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R. D. HARRIS, SR
LOST MOTION MECHANISM FOR COIN-OPERATED TIMER
RUN TIME ACCUMULATOR

3,605,509

Filed May 1, 1969

3 Sheets-Sheet 1

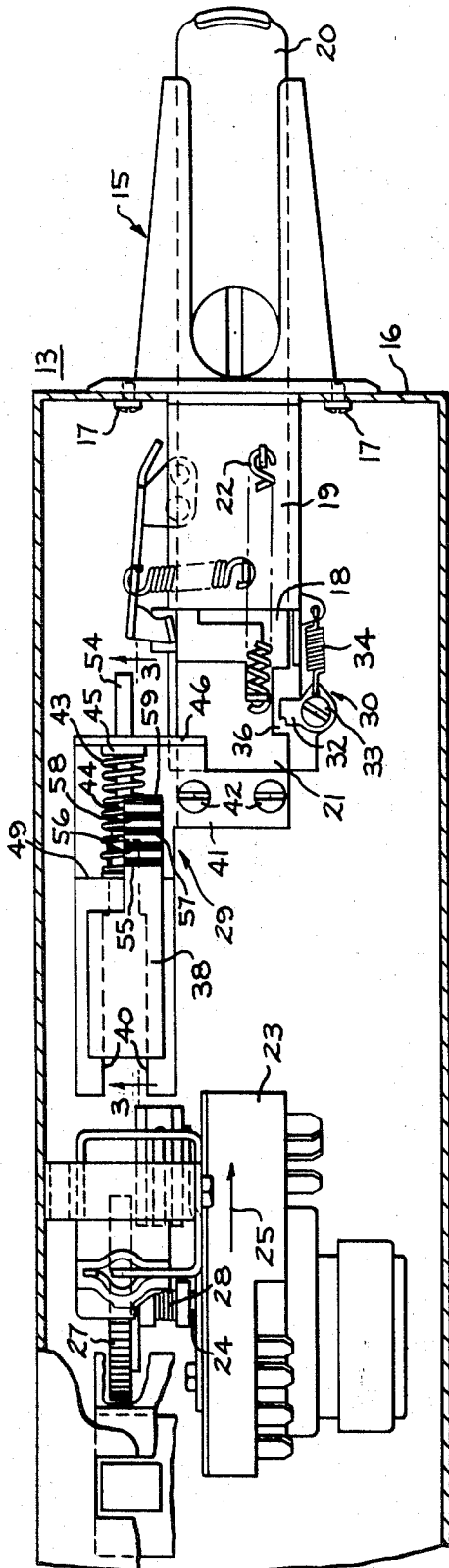


FIG. 1

FIG. 2

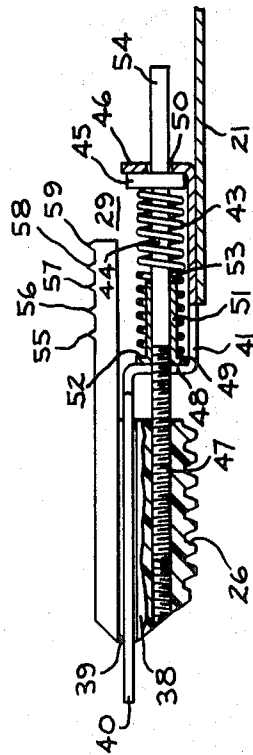


FIG. 3

INVENTOR.
ROBERT D. HARRIS, SR.

