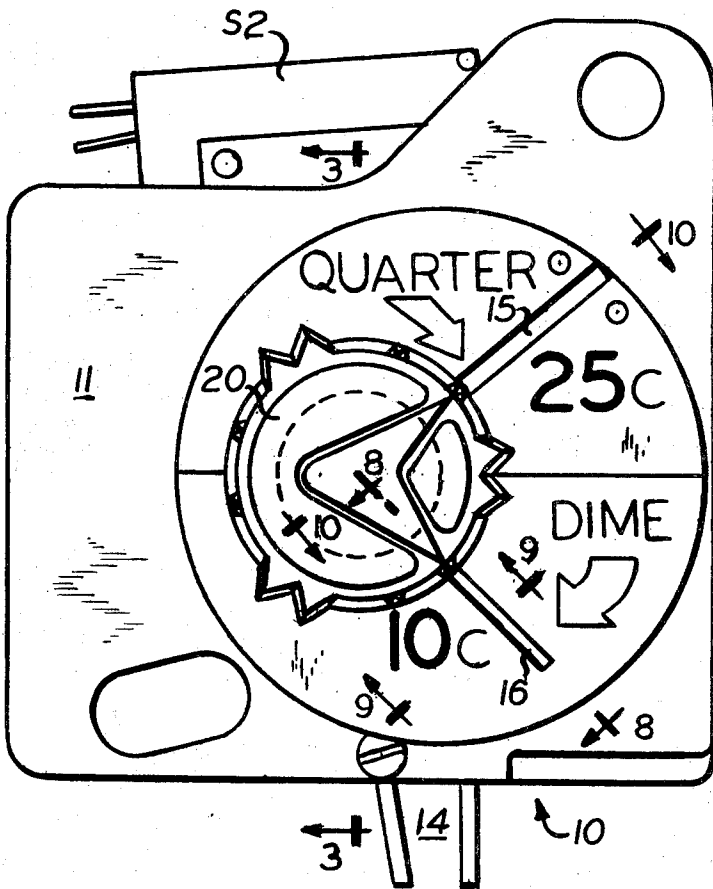


FIG. 1.

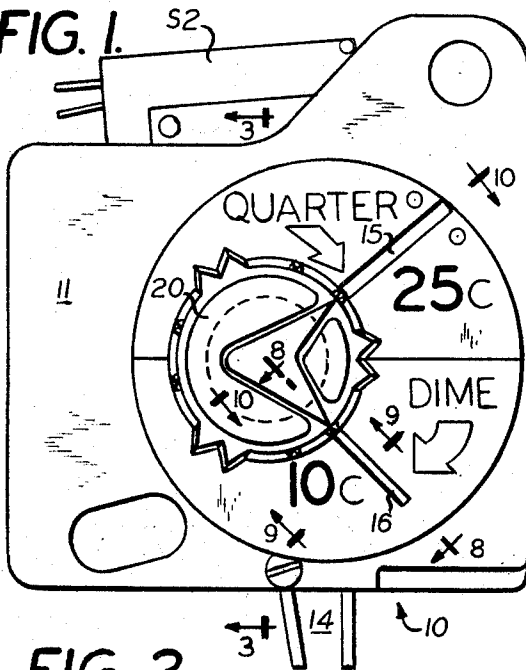


FIG. 4.

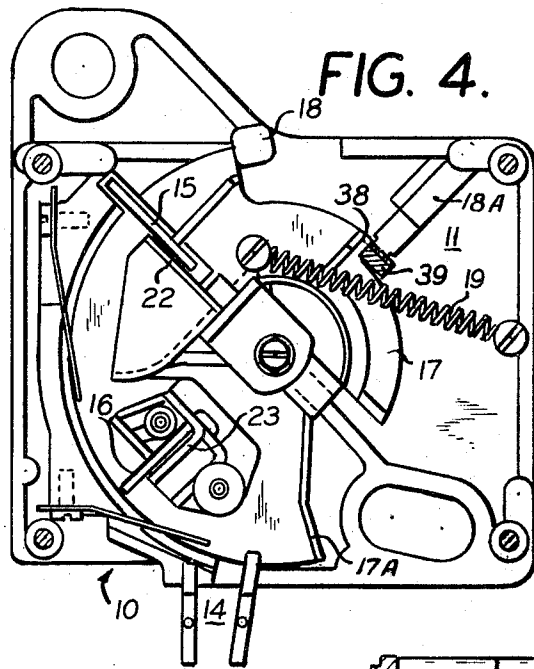


FIG. 2.

