United States Patent [19]

Zajac et al.

[11] **3,738,467**

[45] **June 12, 1973**

[54] **TIME PURCHASE WINDING MEANS FOR PARKING METERS**

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[21] Appl. No.: **207,355**

[52] **U.S. Cl.** **194.72,** 194/DIG. 22

[51] **Int. Cl.** **G07c 1/30**

[58] **Field of Search** ..... 194/72, 83, 84, DIG. 22, 194/61

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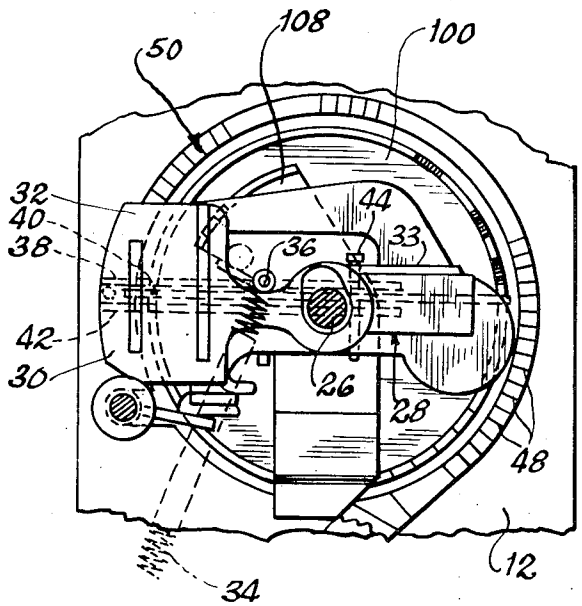
Assistant Examiner—David A. Scherbel
Attorney—McDougall, Hersh & Scott

[57] **ABSTRACT**

A meter construction wherein purchased time is obtained 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 an auxiliary winding arm operatively connected to the winding means. A winding disc is directly tied to the winding means whereby driving engagement of the winding arm with the disc will result in the purchase of time. The winding disc defines teeth which are moved into position after the initial purchase of time so that the subsequent insertion of a coin results in engagement of the pawl directly with the disc for purchase of additional time.

18 Claims, 34 Drawing Figures



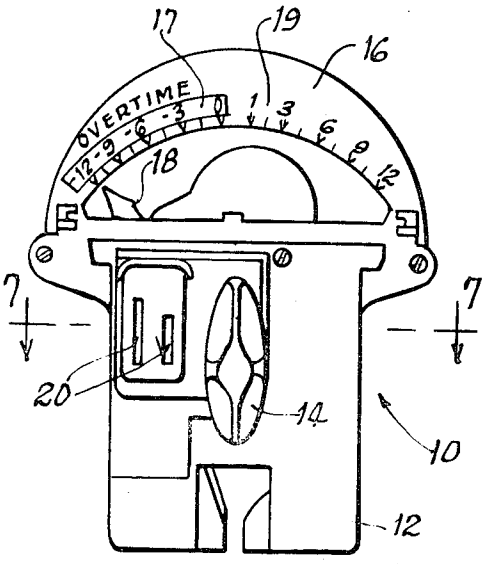


FIG. 1

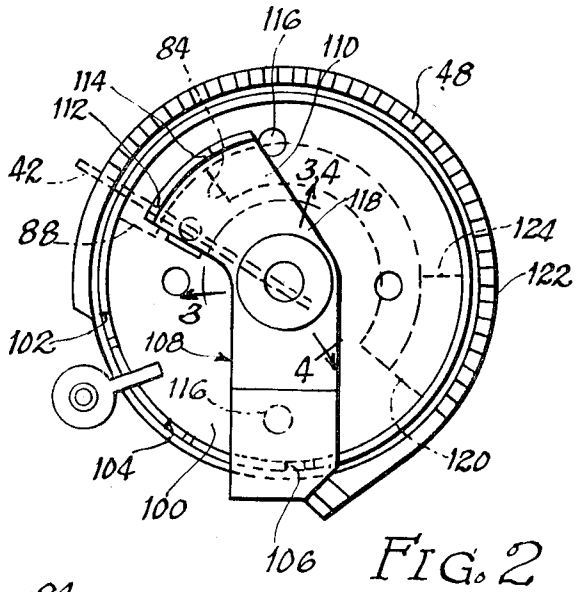


FIG. 2

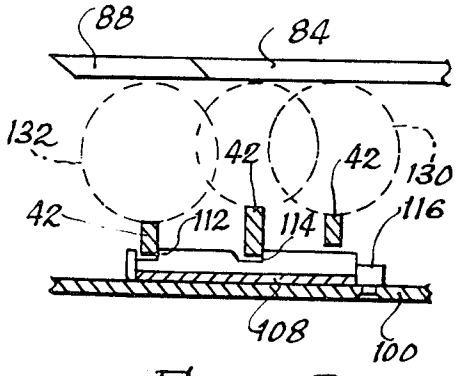


FIG. 3

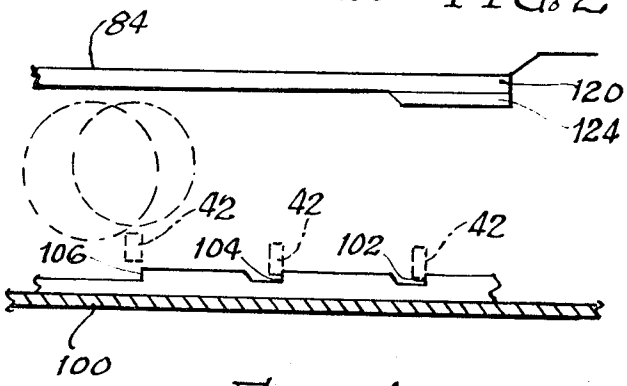


FIG. 4

FIG. 5

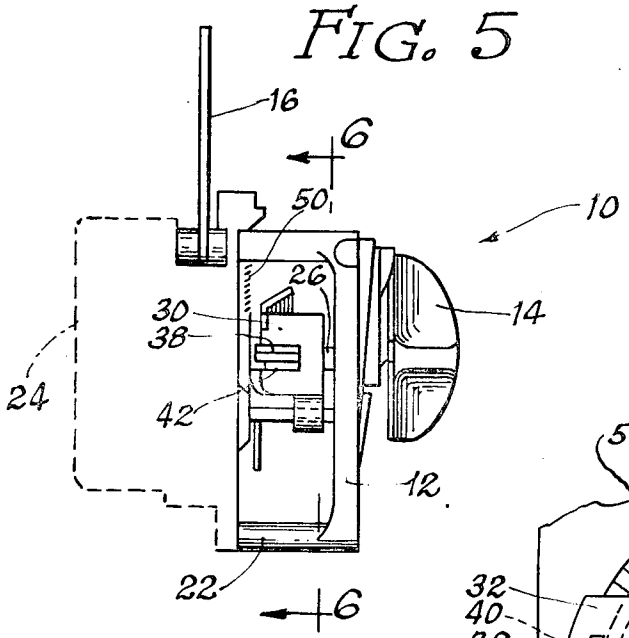
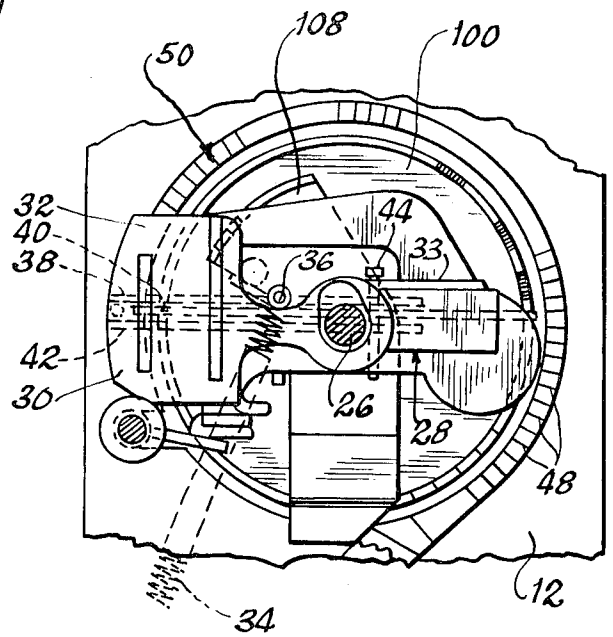