BY *James E. Espe*
HIS ATTORNEY

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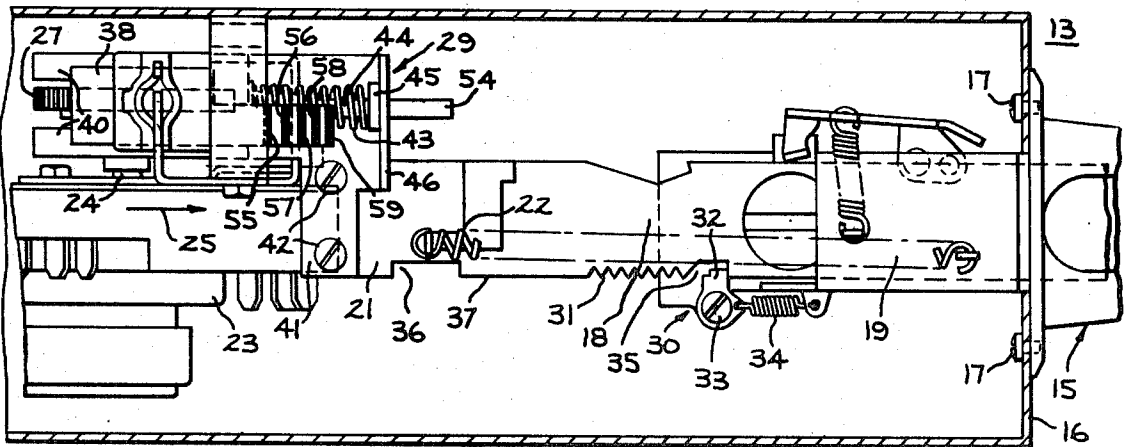


FIG. 4

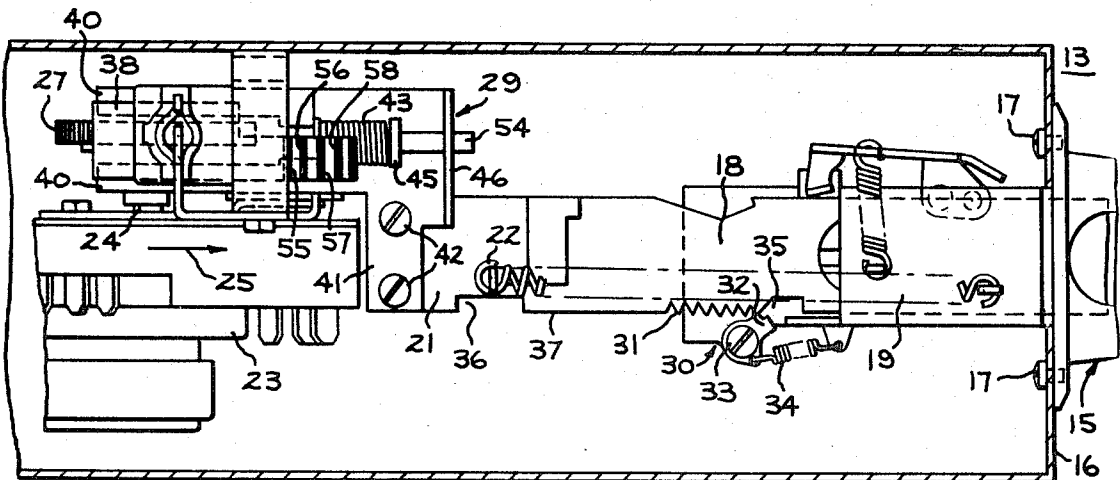


FIG. 5

INVENTOR
ROBERT D. HARRIS, SR.

BY *James E. Espe*
HIS ATTORNEY

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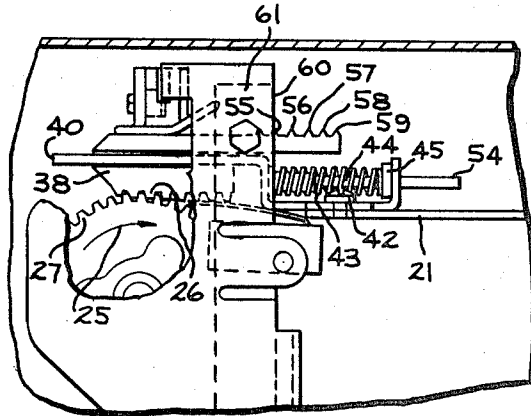