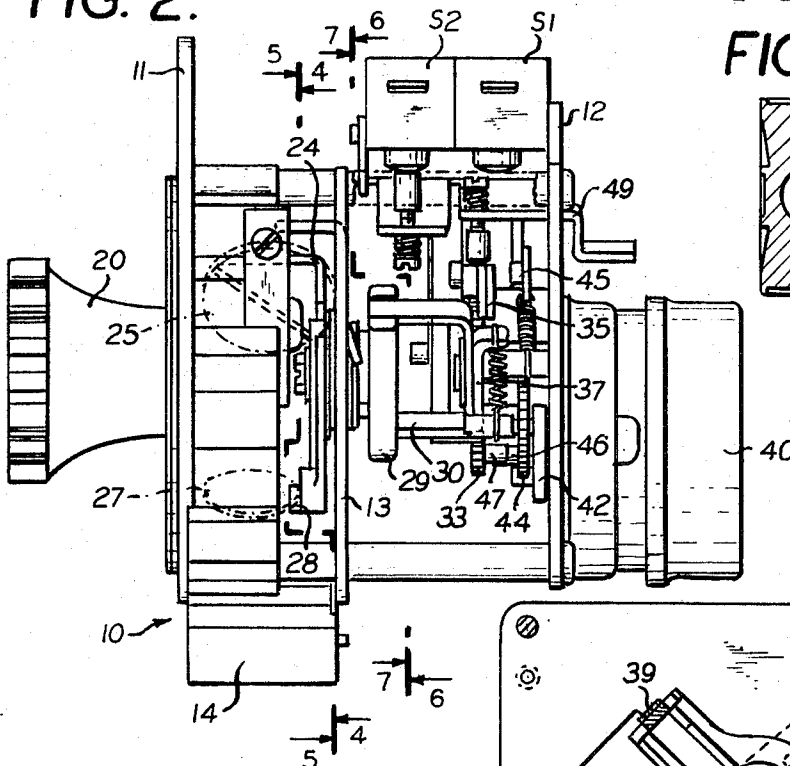


FIG. 3.

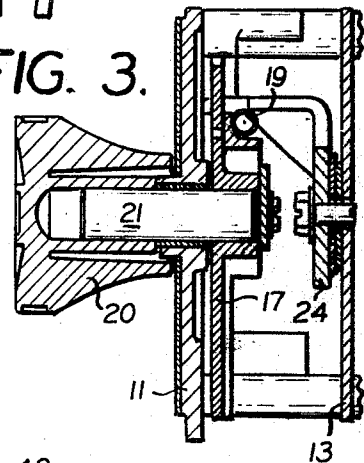


FIG. 5.

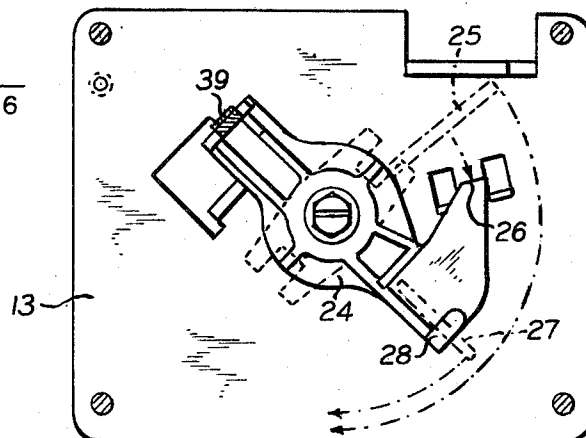


FIG. 6.

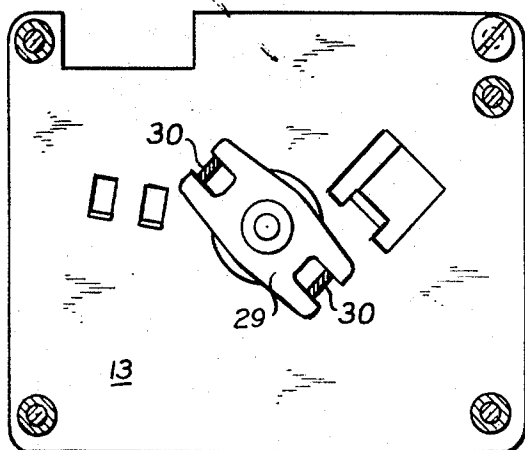


FIG. 7.