FIG. 6



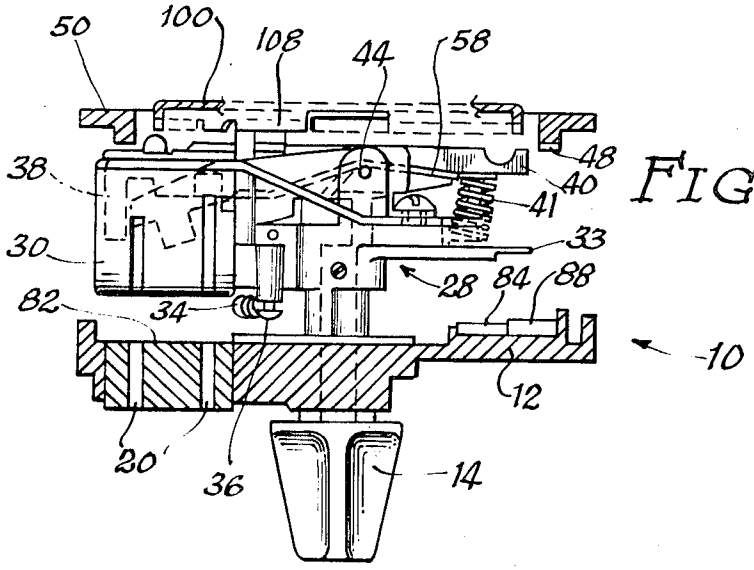


FIG. 7

FIG. 8

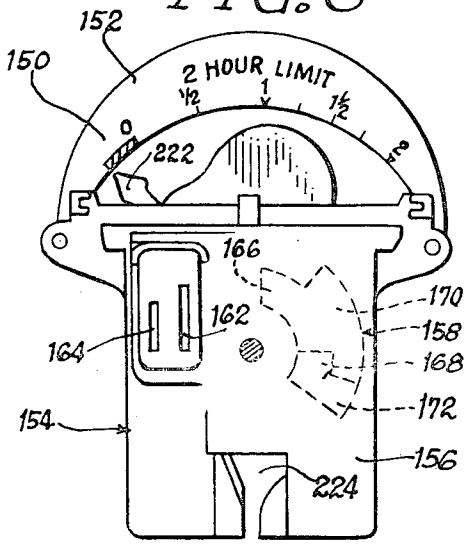


FIG. 11

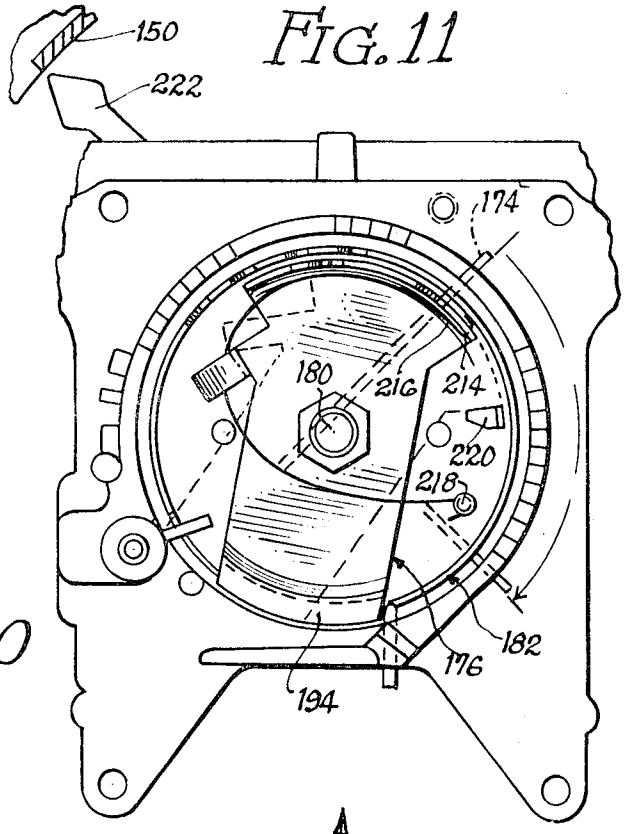


FIG. 9

FIG. 10

FIG. 12

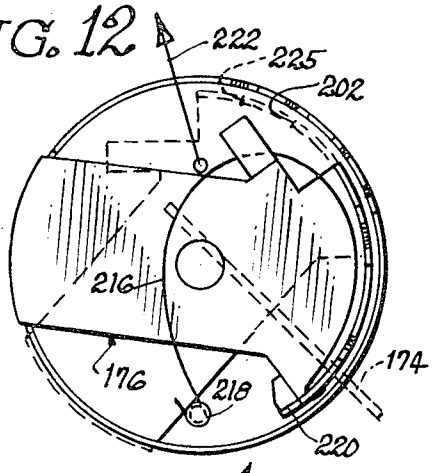


FIG. 13

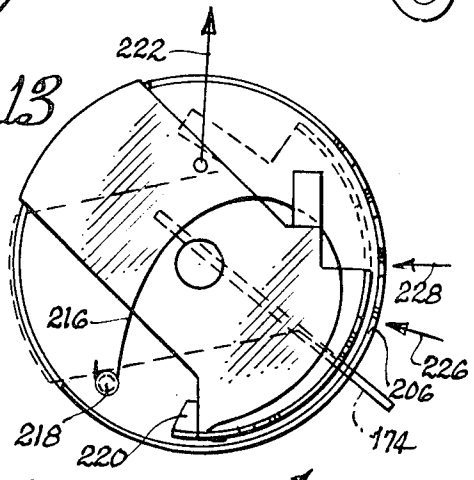
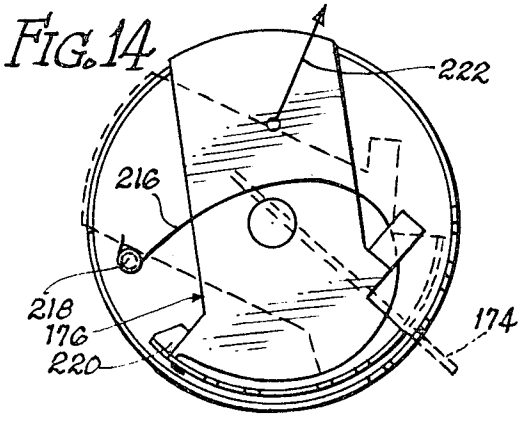


FIG. 14



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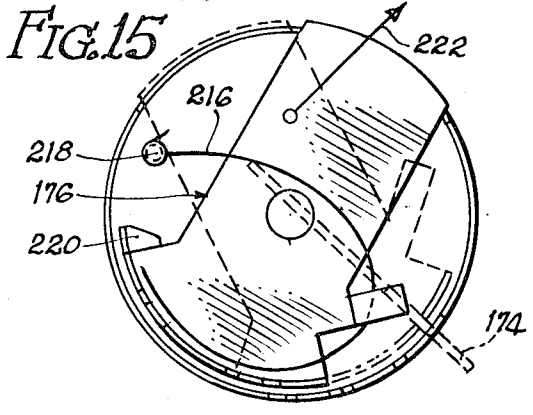