FIG. 6

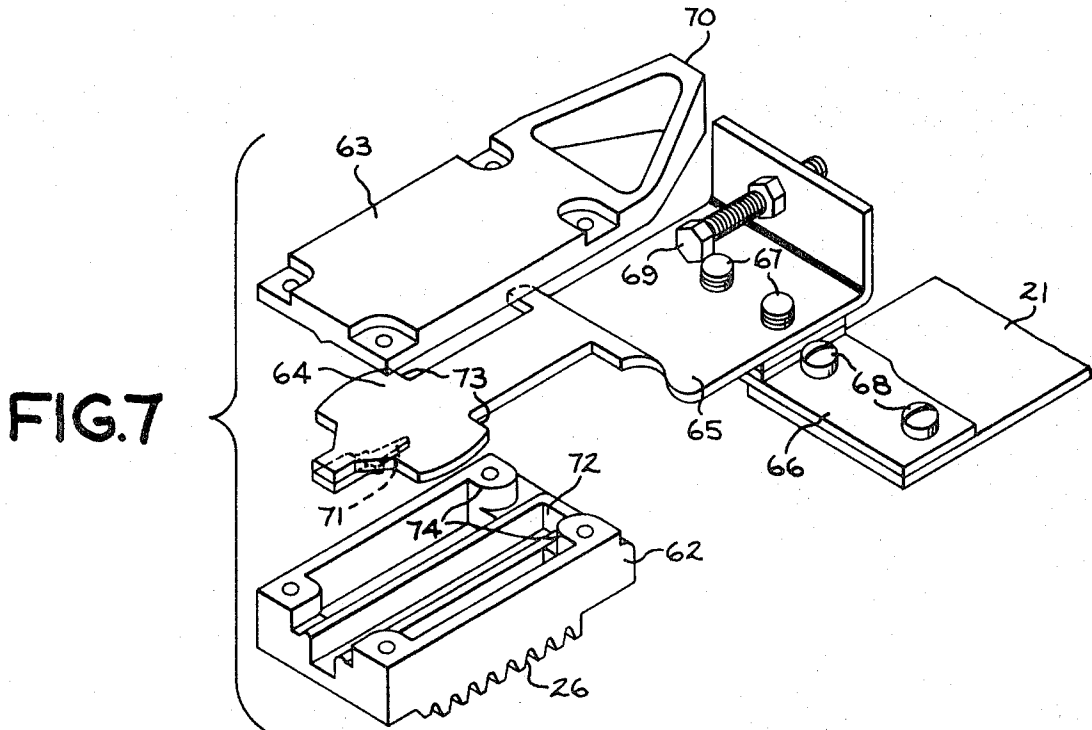


FIG. 7

INVENTOR
ROBERT D. HARRIS, SR.

BY *James E. Eise*
HIS ATTORNEY

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3,605,509

LOST MOTION MECHANISM FOR COIN-OPERATED TIMER RUN TIME ACCUMULATOR

Robert D. Harris, Sr., Louisville, Ky., assignor to

General Electric Company

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U.S. Cl. 74-130

7 Claims

ABSTRACT OF THE DISCLOSURE

A lost motion mechanism is provided for use in conjunction with a time accumulating means adapted to accumulate timer run time on a timer mechanism in response to an outward reciprocation of the slide of a coin-receiving mechanism from a fully inward position. The lost motion mechanism is associated with the slide to delay the operation of the time accumulating means during the initial outward reciprocation of the slide from the fully inward position.

BACKGROUND OF THE INVENTION

This invention relates generally to coin operated timers such as may be used to control laundry machines, and more specifically, to a lost-motion mechanism for an improved coin operated time accumulator particularly adapted for use on automatic clothes dryers.