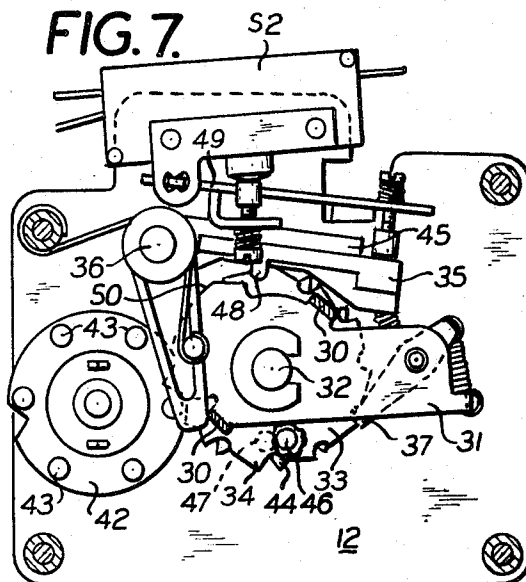


FIG. 8.

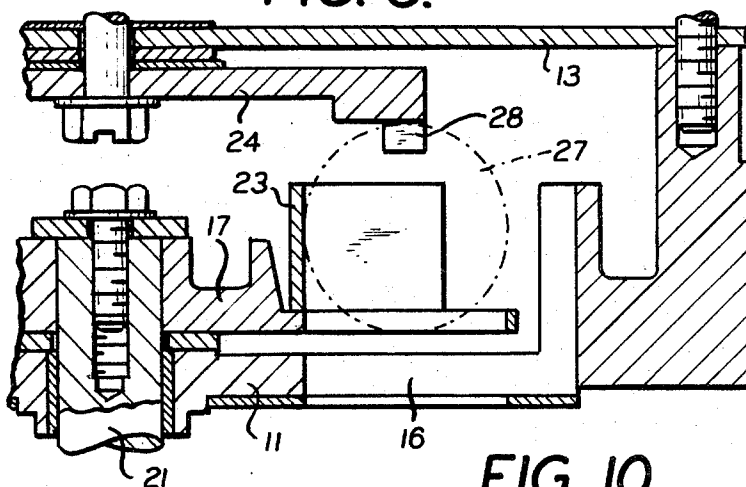


FIG. 9.