FIG. 16

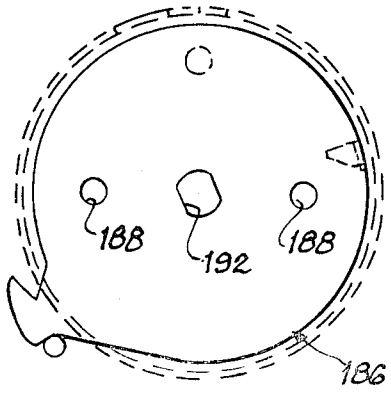
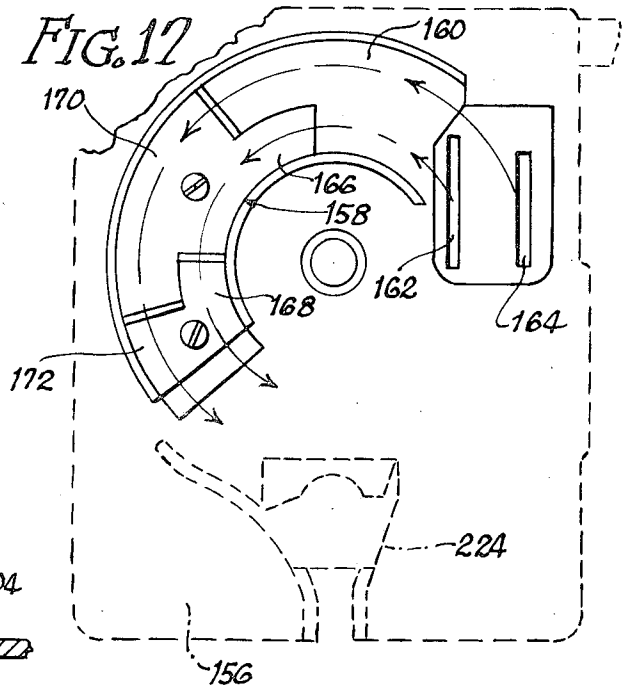


FIG. 17



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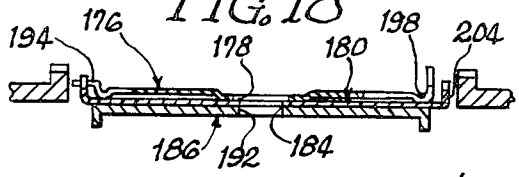


FIG. 19

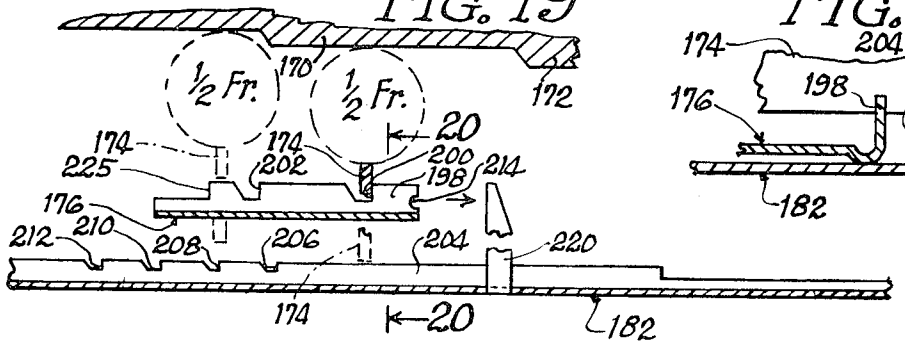


FIG. 20

FIG. 21

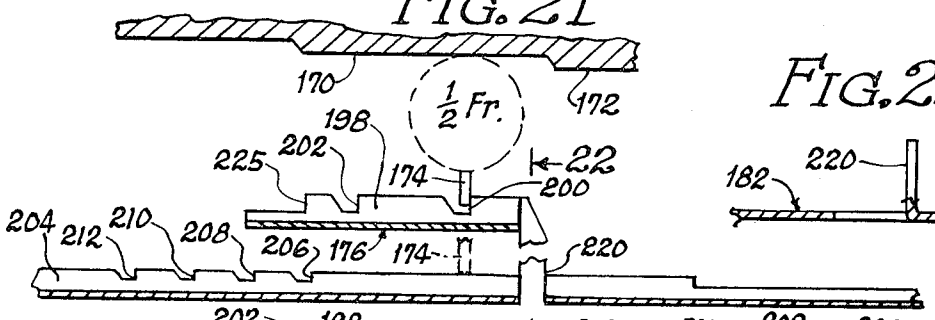


FIG. 22

FIG. 23

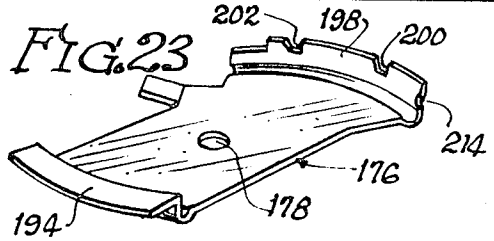


FIG. 24

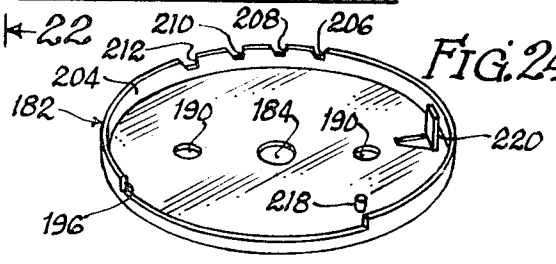


FIG. 25

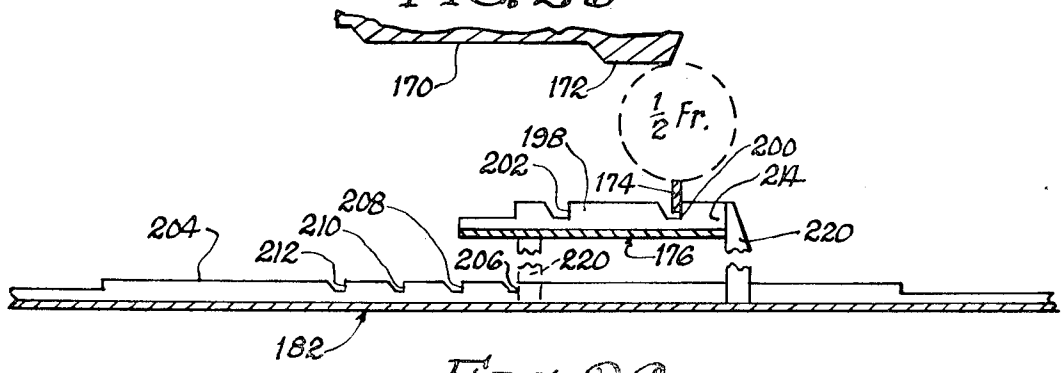


FIG. 26

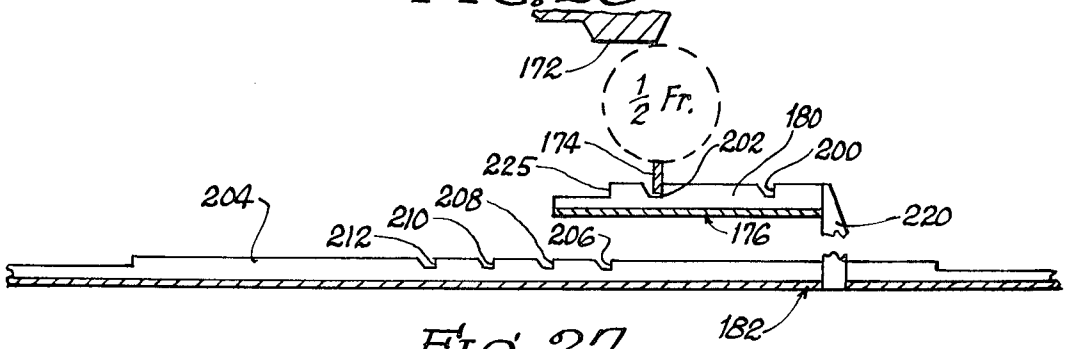
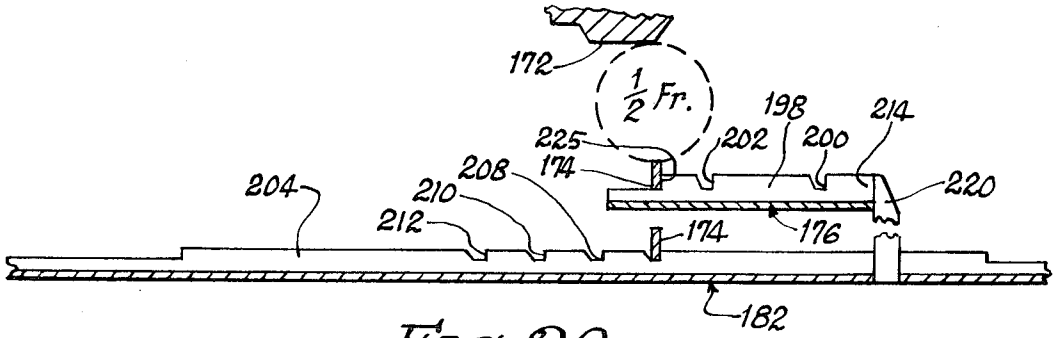