In U.S. patent application Ser. No. 820,771, filed concurrently herewith by Clarence A. Zininger and assigned to the assignee of the instant invention, means are described and claimed for accumulating timer run time by the sequential introduction of a series of coins in a coin receiving mechanism. The coin receiving mechanism employed by Zininger is of a type commonly available, the structure and operation of which is well known to those skilled in the art. Such coin receiving mechanisms commonly incorporate an inwardly and outwardly reciprocable slide biased toward the outward position, and have various assemblies adapted to receive, evaluate and collect coins and to restrict the reciprocation of the slide in the event of inadequate or improper coinage deposit. Included within the group of such assemblies is a movement restricting means operable after an initial amount of outward reciprocation of the slide from the fully inward position to prevent subsequent inward reciprocation of the slide. A problem arises in conjunction with a time accumulating means such as disclosed by Zininger when employed in conjunction with such commonly available coin receiving mechanisms in that an unscrupulous operator may accumulate unauthorized timer run time by repeatedly reciprocating or ratcheting the slide inwardly and outwardly in small increments when the slide is near its fully inward position.

It is therefore an object of the present invention to provide a means for preventing the unauthorized accumulation of timer run time on coin operated timer mechanisms.

It is a further object to provide such a means which is adapted to delay the operation of a time accumulating means during the initial outward reciprocation of the slide of a coin receiving mechanism until a movement restricting means becomes operable to prevent the subsequent inward reciprocation of the slide.

It is still a further object to provide such a means in the form of a simple and inexpensive lost motion mechanism associated with the slide of the coin receiving means.

SUMMARY OF THE INVENTION

Briefly stated, in accordance with one aspect of the

present invention, there is provided in a time accumulating means adapted to accumulate timer run time on a timer mechanism in response to an outward reciprocation of the slide of a coin receiving mechanism from a fully inward position, the improvement of a lost motion mechanism associated with the slide to delay the operation of the time accumulating means during the initial outward reciprocation of the slide from the fully inward position.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description of the preferred embodiments taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a clothes dryer incorporating my invention;

FIG. 2 is a plan view partly in section illustrating various details of one embodiment of my invention with the slide of the coin receiving mechanism extended fully outwardly;

FIG. 3 is an enlarged sectional view taken along line 3-3 of FIG. 2;

FIG. 4 is a view similar to FIG. 2 with the slide of the coin receiving mechanism extended fully inwardly;

FIG. 5 is a view similar to FIG. 4 with the slide of the coin receiving mechanism shown during the initial outward reciprocation from the fully inward position;

FIG. 6 is an elevational view of my invention in the position of FIG. 4; and

FIG. 7 is an exploded perspective view illustrating an alternative embodiment of my device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and initially to FIG. 1 thereof, there is illustrated an automatic clothes dryer 10 having a suitable appearance and protective outer cabinet 11 with a service access door 12 pivotally mounted thereon for providing entry to the interior of the cabinet. The cabinet 11 also supports a coin operated mechanism 13 adapted to initiate and control the operation of the dryer 10 in response to the selection of a drying cycle by means of control buttons 14 and the introduction of appropriate coinage through a coin receiving mechanism 15.

In FIG. 2 it may be seen that coin operated mechanism 13 comprises a rigid housing 16 having a coin receiving mechanism 15 secured to an end wall thereof by means of suitable fasteners 17. The details of coin receiving mechanism 15 do not form a part of the instant invention, and are well known in the art. In brief, such mechanism comprises a slide 18 reciprocally mounted in a slide housing 19, the slide 18 having an outward end 20 adapted to be moved manually by an operator and an inward end 21 adapted for mounting appropriate operational mechanism thereon. A spring 22 operates between slide 18 and slide housing 19 to bias slide 18 outwardly. Included in the coin receiving mechanism 15 are various assemblies (not shown) adapted to receive, evaluate and collect coins, and to restrict the reciprocation of slide 18 in the event of inadequate or improper coinage deposit.