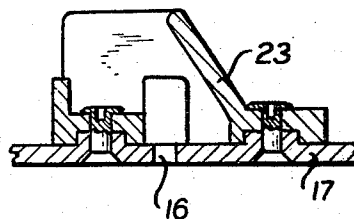
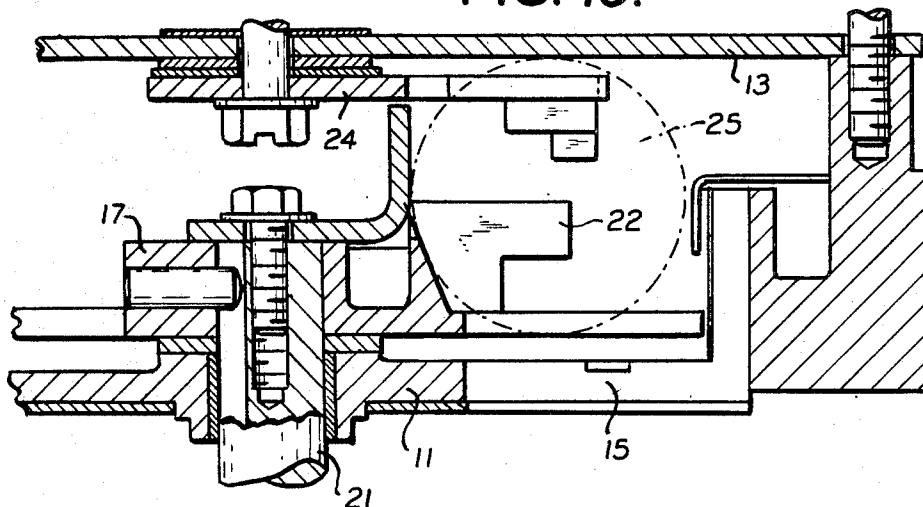
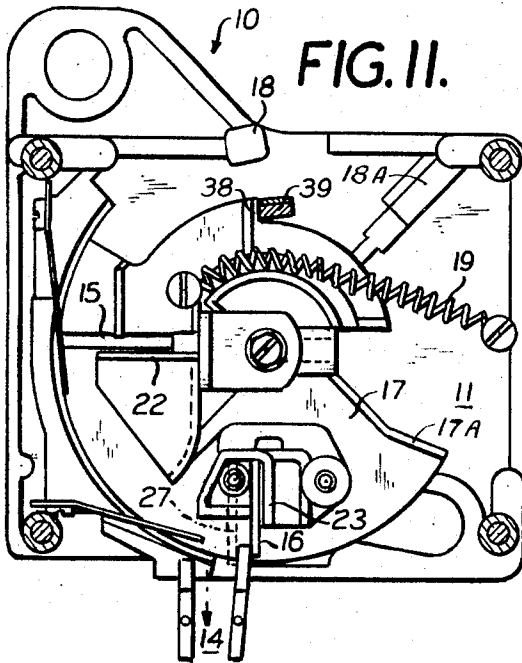
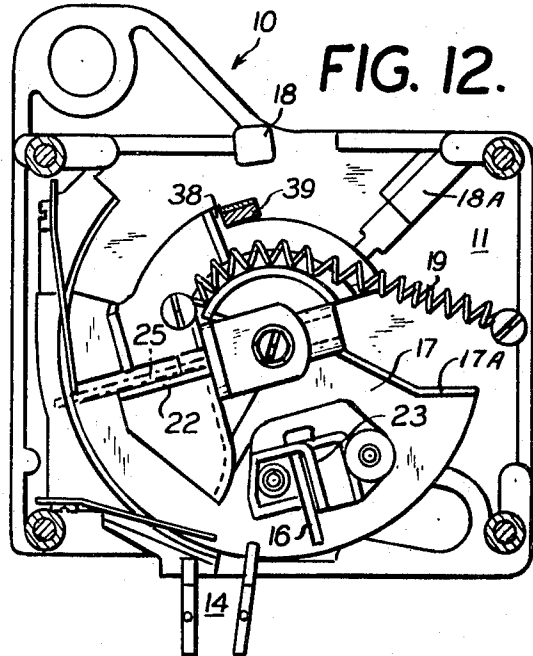
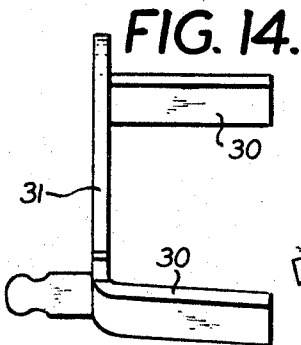
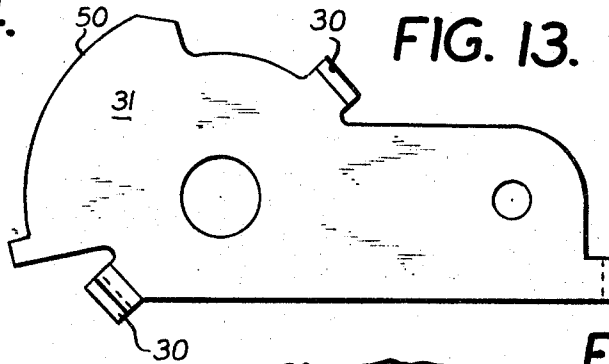
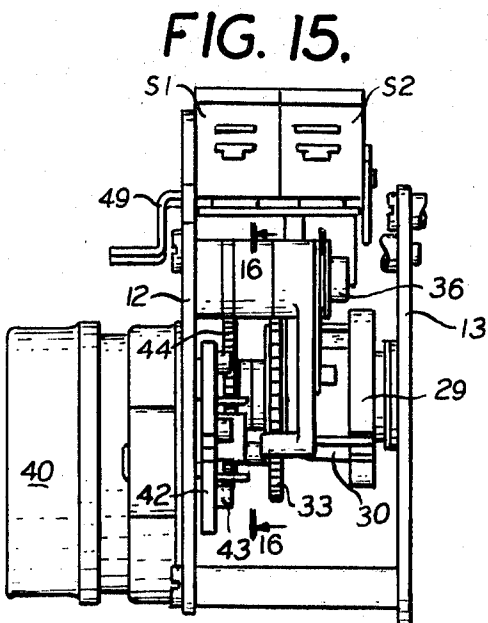
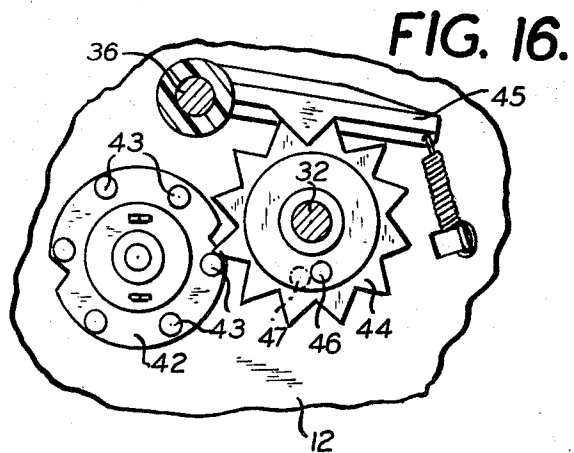


FIG. 10.