FIG. 27



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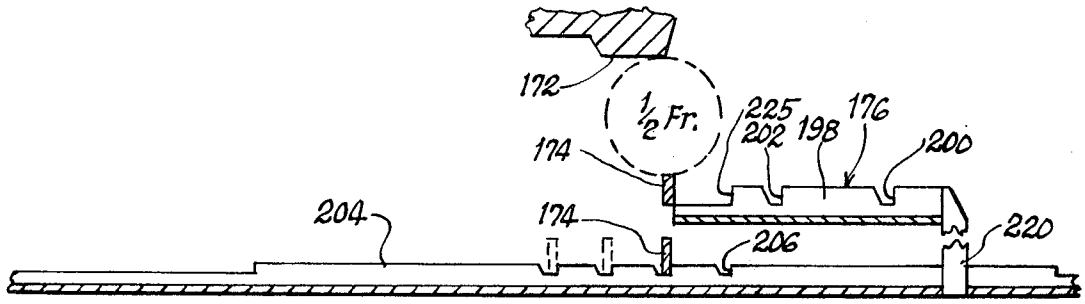


FIG. 29

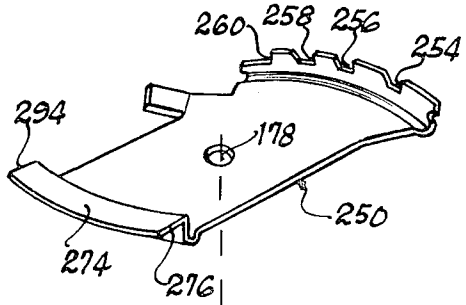


FIG. 31

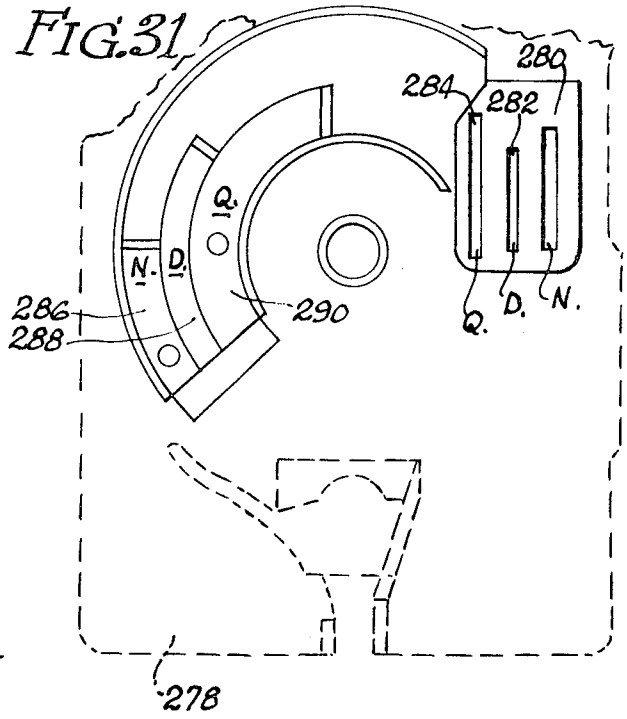


FIG. 30

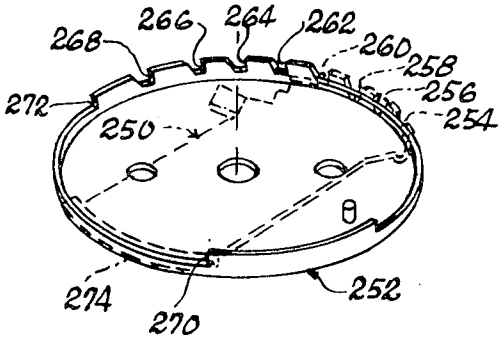


FIG. 33

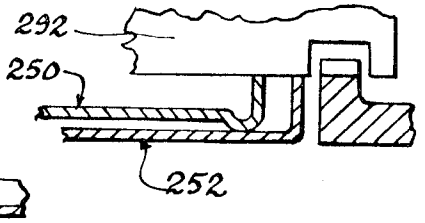


FIG. 32

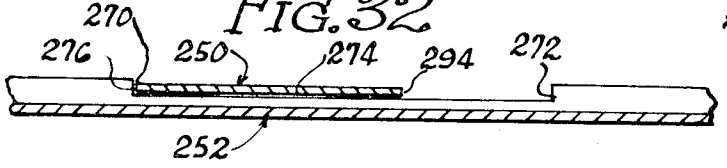
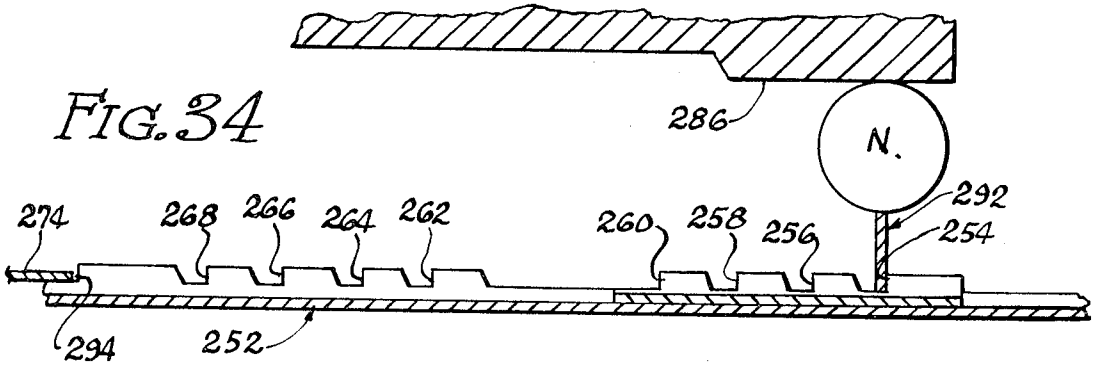


FIG. 34



TIME PURCHASE WINDING MEANS FOR PARKING METERS

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 one 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.

Some meters include an overtime parking feature. Thus a portion of the indicator for the meter provides a means for indicating the amount of excess time that a vehicle has used a parking space. The fine imposed can then be made proportional to the excess time.

In other meter applications, it has been found desirable to provide a large amount of time for the initial deposit of coins, and to then provide lesser amounts for later deposits. In this case, as with the overtime parking indication, it is necessary to provide a winding arrangement wherein the timer is wound a greater amount for the initial deposit than for a later deposit.

It is a general object of this invention to provide an improved meter mechanism including a winding arrangement wherein a greater degree of timer winding is achieved upon initial insertion of a coin than upon later insertion.

It is a more specific object of this invention to provide a meter mechanism which provides for different degrees of winding of the timer through the use of auxiliary winding means which can be incorporated in the meter while retaining the basis operating principles of the meter whereby the mechanism can be efficiently manufactured and maintained.

It is a further object of this invention to provide an improved meter mechanism particularly suitable for parking meters of the type having an overtime parking or differential rate parking feature.