A timer mechanism 23 is supported by the rigid housing 16 and has a setting shaft 24 extending outwardly therefrom. Included within timer mechanism 23 are a series of cam operated switches provided to control the program of dryer 10. The timer mechanism 23 is so internally wired that when setting shaft 24 reaches a particular angular position, power to the motor of the timer mechanism is interrupted. To restart the timer mechanism, it is necessary to advance the timer setting shaft in the direction of arrow 25. Such rotation of setting shaft

24 in the direction of arrow 25 causes an accumulation of timer run time proportional to the amount of rotation of the setting shaft. When the desired amount of timer run time has been set by rotating setting shaft 24 in the direction of arrow 25, the motor of the timer mechanism will cause a return rotation of the setting shaft in the direction opposite arrow 25 until the shaft 24 reaches the annular position wherein the timer mechanism motor power is internally interrupted.

In accordance with the aforementioned Zininger application Ser. No. 820,771, means are provided for accumulating timer run time by rotating timer setting shaft 24 in the direction of arrow 25 in response to the introduction of proper coinage into coin receiving mechanism 15. It is a feature of the Zininger invention that the time accumulation means provided is operative to rotate shaft 24 in the direction of arrow 25 a predetermined amount for each introduction of proper coinage, despite the fact that shaft 24 may already be rotated to a position wherein a small amount of timer run time is already accumulated. Stated in other terms, with the Zininger mechanism, the introduction of coinage to accumulate timer run time will cause no loss of timer run time which has been previously accumulated by the deposit of prior coinage. Of course it is to be understood that timer mechanisms such as the one employed herein operate within certain limits of time accumulation capability, and that when the timer setting shaft has been rotated a full 360°, this may result a return of the timer to the zero time. However, such limits of time accumulation are normally sufficiently large to preclude a 360° rotation of the timer setting shaft in everyday operation.

As taught by Zininger, a gear rack 26 is secured to slide 18 for reciprocation therewith, and a gear 27 is rotatably positioned to engage the gear rack 26. Gear 27 is selectively coupled to timer setting shaft 24 by a uni-directional clutch, generally indicated by the numeral 28. It is the function of uni-directional clutch 28 to couple setting shaft 24 to gear 27 for rotation therewith only when gear 27 is rotated in the direction of arrow 25. By this arrangement, when slide 18 and gear rack 26 are reciprocated inwardly, gear rack 26 will cause rotation of gear 27, but clutch 28 will assure no reverse rotation of timer setting shaft 24 and hence no loss of timer run time accumulated thereon. When, however, slide 18 is moved fully outwardly from a fully inward position, gear rack 26 will cause a predetermined rotation of gear 27 in the direction of arrow 25, and hence the addition or accumulation of a predetermined amount of timer run time.

As further taught by Zininger, it has been found to be more desirable to rotate timer setting shaft 24 for accumulation of timer run time thereon during the outward reciprocation of slide 18, than during the inward reciprocation of the slide, as a greater degree of accuracy in time accumulation is achieved. Such a greater degree of accuracy is achieved because, by initiating the rotation of setting shaft 24 with gear rack 26 and slide 18 in the fully inward position, gear rack 26 and gear 27 are meshed, and rotation of shaft 24 continues until gear rack 26 and gear 27 become disengaged. This is to be compared with the less accurate alternative of initiating rotation of shaft 24 on the inward stroke of slide 18 at such time as gear rack 26 and gear 27 become meshed; with this alternative, no initial meshing relationship necessarily exists between gear rack 26 and gear 27, and the initiation of rotation of shaft 24 may occur earlier or later than is required for an accurate accumulation of timer run time.

It is to be understood that the aforescribed time accumulating means is described in detail and claimed in the Zininger application and forms no part of my invention.