ROTARY COIN METER

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates in general to a coin meter, and more specifically to a coin meter for controlling the operating cycle of a coin operated, controlled device in accordance with the value of the coins deposited.

Coin operated machines in common use, for example, washing machines and driers, are provided with coin meters which require the insertion of a coin before the operating cycle of the machine is initiated, and use electrically operated timers to terminate the operating cycle. Examples of prior art coin meters are presented by the U.S. Pats. Nos. 2,915,692, 3,168,947, and 3,172,520.

While there are many instances where it is desirable to operate a machine cycle using only coins of the same denomination, greater flexibility can be achieved with a coin meter that can accept coins of different denominations to purchase a machine cycle length corresponding to the value of the coin deposited, as for example, a choice of 10 minutes of machine operation for a dime or 30 minutes operation for a quarter.

Furthermore, even in cases where the machine cycle length is to remain fixed, it is more practical to have a coin meter that can handle coins of two different denominations than to set the per cycle operation price to a value that can be made up with coins of the same denomination. For example, the invention provides a coin meter that requires 35 cents for operation, and which accepts a quarter and dime combination deposited one at a time in sequence. With currently available United States coins, restriction to a single denomination, exclusive of pennies, would require a coin meter capable of counting seven nickels in order to keep a 35 cents price. Apart from the coin storage problems resulting from such single coin type restriction, there would be the competitive disadvantage of limiting the sale of machine service to users having the rather large number of nickels at hand.

The invention presents an improved rotary coin meter having a rotary coin carrier that accepts and deposits coins of different denominations, one at a time. This coin carrier is coupled, when a coin is inserted, to a rotary time-setting member that establishes the operating cycle duration of the controlled device, such as a drier, according to the value of the coins deposited. Initiation and termination of the operating cycle is effected by switches controlled by a timer cooperating with the time-setting member.

The time setting member has a multiplicity of cam teeth which cooperate with a follower lever used to actuate the switches, and which also engage a ratchet mechanism driven by the coin carrier to advance the time-setting member.

According to a preferred embodiment of the invention, the coin carrier is designed to accept coins of two different denominations, one lesser in value than the other, and is so constructed and arranged that the coin carrier rotation required for deposit of the lesser value coin effects a one-tooth advancement of the time-setting member, and that the coin carrier rotation required for deposit of the higher value coin effects an integral multiple-tooth advancement of the time setting member, as for example, deposit of a dime will produce a one-tooth advancement, and deposit of a quarter will

produce a three-teeth advancement of the time setting member. Through the use of a coin slot mask and a time-setter tooth mask, the basic coin meter structure of the invention can be converted from selectable cycle length, two price operation to fixed cycle length and price operation.

The timer used in connection with the invention has an electrically operated clock motor that turns a star wheel bearing a projecting pin arranged to engage a similar projecting pin borne by the time-setting member, when the cycle is terminated. When the two pins engage, the star wheel turns the time-setting members a fraction of a tooth to shift the follower lever to a position in which a switch opens to stop the clock motor and interrupt power to the controlled device. Thus, at the end of one cycle, and the beginning of the new cycle, the timer clock is stopped and power to the controlled device is off. To initiate the new cycle, the coin carrier is turned to deposit a coin and advance the time-setting member so that its pin is separated from the star wheel pin by an angular distance corresponding to the amount deposited. A cam surface on the ratchet plate which indexes the time-setting member keeps the follower lever in a switch off position until the coin carrier is returned to its starting position, so that the cycle does not begin until after coin deposit is completed.

For a better understanding of the invention, reference should be had to the following detailed description and accompanying drawing which together illustrate and exemplify certain preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a front elevation view of a rotary coin meter constructed in accordance with a preferred embodiment of the invention.

FIG. 2 is a right side elevation view of the coin meter shown in FIG. 1.

FIG. 3 is sectional view of the coin meter shown in FIG. 1 taken along line 3—3 therein.

FIG. 4 is a sectional view of the coin meter taken along line 4—4 of FIG. 2, and showing the rotary coin carrier in its coin receiving position.

FIG. 5 is a sectional view of the coin meter taken along line 5—5 of FIG. 2.

FIG. 6 is a sectional view of the coin meter taken along line 6—6 of FIG. 2.

FIG. 7 is a sectional view of the coin meter taken along line 7—7 of FIG. 2.

FIG. 8 is a sectional view of the coin meter taken along line 8—8 of FIG. 1.

FIG. 9 is a sectional view of the coin meter taken along line 9—9 of FIG. 1.