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 one form of a time setting winding disc assembly utilized in the construction;

FIG. **3** is a cross-sectional view of the disc structures taken about the curved line **3—3** of FIG. **2**;

FIG. **4** is a cross-sectional view of the disc structure, as the disc structure appears after setting of time, taken about the curved line **4—4** of FIG. **2**;

FIG. **5** is a side elevational view of the meter construction shown in FIG. **1** with the outer housing removed;

FIG. **6** is an enlarged cross-sectional view taken about the line **6—6** of FIG. **5**;

FIG. **7** is an enlarged horizontal, sectional view taken about the line **7—7** of FIG. **1**;

FIG. **8** is a front elevational view of a parking meter construction modified to include an alternative version of the invention;

FIGS. **9** and **10** are perspective views of coins employed with this alternative form;

FIG. **11** is an enlarged plan view illustrating the time setting winding disc assembly utilized in the construction of FIG. **8**;

FIGS. **12** through **15** comprise plan views illustrating various positions of the winding disc assembly;

FIG. **16** is a plan view of a winding ring utilized in the construction;

FIG. **17** is a detailed view illustrating the segment arrangement mounted on the front wall of the meter construction;

FIG. **18** is a cross-sectional view of the winding disc assembly utilized in the construction;

FIG. **19** is a fragmentary, cross-sectional view of the winding disc structure with the auxiliary and main disc portions being separated for clarity;

FIG. **20** is a fragmentary, sectional view taken about the line **20—20** of FIG. **19**;

FIG. **21** is a fragmentary, cross-sectional view of the winding disc structure with the auxiliary and main disc portions being separated for clarity;

FIG. **22** is a fragmentary cross-sectional view taken about the line **22—22** of FIG. **21**;

FIG. **23** is a perspective view of the auxiliary discs utilized in the construction;

FIG. **24** is a perspective view of the main winding disc;

FIGS. **25** through **28** are fragmentary, cross-sectional views illustrating the disc relationship at various stages of the meter operation with the auxiliary and main disc members being separated for clarity;

FIG. **29** is a perspective view of a modified auxiliary winding disc;

FIG. **30** is a perspective view of a modified main winding disc employed with the disc of FIG. **29**;

FIG. **31** is an elevational view illustrating the segment arrangement employed with the discs of FIGS. **29** and **30**;

FIG. **32** is a fragmentary cross-sectional view illustrating the assembled discs of FIGS. **29** and **30**;

FIG. **33** is an additional fragmentary cross-sectional view of the assembled discs; and,

FIG. **34** is an additional fragmentary cross-sectional view of the discs shown in association with a segment and coin.

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 ring or other 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 mechanism comprises an assembly including a rotatable member preferably in the form of a winding disc and an auxiliary winding arm mounted for movement relative to the disc. The winding disc is tied to the clock mechanism so that movement of this disc will set the clock for a period of time proportional to the amount of movement. Both the disc and auxiliary arm include teeth which are adapted to be engaged by the pawl

means in response to the insertion of an appropriate coin into the meter.

The constructions of the invention are designed so that the initial insertion of a coin will cause the pawl means to engage the auxiliary arm. This auxiliary arm is initially adapted to impart movement to the winding disc to thereby set the clock mechanism. This movement of the winding disc operates to shift the position of the teeth on the winding disc so that subsequent insertion of a coin will result in direct engagement of the pawl means with the teeth of the winding disc. By employing the auxiliary arm in the manner to be described, the degree of movement of the winding disc upon initial insertion of a coin can be significantly different than the degree of movement upon subsequent insertion of a coin. This provides a highly efficient means for constructing meters having an overtime parking feature, or providing different rates for time purchased. Thus, the meters can be set so that the initial insertion of a coin will set the clock mechanism for a relatively long period of operation while the subsequent insertion of a coin will provide a reduced degree of setting of the clock mechanism. The invention will be particularly described with reference to overtime parking meters; however, it will be obvious that the arrangements are applicable to other meter designs.

FIGS. **1** and **5** through **7** illustrate a 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.

The indicator dial **16** includes a first section **17** which provides for an indication of the amount of overtime parking. As will be explained, the initial insertion of a coin will result in movement of the pointer **18** across the entire section **17,** and into the purchased time area **19.** If, for example, three hours of purchased time is obtained, the clock mechanism will actually be set for 15 hours of operation, the first 3 hours being purchased time, and the remaining clock movement indicating the amount of time that the meter has been used beyond the purchased time.

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 FIGS. **6** and **7.**

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 areas are defined on the inner edges of the pawl member **38** so that the pawl will not interfere with coins inserted into the meter. The pawl member **42** includes an engaging end which is adapted to engage the teeth of the timer winding members to be described.

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 wit 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 wit 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 will be in position to engage a tooth of the winding members. Continued rotation of the handle **14** will therefore result in corresponding rotation of the winding member. Depending on the winding member engaged and the length of the segments **84** and **88,** the degree of rotation of the winding member will determine the time purchased. 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.**

As indicated, the pawl **42** engages teeth of winding members for purposes of setting time on the meter. The winding members comprise a rotatable disc **100** defining teeth **102, 104** and **106.** The disc **100** is directly tied to the clock mechanism and, accordingly, setting of time on the meter will only occur when this disc is rotated.

A rotatable arm **108** is positioned for movement over the surface of the disc **100**, these members being coaxially mounted. One extension **110** of the arm includes an up-turned flange defining a pair of teeth **112** and **114**. When the clock mechanism is completely wound down with the indicator in the position shown in FIG. **1**, then the disc **100** and arm **108** are in the positions shown in FIG. **2**. The disc **100** carries a post **116** which engages the edge **118** of the arm **108** when these members are in this position.

In accordance with conventional operation, the position of the pawl **42** is controlled by the presence of a coin in the coin carrier **30**. When a coin of proper denomination is in the coin carrier, the coin is carried over the surface **82** during rotation of the handle **14**. When the coin engages a segment or rides on the surface, it will then drive the pawl **42** toward teeth located for engagement by the pawl. In the structure of this invention, a first segment **88** is located for engagement by coins inserted in the outermost slot **20** while a second segment **84** is located for engagement by coins in the inner slot. For purposes of this description, it will be assumed that the outer slot **20** is provided for receiving a nickel and the inner slot for receiving a penny. It will also be assumed that the initial insertion of a nickel entitles the user to three hours of time, and the initial insertion of a penny to one hour of time.

With the meter in the position illustrated in FIGS. **1** and **2**, the insertion of a nickel and the rotation of the handle will cause the pawl **42** to engage the tooth **112** of arm **108**. Thus, the segment **88** drives the coin and pawl toward the arm just before the pawl passes the tooth **112**.

Continued rotation of the handle drives the arm **108** against the post **116** for rotation of the winding disc **100**. This rotation of the disc continues until the end **120** of the segment is reached. In the embodiment illustrated, this amounts to the rotation of the disc through 187 ½° with the post **116** ending in the dotted line position shown toward the bottom of FIG. **2**. When the end of the segment is reached, the coin drops out for collection which releases the pawl **38** from the ratchet teeth **48** for return of the coin carrier to the starting position. The disc **100**, of course, begins its return as the clock winds down.

The structure illustrated is set for 1 hour of clock movement for each 12 ½° of winding. Accordingly, the 187 ½° movement provides for winding through 12 hours of overtime (150°) and 3 hours of purchased time (37 ½°). Additional 3-hour periods of purchased time are then available upon insertion of additional nickels. This is accomplished by means of the teeth **102, 104** and **106** which have been moved 187 ½° along with the disc **100**. This locates the tooth **102** in the position **122** shown at the right-hand side of FIG. **2**, and the teeth **104** and **106** are located, respectively, 37 ½° and 75° behind the tooth **122**. To accomplish the purchase of additional time, a second nickel is inserted and, as before, the pawl will engage the auxiliary arm **108**. Thus, this arm will return to the position shown in FIG. **2** after each operation, and the arm may be spring loaded or driven by the coin carrier to accomplish this. Movement of the arm will not, however, result in any time setting since there is no engagement with the post **116**.