In accordance with my invention, gear rack 26 is supported from slide end 21 by means of a lost motion mechanism 29. It is the function of lost motion mechanism

29 to delay the rotation of gear 27 in the direction of arrow 25 during the initial outward reciprocation of slide 18 from the fully inward position of the slide. It is desirable to delay the rotation of gear 27 during the initial outward movement of slide 18 from the fully inward position to prevent the unauthorized accumulation of timer run motion by an unscrupulous operator. Without the lost time mechanism 29, it is possible for an operator to accumulate unauthorized timer run time by repeatedly reciprocating or ratcheting slide 18 inwardly and outwardly in small increments when slide 18 is near its fully inward position. By incorporating lost motion mechanism 29, ratcheting of slide 18 near its innermost position will not function to progressively advance timer setting shaft 24 in the direction of arrow 25; rather, gear rack 26 will not reciprocate outwardly until such time as a movement restricting means included within the coin receiving mechanism becomes operable to prevent subsequent inward reciprocation of the slide.

In order to better understand the function and operation of my device, it is necessary to examine in somewhat greater detail the construction and operation of coin receiving mechanism 15. As shown best in FIG. 4, incorporated within the coin receiving mechanism is a ratchet and pawl arrangement 30 comprising a ratchet 31 formed along one edge of slide 18 and a pawl 32 pivotally mounted from slide housing 19 by a pin 33. A spring 34 biases pawl 32 such that when pawl 32 is rotated either clockwise or counterclockwise it tends to return to the position of FIG. 4. Also formed on slide 18 are two pawl reversal cut-outs 35 and 36. It will be seen that ratchet 31 extends from cut-out 35 only part of the way toward cut-out 36, the remaining distance comprising a smooth surface 37.

With slide 18 in the fully outward position of FIG. 2, it may be seen that pawl 32 extends into cut-out 36. When slide 18 is reciprocated inwardly from the position of FIG. 2, smooth surface 37 will force pawl 32 to rotate counterclockwise a small amount. As the slide 18 progresses inwardly, ratchet 31 comes into engagement with pawl 32 whereupon outward reciprocation of slide 18 is prohibited. When slide 18 reaches the fully inward position of FIG. 4, pawl 32 disengages ratchet 31 and enters cut-out 35. With this arrangement, slide 18 may now be reciprocated outwardly.

During the initial outward reciprocation of slide 18 from the fully inward position of FIG. 4, pawl 32 rotates clockwise as shown in FIG. 5, but does not yet engage ratchet 31. It is during this initial outward reciprocation of slide 18 that the slide may be repeatedly reciprocated or ratcheted inwardly and outwardly. When, however, the slide 18 moves outwardly a sufficient amount for pawl 32 to engage ratchet 31, the subsequent inward movement of slide 18 is prevented. Spring 22 is operative during the final outward movement of slide 18 to return the slide to the position of FIG. 2.

It is the purpose of my invention to prevent the unauthorized accumulation of timer run time during the above-mentioned period of initial outward reciprocation of slide 18 from the fully inward position. Turning now to FIG. 3 in conjunction with FIG. 2, it may be seen that in one embodiment of my device, lost motion mechanism 29 comprises a member 38 carrying gear rack 26. Member 38 has grooves 39 formed longitudinally along each of two opposite sides for cooperation with arms 40 formed integrally with a mounting bracket 41. Mounting bracket 41 is secured to slide end 21 by means of fastener 42 for reciprocation with slide 18. By the arrangement of arms 40 in cooperation with grooves 39, member 38 is adapted to reciprocate relative to slide 18 on a path parallel to the path of reciprocation of slide 18 from a first position shown in FIGS. 2 and 3 to a second position shown in FIG. 5.

A biasing means in the form of spring 43 mounted coaxially on a follower 44 is operative to bias member 38 to the first position of FIG. 2. It will be seen that follower

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44 has a flange 45 of enlarged diameter formed thereon having one surface adapted to engage spring 43 and the other surface adapted to engage a stop 46 formed integral with mounting bracket 41. Follower 44 is secured to member 38 by means of a threaded connection 47 and extends through a slot 48 formed in vertical surface 49 of mounting bracket 41 and thence through an aperture 50 formed in stop 46. A bushing 51 is coaxially mounted on follower 44 for reciprocation relative thereto and has a flanged end 52 adapted to engage on one side of the vertical surface 49 and on the other side to engage an end of spring 43. The other end of bushing 51 comprises a flat annular surface 53 adapted to engage flange 45 when member 38 moves to the position of FIG. 5.