FIG. 10 is a sectional view of the coin meter taken along line 10—10 of FIG. 1.

FIG. 11 is a sectional view of the coin meter similar to FIG. 4 but showing the rotary coin carrier in its dime depositing position.

FIG. 12 is a sectional view of the coin meter similar to FIG. 11 but showing the rotary coin carrier turned past a coin trap spring.

FIG. 13 is a detail frontal view of a ratchet plate used in the coin meter for advancing the time-setting member thereof.

FIG. 14 is a side view of the ratchet plate shown in FIG. 13.

FIG. 15 is a side elevation view of a sub-assembly of the coin meter which contains the timer, time-setting, and switching elements thereof.

FIG. 16 is a sectional view of the sub-assembly shown in FIG. 15 taken along line 16—16 therein.

FIG. 17 is a front elevation view of a rotary coin meter according to another embodiment of the invention, and which is adapted for use in devices requiring deposit of two different coins for operation.

FIG. 18 is a sectional view of the coin meter shown in FIG. 17, taken in a manner similar to FIG. 4, and showing the arrangement of a coin slot mask used in conjunction with the rotary coin carrier.

FIG. 19 is a detail view showing the configuration of the coin slot mask in FIGS. 17 and 18.

FIG. 20 is a detail section view of a portion of the coin meter shown in FIG. 17 and illustrating the operation of the coin slot mask.

FIG. 21 is a sectional view of the coin meter shown in FIG. 17, taken in a manner similar to FIG. 7, and showing the time setting member equipped with an adapter plate that prevents initiation of the operating cycle until both coins are deposited.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

In FIGS. 1-16 there is exemplified a rotary coin meter 10 which is adapted for operation with coins of two different denominations, namely dimes and quarters, and which will give a selection of operating cycle length according to the amount deposited.

As better seen in FIGS. 1, 2 and 4, coin meter 10 has a precast front plate 11, a back plate 12 and divider plate 13 interconnected in spaced-apart relation to form a base structure for the several working parts of the meter 10. On plate 11, there are projecting parts defining a coin discharge slot 14, a slot 15 for the insertion of quarters, and a slot 16 for the insertion of dimes. Behind plate 11 and supported thereby for limited rotary movement relative thereto, is a coin carrier 17 which is biased into a starting position against a mechanical stop 18 by a spring 19, as illustrated in FIG. 4. From the details presented in FIG. 3, it can be noted that carrier 17 is connected to a knob 20 by a shaft 21 extending through plate 11, the knob 20 enabling the user to turn carrier 17 clockwise until, at its maximum degree of rotation, a projecting edge portion 17A thereof bears against mechanical stop 18A.

Carrier 17 has two sets of coin-receiving parts 22, 23 that hold the coin generally perpendicular to plates 11 and 13 for bearing against a yoke 24, the parts 22 being arranged to hold a quarter 25 (shown in phantom in FIG. 5) to bear against edge 26 of yoke 24, and the parts 23 being arranged to hold a dime 27 (shown in phantom) to bear against lug 28 of yoke 24. The coin inserted, whether it be a dime or quarter, serves to complete a coupling between carrier 17 and yoke 24, which is supported by plate 13 for rotary movement relative thereto. On the other side of plate 13, a slotted spanner 29, shown in FIG. 6, which is a part of yoke 24, receives lugs 30 extending from a ratchet plate 31 (shown in FIGS. 14 and 15). Ratchet plate 31 is mounted on a shaft 32 for rotation thereto, and serves to stepwise advance a ratchet wheel 33 also mounted for rotation on shaft 32. Ratchet wheel 33 serves as a time-setting member and has a plurality of cam teeth 34 disposed for engagement with a follower lever 35

pivotally supported from back plate 12 on a shaft 36 which also supports a pawl 37 spring-loaded against ratchet wheel 33.

When a dime is inserted and deposited by turning knob 20 clockwise through an angular distance corresponding to the angular spacing between slots 16 and 14, the carrier 17, yoke 24 and ratchet plate 31 turn in unison, until the dime bears against an edge portion of slot 14 preventing further rotation of carrier 17, yoke 24 and ratchet plate 31. The dime then drops through slot 14, as shown in FIG. 11, after which further clockwise movement of carrier 17 has no effect in moving either yoke 24 or ratchet plate 31 clockwise. When knob 20 is released, spring 19 returns carrier 17 counter-clockwise to its starting position, and both yoke 24 and ratchet plate 31 are returned to similar starting positions, through pushing forces exerted by lug 38 against lug 39 of yoke 24. In summary, the action of carrier 17 in depositing a dime results in a clockwise advancement of ratchet wheel 33 by plate 31 through an angular distance defined by one tooth 34.