As the movement continues, the nickel will reach an additional segment **124** which is formed over the segment **88**. This drives the pawl **42** further toward the disc **100** and into engagement with the tooth **102**. The distance from this point of engagement to the end **120** of the segments is 37 ½° resulting in the purchase of three additional hours. The winding of the disc **100** results in movement of tooth **104** into the position **122** whereby three more hours can be purchased, and in such case, the tooth **106** will be driven to the position **122** for the purchase of 3 additional hours.

It will be appreciated that the combination of the auxiliary arm and disc provides for an initial wind of a considerable amount, and one or more winds of a substantially lesser amount even though a coin of the same denomination is inserted for each wind. The structure also provides a similar result where a coin of different denomination is inserted. In the embodiment illustrated, the inner slot **20** will receive a penny, and the segment **84** is located in line with the path of movement of the penny. This segment will cause the pawl **42** to engage the second tooth **114** on the arm **108**. This second tooth is displaced 25° with respect to the tooth **112** so that full rotation will rotate the disc **100** 162 ½°. Accordingly, the clock will wind through the overtime zone (150°) and through 1 hour of purchased time (12 ½°).

The illustrated structure is designed so that the user cannot use a penny to purchase time after a nickel has been used. Thus, the segment **124** is only positioned over segment **88** and, therefore a penny will have no affect on the winding operation once the post **116** has been moved beyond a position for engagement by the arm **108**. The addition of a penny immediately after the first penny will not lead to the purchase of any additional time since the penny will drop out of the coin carrier at the same time that the arm **108** reaches the position of the post **116**.

The addition of a nickel immediately after the insertion of a penny will result in the purchase of only 2 hours of time since the arm **108** cannot move the post **116** beyond the dotted line position shown in FIG. **2**. Accordingly, the meter design is such that a penny can only be practically used where the purchaser of time desires only 1 hour of time.

The meter also effectively limits the amount of time that can be purchased when the timing mechanism is only partially run down. Thus, when a user leaves a parking space with less than 3 hours purchased time remaining on the meter or when the pointer **18** is still in the overtime section, then the initial insertion of a nickel will only result in a display of 3 hours purchased time. Thus, the nickel will cause the pawl **42** to engage the arm **108**, and it will drive the arm to the position of the post **116**. Continued rotation will then move the post to the dotted line position in FIG. **2** at which time, the nickel will be released. It will be appreciated that if the time remaining exceeds 3 hours, then the pawl **42** will pick up one of the teeth **102, 104, 106** whereby the next 3 hour increment of purchased time will show on the indicator.

Where the pointer **18** shows less than 1 hour of purchased time or where the pointer is in the overtime section, then the insertion of a penny will provide 1 hour of purchased time. Thus, the arm **108**, when picked up by a pawl engaged by a penny, can do no more than move the pointer to the 1 hour position.

In the meter construction illustrated in FIGS. **8–28**, an overtime and purchased time combination is also

employed. In this meter, the overtime portion of the construction is designated by the mark **150** on the dial **152** of the meter **154** shown in FIG. **8**. The mark **150** covers a 20-minute section of the dial, and the dial is otherwise marked to permit the purchase of 2 hours of time. In the example illustrated, one-half franc and 1 franc coins are used for the purchase of time; however, it will be apparent that the meter can be employed with coins of many different denominations.

The front wall **156** of the meter is provided with a segment assembly **158** on its interior surface as is the typical arrangement with meters of the type illustrated. As best shown in FIGS. **8** and **17**, the segments are located on a track **160** which begins adjacent the coin slots **162** and **164**. As in the case of the previously described construction, coins inserted in these slots are picked up by a coin carrier, and the edges of the coins ride on the track **160** when the user of the meter turns the meter handle. Depending on the coin inserted, a segment portion will be engaged to operate pawl means.

In the embodiment illustrated, the 1 franc coin is inserted through opening **162** for engagement with a segment portion **166**. A segment portion **168** which comprises a continuation of the portion **166** but which is raised relative thereto, is also engaged by the one franc coin. A ½ franc coin will ride on the track **160** until engagement with a segment portion **170** and then into engagement with the raised segment portion **172**.

As in the case of the previously described embodiment, the pawl structure which is moved in response to the presence of coins will engage an auxiliary winding member and a main winding member, the specific nature of the engagement depending upon the stage of the coin insertion sequence. The pawl which engages the winding members is designated by the numeral **174**, and it will be appreciated that this pawl structure will correspond with the structure **42** previously described.

The winding members comprise the structures illustrated in FIGS. **23** and **24**. The auxiliary winding arm or disc comprises a member **176** which defines a central opening **178** whereby this member can be mounted on a central post **180**. The arm **176** is dimensioned so that it can be received within the main winding disc **182**, this latter disc also defining a central opening **184** for receipt of the disc on the post **180**.

As best shown in FIGS. **16** and **18**, the arm **176** and disc **182** are positioned on a winding ring **186**. This winding ring is provided with upstanding bosses **188** which are received within openings **190** defined by the main disc **182**. Accordingly any movement of the disc **182** will result in corresponding movement of the winding ring **186** while the arm **176** is movable relative to these members. The winding ring defines a square opening **192**, and the winding shaft for a clock mechanism is received in this opening so that time will be set on the meter whenever the ring **186** is rotated.

The arm **176** defines an outwardly extending flange portion **194** which is received within a cutout section **196** defined by the disc **182**. Accordingly, the relative movement of the arm and disc is restricted by the extent of the cutout section **196**.

On the opposite side of the arm **176**, there is provided an upstanding flange **198** defining teeth **200** and **202**. The arm **176** is dimensioned so that these teeth are located radially inwardly relative to the side wall **204** of the main disc **182**. Teeth **206**, **208**, **210** and **212** are defined by this side wall, and as best shown in FIG. **18**, these teeth are at a lower level when compared with the teeth **200** and **202**.

The leading edge of the arm **176** defines a recessed portion **214** which is provide for receiving the end of a wire spring **216**. As best shown in FIGS. **11** through **15**, this spring extends to a post **218** which is attached to the main disc **182**. The spring operates to urge the arm **176** in a counterclockwise direction. As will be explained, engagement of the arm **176** by the pawl means will serve to rotate the arm in a clockwise direction in opposition to the spring **16**. This rotation will move the leading edge of the arm into engagement with a tab **220** formed on the main disc **182**.

FIG. **11** illustrates the positions of the arm **176** and disc **182** when the pointer **222** is at the extreme left-hand position of the dial **152**. The meter operation will be described with reference to the insertion of coins of one-half franc and 1 franc value, and for purposes of this description, it will be assumed that one-half franc will buy one-half hour of time on an expired meter with 1 franc buying 1 hour of time. A second one-half franc will purchase an additional one-half hour; however, continued use of ½ franc coins will purchase time only in 15 minute increments. Similarly, when 1 hour of time has been purchased with 1 franc, the addition of a second franc will result in the purchase of only an additional one-half hour of time as will be the case upon the insertion of a third franc. Irrespective of whether ½ franc or 1 franc coins are used in any combination, the purchase of 2 hours of time will cost a total of 3 francs. The operation also includes movement of the pointer **222** out of the overtime period.

When a ½ franc coin is inserted and the meter handle rotated, the edge of the coin moves along the track **160** into engagement with the segment portion **170**. This engagement occurs just prior to the position of the pawl **174** illustrated in FIG. **11**. Accordingly, the pawl moves into engagement with the tooth **200** of auxiliary arm **176** as is illustrated in FIG. **19**. As the meter handle rotation continues, the arm **176** moves into engagement with the tab **220** on the disc **182** (FIG. **21**). Continued movement then results in movement of the disc **182** to the position shown in FIGS. **12** and **25** at which point the end of segment portion **172** is reached whereby the pawl **174** will move out of engagement with the tooth **200**, the coin then dropping into the coin collection passage **224**.