By this arrangement of spring 43, follower 44, flange 45, stop 46, vertical surface 49 and bushing 51, a range of reciprocation is defined for member 38 relative to slide 18, limited in the first position by the engagement of flange 45 with stop 46, and in the second position by the engagement of flange 45 with flat annular surface 53 of bushing 51. Furthermore, by means of the threaded connection 47 between follower 44 and member 38, means are provided for adjusting the position of gear rack 26 relative to slide 18. As explained in the aforementioned Zinniger application, by adjusting the position of gear rack 26 relative to slide 18, the length of engagement of the gear rack 26 with gear 27, and hence the amount of timer run time accumulated per coinage deposit is selectively adjustable.

Whereas the Zinniger device provides a means of adjusting gear rack 26 relative to slide 18 in selective increments, by adjusting means provides, over a limited range, an infinitely adjustable means of positioning gear rack 26 relative to slide 18. To facilitate such adjustment through threaded connection 47, a hex or other readily engagable surface may be formed on follower end 54 to facilitate rotation of the follower 44. As may be best seen in FIG. 6, member 38 has a plurality of upstanding ribs 55, 56, 57, 58 and 59 formed on the top surface thereof in a direction perpendicular to the path of reciprocation of the slide 18. It is the function of these ribs to provide an indication of the position of member 38 relative to slide 18 and to gear 27 as is determined by the adjustment of threaded connection 47. In FIG. 6, slide 18 is in its fully inward position and member 38 is positioned relative thereto so as to align rib 55 with edge 60 of timer mechanism support bracket 61. Alignment of rib 55 with edge 60 when slide 18 is fully inward indicates that during the outward travel of slide 18, twenty minutes of timer run time will be accumulated on the timer mechanism. Similarly, alignment of rib 56, 57 or 58 with edge 60 when slide 18 is fully inward will result in the accumulation of thirty, forty, fifty or sixty minutes of timer run time, respectively, during the outward movement of the slide 18. Such means of indicating the position of member 38 as determined by the adjustment of threaded connection 47 eliminates the error which would otherwise be caused by the variation in manufactured length of the coin receiving mechanism 15 or housing 16, and provides a simple means of adjusting the amount of timer run time to be accumulated per coinage deposit.

In operation, after the operator has made the desired cycle selection by means of control buttons 14 and has placed the proper coinage into the coin receiving mechanism 15, slide 18 may be reciprocated inwardly from the position of FIGS. 2 and 3 to the position of FIG. 4. During such inward reciprocation, gear rack 26 engages gear 27 rotating it in the direction opposite arrow 25. During such rotation, uni-directional clutch 28 transmits no motion to the timer setting shaft 24. Subsequent outward reciprocation of slide 18 will cause no motion of member 38 which remains in the fully inward position until such time as flange 45 engages the flat annular surface 53 of bushing 51, whereupon gear rack 26 and member 38 will move outwardly with slide 18 causing rotation of gear 27. When gear rack 26 has moved outwardly suffi-

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ciently to disengage gear 27, spring 43 re-extends, snapping member 38 forward until such time as flange 45 engages stop 46.