When a quarter is deposited, as shown in FIG. 12, carrier 17 is turned through a greater distance to its maximum degree of rotation as defined by the projecting edge portion 17A of coin carrier 17 bearing against mechanical stop 18A; whereupon the quarter then drops through slot 14. In other words, the construction and orientation is such that when coin carrier 17 is turned to its maximum degree of rotation, the quarter coin is positioned to drop through slot 14. The extent of rotation of carrier 17 is chosen so as to effect a clockwise advancement of ratchet wheel 33 through an angular distance of three teeth 34.

It should be noted that in the absence of a coin inserted into carrier 17, no advancement of ratchet wheel 33 can be effected by turning the knob 20 because without a coin, carrier 17 and yoke 24 are uncoupled for clockwise movement, and because of the ratchet plate 31 and pawl 37 combination, counterclockwise movement of yoke 24 back to its starting position produces no movement of ratchet wheel 33.

From the foregoing, it can be appreciated that the coin carrier 17 in depositing either type of coin moves through an angular distance corresponding to the value of such coin, and that the time-setting wheel 33 is coupled to carrier 17 for advancement thereby in accordance with the movement thereof, and the amount of angular advancement of wheel 33 likewise corresponds to the value of the coin deposited, i.e. one tooth for a dime, three teeth for a quarter. According to the concept of the invention, the angular distance through which wheel 33 is advanced is translated into the operating cycle duration of a controlled device, such as a drier (not shown).

For example, in a typical application, the basic unit of cycle time is set at ten minutes per tooth 34 of wheel 33, which sets 10 minutes as the cycle length for a dime, thirty minutes as the cycle length for a quarter, and a maximum cycle length equal to 10 minutes multiplied by the number of teeth 34 on wheel 33, cycle lengths other than exactly 10 or 30 minutes being obtained by depositing appropriate combinations of dimes and quarters.

The translation of wheel 33 displacement into cycle length settings corresponding to the value of the coin or coins deposited is achieved through a timer mechanism that cooperates with the time-setting wheel 33 to

control the operation of a combination of switches S1 and S2 that are actuated by follower lever 35.

Switches S1 and S2 are operable to initiate and terminate the operating cycle of the controlled device.

The timer mechanism employed by the invention has an electrically operated clock motor 40 having an output shaft that expediently turns at a speed of one revolution every sixty minutes, carrying a wheel 42 with six equally spaced pins 43 disposed for engagement with a star wheel 44 mounted for rotation upon shaft 32, as better seen in FIGS. 15 and 16. A spring loaded index lever 45 pivoted on shaft 36 engages star wheel 44 to assure positive advancement thereof when driven by pins 43 of wheel 42.

On star wheel 44 there is a pin 46 projecting toward time-setting wheel 33, and disposed for engagement with a similar pin 47 projecting from wheel 33 toward wheel 44. This engagement of pins 46 and 47 occurs at the end of the operating cycle.

As time-setting wheel 33 is advanced by any one tooth 34, the follower 35 passes through three predetermined switch actuation positions in succession, a bottom position in which lug 48 of follower 35 contacts the bottom of the valley between consecutive teeth 34, a mid-position in which lug 48 contacts the tooth 34 at approximately its mid-height, and a top-cam position in which lug 48 contacts the top portion of tooth 34.

Switches S1 and S2 are electrically connected in series and mechanically operated by a common pivot lever 49 driven by follower 35. The switches S1 and S2 are so arranged that when follower 35 is at its bottom-cam position, both switches S1, S2 are closed to apply power to the controlled device and clock motor 40 concurrently, and when follower 35 is at its mid-cam position, switch S1 is open, switch S2 is closed thereby interrupting power to both clock motor 40 and the controlled device, and when follower 35 is at its top-cam position, both switches S1 and S2 are open to interrupt power to both clock motor 40 and the controlled device.

At the beginning of each new operating cycle, before any coin is deposited, time-setting wheel 33 is turned such that follower 35 is at the mid-cam position, and power to clock motor 40 and the controlled device is off.

As wheel 33 is advanced by deposit of a coin or coins, follower 35 rises to the top-cam position and is held there by a cam edge 50 on ratchet plate 31 that bears against lug 48 until knob 20 and plate 31 are returned to their starting positions. This feature assures that neither the initiation of the operating cycle nor the timing of the cycle will occur until after the coins are deposited. It should be noted that cam edge 50 extends over a circumference sufficient to span at least two valleys and preferably a portion of three consecutive teeth, so that when wheel 33 is indexed three teeth 34 by deposit of a quarter, follower 35 will not drop to the bottom-cam position until after passing the third tooth 34 and until knob 20 and plate 31 are returned to their starting position.