The main disc **182**, being tied to the clock mechanism, will remain in the position shown in FIG. **12** subject only to return movement as the clock mechanism runs down. The auxiliary arm **176** will move back to the dotted line position shown in FIG. **12** in response to the action of spring **216**. This return movement is limited by the position of the post **218**. The pawl **174** will return with the coin carrier to its normal position opposite the coin slots.

The insertion of a second one-half franc, and the rotation of the handle will result in the engagement of the tooth **202** on the arm **176** by the pawl **174**. Thus, the arm **176** is positioned in FIG. **12** so that the tooth **202** will be engaged by the pawl as the coin reaches the segment portion **170**.

When the pawl catches the tooth **202**, the arm **176** is driven to the solid line position shown in FIG. **12** at which time the arm will engage the tab **220** on main disc **182**. Continued rotation will move the arm and

disc together until the coin and pawl reach the end of the segment portion **172.** This results in movement of the tab **220** to the point shown in FIGS. **13** and **26** thus providing an additional wind on the clock mechanism.

The segment portion **172** which is raised relative to the portion **170** is engaged during each insertion of a ½ franc piece. This does not, however, affect the operation described since the raised portion merely operates to drive the pawl **174** further toward the arm **176.** This will drive the pawl deeper into the groove adjacent the teeth **200** or **202,** and the pawl will bottom in the groove in which case the spring loading of the pawl will provide the necessary relief to permit continued movement of the coin over the segment portion **172.**

When a third one-half franc is inserted, the arm **176** will be in the dotted line position shown in FIG. **13.** In this position, the edge portion **225** on the arm is located beyond the leading end of the segment portion **170** so that the pawl **174** will engage this edge portion. At this point, however, the first tooth **206** on the main disc **182** is positioned beyond the leading end of the segment portion **172** (FIG. **26**). This leading end position is also designated by the arrow **226** in FIG. **13.**

The pawl **174** will be driven by the segment portion **172** toward the tooth **206** when the segment portion is reached. The pawl will then directly drive the disc **182** until the end of the segment portion resulting in additional time being purchased (FIG. **27**). This driving movement will move the next tooth **208** on the main disc into the position previously occupied by the tooth **206,** and the same sequence will occur when the next one-half franc is inserted. This will be repeated for the teeth **210** and **212** until a total of 6 one-half francs have been inserted (FIG. **28**). The action described results in the purchase of two hours of time with one-half hour being purchased by each of the first two and ½ franc pieces, and with 15 minutes being purchased by each of the next 4 ½ franc pieces.

The purchase of the first one-half hour of time is combined with the winding of an additional 20 minutes on the clock mechanism to provide an indication of overtime parking. In the embodiment illustrated, the clock mechanism is wound through 12 ½° for every 10 minutes of time. To accomplish the next amount of movement when the first one-half franc is inserted, the tab **220** on the disc **182** is positioned 62 ½° away from the end-of-wind position. Accordingly, engagement of the auxiliary arm by the pawl will move the tab and consequently the disc by this amount so that 50 minutes of winding is accomplished.

Once the tab is moved to the position shown in FIG. **12,** the next wind will only be 37 ½° to provide for the next one-half hour of purchased time. At this point, the first tooth **206** on the main disc has moved to a position 18 ¾° away from the end-of-wind position so that 15 minutes will be purchased by the next one-half franc. The teeth on the main disc are all 18 ¾° apart whereby additional increments of 15 minutes of time are purchased with each succeeding one-half franc.

A closely corresponding operation occurs when 1 franc pieces are employed. In that case, the segment portions **166** and **168** are engaged, and these portions are located so that the first franc will engage the second tooth **202** on the arm **176.** This tooth is angularly offset by 37 ½° from the tooth **200** so that 30 minutes more will be purchased than is the case with the ½ franc piece, specifically 80 minutes in the case of the first full franc inserted.

When a second full franc is inserted, the mechanisms will be in the position shown in FIG. **13.** It will be noted that the leading end of the raised segment portion **168** (designated by the arrow **228** in FIG. **13**) is just ahead of the position of the second tooth **208** on the wind disc **182.** Accordingly, the raised segment portion will cause the pawl to engage this second tooth which is disposed 37 ½° away from the end-of-wind position. Accordingly, the second franc will result in the purchase of 30 minutes of time. When this has been accomplished, the fourth tooth **212** on the winding disc is moved to the position previously occupied by the tooth **208** so that the final one-half hour can be purchased by inserting the third franc.

The meter operation is capable of accomplishing the same purchase rate even if the insertion of a one-half franc piece is followed by the insertion of a full franc piece or vice-versa. Thus, when the mechanisms are in the position shown in FIG. **12** after the purchase of one-half hour of time, the insertion of a full franc will cause the pawl **174** to engage the edge portion **225** of the arm **176.** This edge portion is offset 18 ¾° from the position of the second tooth **202.** Accordingly, continued movement of the arm will result in a wind of 56 ¼° or 45 minutes of time. This is, of course, the same amount of time that would be purchased if the full franc were inserted first and the one-half franc thereafter. In the latter case, the full franc would move the main winding ring **182** to the position shown in FIG. **13** while the one-half franc would cause the pawl to engage the tooth **206** to provide an additional 18 ¾° of wind.

The functions described will vary somewhat whenever a coin is inserted at some time after the clock mechanism has begun to run down. Assuming for example that one-half hour of time has been purchased, and that 7 ½ minutes have elapsed, the main winding ring will have moved back through 9 ⅜° with a corresponding return movement of the auxiliary arm. If a full franc is now inserted, the edge **225** of the auxiliary arm will still be engaged in a wind sufficient to place one hour and **15** minutes of time on the meter will result. If, on the other hand, the coin is not inserted until after the edge **225** has moved past the leading end of the segment portion **166,** then the pawl will catch the tooth **202** on the arm **176** which will result in the purchase of only 1 full hour of time. The mechanism thus does not reduce or increase the time available by any significant amount even when coins are inserted at irregular periods.

The structures described are particularly adaptable to meter designs which prevent the use of slugs, washers, etc. For example, the structure described in U.S. Pat. No. 3,262,554 can be readily incorporated in a meter along with the novel features disclosed herein. In addition, a "grasshopper" type arrangement is readily used in conjunction with an auxiliary arm since, with this arrangement, a spurious coin **130** (FIG. 3) of slightly smaller diameter than the coin **132** will not move the pawl **42** sufficiently to catch a tooth on the arm **108.**

The concepts of the invention are also applicable to a meter arrangement wherein the initial insertion of a coin will purchase a lesser amount of time with the subsequent insertion of a coin of the same denomination

providing for an increase in the amount of time purchased. This could be accomplished by an arrangement of the type already described wherein the teeth on the main disc are located ahead of the teeth on the auxiliary arm instead of behind the teeth on the arm. The initial insertion of a coin would provide for engagement of the main disc teeth with the resulting wind moving the auxiliary arm in the manner described. The next or some subsequent coin would result in picking up of the auxiliary arm by the pawl whereby an increased amount of time could be obtained.

FIGS. **29** through **34** illustrate a further utilization of the concepts of the invention wherein a lesser amount of time is obtained during an initial wind. In this arrangement, an auxiliary arm **250** is associated with a main disc **252.** The arm **250** defines a plurality of teeth having engaging edges **254, 256, 258** and **260.** Additional engaging edges **262, 264, 266,** and **268** are defined by the main disc **252.**

As shown in FIG. **30,** the main disc defines a first cut-out section extending between the edge portions **270** and **272.** The flange **274** defined by the arm **250** extends within this cut-out portion with the edge **276** of the flange being normally held in engagement with the edge **270** of the main disc. A spring corresponding with the spring **216** employed in the previously described construction is utilized for maintaining the auxiliary arm in this position.

FIG. **31** illustrates the rear surface of the front wall **278** of a meter. This front wall defines slots **280, 282** and **284** for receiving, respectively, nickels, dimes and quarters. These coins are adapted to move into engagement with the segments **286, 288** and **290** in accordance with the practice previously described.