An alternate embodiment of my design is shown in FIG. 7 wherein gear rack 26 is shown formed integrally with a lower member 62 adapted for reciprocation relative to slide end 21. An upper member 63 is adapted to cooperate with lower member 62 to form a housing assembly for capturing a projection 64 on first mounting bracket 65. First mounting bracket 65 is secured to a second mounting bracket 66 by means of fasteners 67, and second mounting bracket 66 is, in turn, secured to slide end 21 by means of fasteners 68. A stop 69 is secured to one end of first mounting bracket 65, and is adapted to engage end 70 of upper member 63. Projection 64 has a tab 71 formed on the lower surface thereof for engaging a compression spring (not shown) which operates between tab 71 and surface 72 within lower member 62. By this arrangement of lower member 62, upper member 63, projection 64, stop 69, and the spring operating between tab 71 and surface 72, a range of reciprocation is established by gear rack 26 limited in the first position by the engagement of end 70 stop with stop 69, and in the second position by the engagement of surfaces 73 on projection 64 with surfaces 74 formed within lower member 62. Furthermore, the spring operative between tabs 71 and surface 72 serves to bias gear rack 26 toward the first position wherein surface 70 engages stop 69. It will be understood that the operation of this embodiment of my invention is substantially similar to that of the aforescribed embodiment, differing therefrom primarily in the positioning and arrangement of the biasing and stop means which define the range of reciprocation of gear rack 26 relative to the slide 18 and which cause the biasing of gear rack 26 toward the first position.

As was previously mentioned, my device is particularly adapted for use in automatic clothes dryers wherein it is desirable to enable the accumulation of timer operating time through the sequential deposit of a series of coins while yet preventing the unauthorized accumulation of such timer run time. From the foregoing description it should now be apparent that the present invention, by providing a lost motion mechanism operable during the initial outward reciprocation of the slide of the coin receiving mechanism from a fully inward position, prevents such unauthorized accumulation of timer run time until such time as a movement restricting means included within the coin receiving mechanism becomes operable to prevent the subsequent inward reciprocation of the slide.

As will be evident from the foregoing description, certain aspects of the invention are not limited to the particular details of construction of the examples illustrated, and it is contemplated that other modifications, applications or variations will occur to those skilled in the art. It is therefore intended to cover such modifications, applications and variations as do not depart from the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a time accumulating means adapted to accumulate timer run time on a timer mechanism in response to an outward reciprocation of the slide of a coin receiving mechanism from a fully inward position, wherein the coin receiving mechanism includes movement restricting means operable after an initial amount of outward reciprocation of the slide from the fully inward position to prevent subsequent inward reciprocation of the slide, the improvement comprising a lost motion mechanism associated with the slide to delay the operation of the time accumulating means during the initial outward reciprocation of the slide until the movement restricting means becomes operable to prevent subsequent inward reciprocation of the slide and wherein the time accumulating means rotates the setting shaft of said timer mechanism unidirectionally in response to an inward and outward reciprocation of the

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slide and comprises the elements of a gear rack associated with the slide for reciprocation therewith, a gear rotatably positioned to engage the gear rack during at least a portion of the outward reciprocation, and a unidirectional clutch connecting the gear and the setting shaft; and wherein the lost-motion mechanism delays the rotation of the gear during the initial outward reciprocation of the slide.

2. The invention of claim 1 wherein said lost motion mechanism comprises:

a member carrying the gear rack which reciprocates relative to the slide on a path parallel to the path of reciprocation of the slide from a first position to a second position;

15 biasing means operative to bias said member to the first position.

3. The invention of claim 2 additionally including a stop carried by the slide, said biasing means being operative to bias said member to a position engaging said stop.

4. The invention of claim 3 wherein said biasing means is housed within said member and said stop is arranged to engage an exterior surface of said member.

5. The invention of claim 3 wherein said member includes a follower rod movable therewith, and said biasing means operates on said follower rod to bias said follower rod to a position engaging said stop.

6. The invention of claim 5 additionally including a threaded connection between said follower rod and said member whereby the length of said follower which extends from said member, and hence the length of the gear rack

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which engages the gear during outward reciprocation of the slide may be selectively adjusted.

7. The invention of claim 6 additionally including a plurality of indices formed on said member for adjusting said threaded connection to obtain a desired accumulation of timer run time per proper coinage deposit within the coin receiving mechanism.

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WILLIAM F. O'DEA, Primary Examiner

W. S. RATLIFF, Jr., Assistant Examiner

U.S. Cl. X.R.

194—92