When deposit of either a dime or quarter is completed, and knob 20 is at its starting position, follower 35 drops to its bottom-cam position and the operating cycle commences as does the running of clock motor 40.

The advancement of wheel 33 by coin deposit establishes an angular separation between the reference pins

46 and 47 on wheels 33 and 44 respectively. This angular separation corresponds to the operating cycle length purchased, and decreases with the running of motor 40 such that at the end of the cycle, pin 46 engages pin 47 and the motor driven wheel 44 turns wheel 33 ahead by a fraction of a tooth 34 until follower 35 is raised to the mid-cam position. Upon arrival of follower 35 at the mid-cam position, power to the controlled device is interrupted and motor 40 is automatically stopped.

In FIGS. 17-21 there is shown a rotary coin meter 10' which is basically similar in structure and operation to the coin meter 10, except for certain features which adapt meter 10' for fixed cycle length and price operation.

Meter 10' is essentially a modification of the meter 10 whereby a total of 35 cents, or one quarter and one dime deposited in succession, is required for operating the controlled device.

To assure that both types of coins are deposited in sequence, there is provided a coin slot mask 51, shown in FIG. 19 that is rotatably advanced in accordance with the movement of coin carrier 17 by means of a spring-loaded latch 52 carried by yoke 24 and disposed to engage mask 51 at the edges of apertures 53 provided therein. Mask 51 has radial slots 54A, 54B, 54C and is arranged for rotation about shaft 21 such that first the quarter slot 15 will be covered by mask 51, and one of mask slots 54A-C will be aligned with the dime slot 16 to allow insertion of a dime but prevent insertion of a quarter, and after deposit of the dime, one of mask slots 54A-C will be aligned with the quarter slot 15 to allow insertion of a quarter, and slot 16 will be covered to prevent insertion of a dime, until after the quarter is deposited. Alignment of mask 51 with slots 15 and 16 in cyclical sequence is assured by a detent spring 55 that engages into peripheral notches 56 on mask 51. FIG. 20 shows how mask 51 is positioned to block insertion of a coin in the wrong slot 15 or 16.

In coin meter 10', the operating cycle does not commence until both the quarter and dime have been deposited, and there is no option available to purchase a shorter cycle by deposit of a single coin, as in the case of meter 10. To achieve such result, the time-setting wheel 33 is equipped with an adapter plate 57 that prevents initiation of the operating cycle until both coins are deposited. Adapter plate 57 is mounted on shaft 32 for rotation in unison with time-setting wheel 33, and has notches 58 spaced apart in alignment with cam teeth 34 such that the edge portions of plate 57 between notches 58 engage lug 48 to keep follower 35 raised to the top-cam position and the notches 58 allow follower 35 to drop to the bottom-cam position each time wheel 33 is advanced by four teeth 34. Thus, deposit of a dime alone will advance wheel 33 only one tooth 34, and deposit of a quarter alone will advance wheel 33 only three teeth 34, which is insufficient to bring follower 35 to the bottom-cam position for initiating the cycle. Only deposit of the required two-coin combination will effect the cumulative four teeth 34 advancement of wheel 33 to set follower 35 at the bottom-cam position.

It should be noted that the coin meter 10' can be readily converted to a coin meter 10 by removal of adapter plate 57 and coin slot mask 51.

While specific embodiments of the invention have been shown and described in detail to illustrate the ap-

plication of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. In a rotary coin meter, the improvement which comprises a rotary coin carrier disposed to accept successive coins of different denominations and for repeated angular movements to deposit such coins, carried one at a time, in succession, mask means disposed for movement in accordance with the movement of said coin carrier to obstruct the insertion into the coin carrier of a coin of one denomination until a coin of another denomination has been deposited, the angular distance of each movement corresponding to the value of the coin carried, a time-setting member coupled to said coin carrier for advancement thereby in accordance with the movement thereof to establish the oper-

ating cycle duration of a controlled device, the duration of the cycle corresponding to the total value of the coins deposited, switch means operable to initiate and terminate the operating cycle of such controlled device, and timer means cooperating with said time-setting member to control the operation of said switch means to initiate said operating cycle after deposit of the coins by said coin carrier, and to terminate said operating cycle at the expiration of the time duration established by said time-setting member.

2. The improvement according to claim 1 including means associated with said time-setting member and movable therewith to inhibit initiation of the operating cycle by said switch means until a predetermined combination of coins have been deposited.

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