The segment **286** is positioned so that the tooth **254** will be engaged by the pawl **292** (FIG. **34**) when the meter is at zero time and a nickel is inserted. This engagement will drive the auxiliary arm through a portion of lost motion until the edge **294** of the flange **274** engages the edge **272** of the main disc **252.** In the view of FIG. **34,** the pawl has moved through the lost motion portion, and the time setting of the operation is just beginning. In a typical embodiment, the lost motion would extend for 36° of movement of the auxiliary arm with the time setting extending for 18°.

When a second nickel is inserted, the second tooth **256** will be engaged by the pawl, this second tooth, in the typical example referred to, being displaced by 18°. The function of the mechanisms is otherwise identical with one increment of time being provided by this nickel and for two subsequent nickels if they are inserted.

When a dime is initially inserted instead of a nickel, the second tooth **256** will be engaged. There will also be two increments (36°) of lost motion; however, the winding will amount to two increments so that twice as much time will be obtained when compared with the nickel. Similarly, a second dime will result in engagement with the tooth **260** with the mechanisms then functioning in the same manner.

After four increments of purchased time have been accomplished, the main disc **262** is moved sufficiently so that the insertion of an additional nickel or dime will result in engagement of a tooth **262** or **264.** In this instance, there will be no lost motion so that three increments of wind will develop in the case of a nickel and four increments in the case of a dime.

The meter is designed so that the initial use of a quarter will result in the engagement of the tooth **262** whereby the lost motion is again eliminated. Obviously, the illustrated arrangement can be varied considerably in terms of the amount of lost motion and position of the teeth to achieve different ratios of time purchased for different sequences of operation.

It will be understood that various changes and modifications may be made in the above described construction 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 and including a movable coin carrier associated with the pawl means, the improvement wherein said winding means comprises a first rotatable member tied to means for operating the timing mechanism, a auxiliary winding arm mounted for movement relative to said rotatable member, teeth defined by said rotatable member and by said arm for engagement by said pawl, means cooperating with a coin initially inserted in the coin carrier operating to move said pawl into position for engaging a tooth on said arm whereby movement of the coin carrier operates to move said arm, abutment means defined by said rotatable member for engagement by said arm whereby movement of the arm transmits movement to the rotatable member, such movement of the rotatable member shifting the position of the teeth on the rotatable member, and including additional coin cooperating means for moving said pawl into position for engagement with the teeth on said rotatable member upon subsequent insertion of another coin.

2. A construction in accordance with claim **1** including a plurality of teeth on said arm, and separate means for cooperating with different coins in the coin carrier whereby the engagement of different teeth on the arm will lead to the purchase of different amounts of time.

3. A construction in accordance with claim **1** wherein the means cooperating with a coin initially inserted comprise segments located in the path of movement of a coin held by the coin carrier, said segments operating to drive said coin against the pawl means to thereby locate the pawl means in position for engaging the teeth on said arm.

4. A construction in accordance with claim **3** wherein said additional means cooperating with the coin in the coin carrier comprise an additional segment mounted on said first mentioned segment.

5. A construction in accordance with claim **3** wherein each of the means cooperating with coins in the coin carrier comprise additional segments mounted on said first mentioned segments.

6. A construction in accordance with claim **1** including a bearing surface positioned opposite the coin carrier, coins inserted in said coin carrier bearing against said surface during movement of the coin carrier and wherein the means cooperating with a coin initially inserted comprise segments located in the path of movement of a coin held by the coin carrier, said segments rising above said surface and thereby operating to drive said coin against the pawl means to thereby locate the pawl means in position for engaging the teeth on said arm, and wherein said coin carrier defines a plurality of openings for receiving coins of different denomina-

tions, and including a plurality of segments situated in side-by-side relationship on said surface, each segment being positioned in the path of movement of a coin of a particular denomination.

7. A construction in accordance with claim **6** wherein the leading edges of the respective segments are spaced apart on said surface whereby said pawl means is moved into coin engaging position with different teeth whereby coins of different denominations result in different degrees of winding of the winding means.

8. A construction in accordance with claim **1** wherein said rotatable member comprises a disc having teeth defined on its periphery, said auxiliary arm being mounted co-axially with said disc, the teeth on said auxiliary arm being located on the periphery of the arm and being spaced radially inwardly relative to the teeth on said disc.

9. A construction in accordance with claim **8** wherein said abutment means comprise a post mounted on said disc, the leading edge of said auxiliary arm being adapted to drive against said post for rotation of said disc in response to the movement of said auxiliary arm.

10. A construction in accordance with claim **9** wherein the meter is set to provide a maximum amount of purchased time upon insertion of a coin of a particular denomination, the teeth on said disc being located out of position for engagement by said pawl means whenever the meter displays less than said maximum amount of time whereby engagement of the pawl means with said auxiliary arm provides the only means for operating the timing mechanism, the operation of the timing mechanism by the auxiliary arm serving to move the teeth on said disc into position for engagement by the pawl means when said auxiliary arm drives the disc a sufficient distance to achieve at least the purchase of said maximum time on the meter.

11. A construction in accordance with claim **10** including means for resetting the position of said auxiliary arm at the conclusion of the operation of the timing mechanism.

12. A construction in accordance with claim **11** wherein said auxiliary arm is spring loaded, and second abutment means defined being end movable with said disc whereby said auxiliary arm is reset to a different position depending on the degree of wind during the operation of the timing mechanism.

13. A construction in accordance with claim **8** wherein the teeth on said disc are located at a lower level relative to the teeth on said auxiliary arm, the means cooperating with coins in the coin carrier comprising segments located in the path of movement of a coin held by the coin carrier and operating to drive the coin against pawl means to locate the pawl means in position for engaging said teeth, and additional segments formed on the first mentioned segments at an outer level relative thereto, said additional segments operating to drive said pawl means a sufficient additional distance toward said teeth to provide for engagement of the pawl means wit the teeth of said disc.

14. A construction in accordance with claim **1** including a plurality of teeth on said arm, said means cooperating with a coin operating to move said pawl into engagement with different teeth on the arm when a plurality of coins are inserted.

15. In a meter construction wherein purchased time is obtained through engagement of a pawl with winding means attached to a timing mechanism and including a movable coin carrier associated with the pawl, the improvement wherein said winding means comprises a first rotatable member tied to means for operating the timing mechanism, an auxiliary winding arm mounted for movement relative to said rotatable member, at least one tooth defined by said rotatable member and at least one tooth defined by said arm for engagement by said pawl, means cooperating with a coin inserted in the coin carrier operating to move said pawl into position for engaging said tooth on said arm whereby movement of the coin carrier operates to move said arm, and abutment means defined by said rotatable member for engagement by said arm whereby movement of the arm transmits movement to the rotatable member, and operates said timing mechanism.

16. A construction in accordance with claim **15** wherein said rotatable member comprises a disc having a plurality of teeth defined on its periphery, said auxiliary arm being mounted co-axially with said disc, said auxiliary arm also having a plurality of teeth located on the periphery of the arm and located approximately the same radial distance from the axes of said member and arm as the teeth on said member, and means normally holding said arm in position relative to said member whereby all of the teeth on said arm are circumferentially displaced relative to the teeth on said member.

17. A construction in accordance with claim **16** wherein at least the initial coin inserted in said meter engages one of the teeth on said arm, the movement of the rotatable member effected through engagement with said arm resulting in repositioning of the teeth on said rotatable member whereby teeth on the rotatable member will be engaged upon subsequent insertion of a coin.

18. A construction in accordance with claim **17** wherein the engaging portion of said arm is normally held in spaced relationship with said abutment means whereby a lost motion portion of movement of said arm is required before engagement of the abutment means, the re-positioning of the teeth of said rotatable member resulting in direct engagement of the teeth on said rotatable member by said pawl whereby said lost motion portion of movement does not occur.

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