Aug. 19, 1969 M. A. HALL 3,462,565

COIN-CONTROLLED STARTER MECHANISM FOR CYCLE TIMERS

Filed Feb. 7, 1968

FIG-1

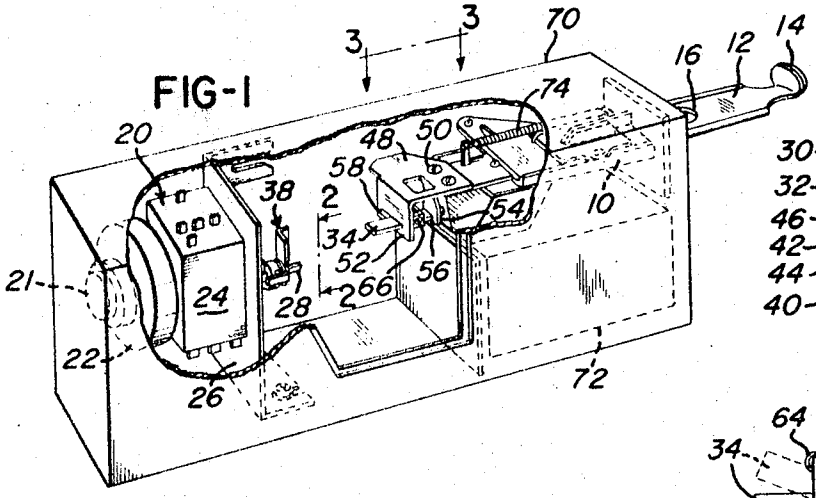


FIG-2

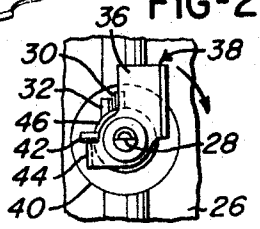


FIG-3

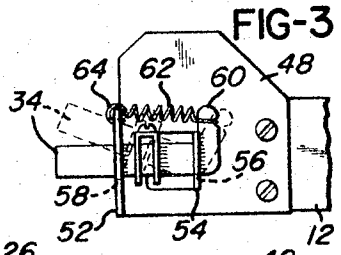


FIG-4

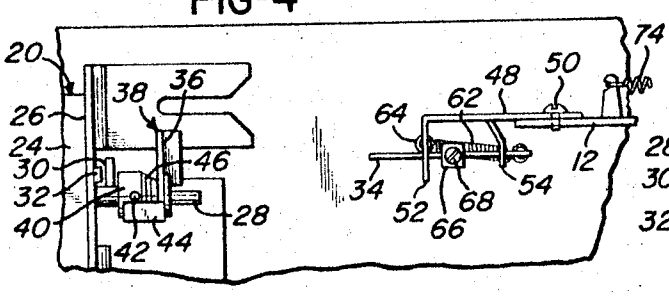


FIG-7

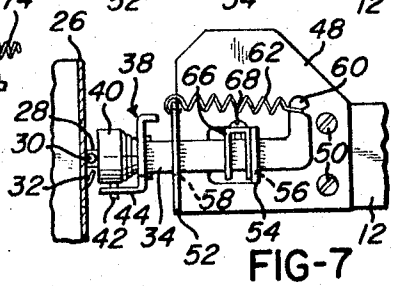


FIG-5

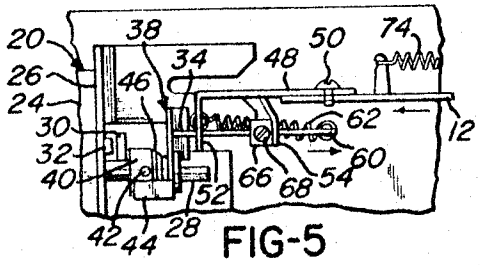
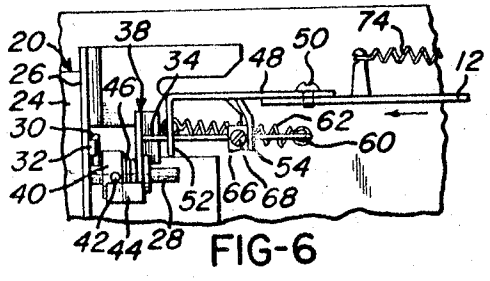


FIG-6



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COIN-CONTROLLED STARTER MECHANISM FOR CYCLE TIMERS

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U.S. Cl. 200—35 10 Claims

ABSTRACT OF THE DISCLOSURE

The starter mechanism comprises a carrier attachable to one end of a coin-controlled slide plate, which carrier mounts a plunger that is displaceable both longitudinally and laterally against the resistance of a very weak spring. Said spring normally keeps the plunger projected relative to the carrier, in position to strike a shift member carried by a cycle timer shaft to be shifted longitudinally to an operative position. During a manual advancement of the slide plate, the plunger may engage the shift member but will not, by spring pressure alone, shift the timer shaft. Shifting of the timer shaft depends upon the retraction of the plunger to stop which backs up the plunger with a positive force. Lateral resilient displacement of the plunger prevents damage to the mechanism in the event of abusive treatment.

This invention relates to a coin-controlled starter mechanism for cycle timers, and is applicable particularly to situations wherein the cycle timer is a unit separate and distinct from the coin-controlled mechanism, but is located for direct physical actuation by the latter. Thus, in FIG. 1 of the accompanying drawing, the cycle timer is shown at the left in position to be actuated and started in operation by the coin-controlled mechanism at the right, which mechanism includes a hand-operated slide plate to be projected manually toward the cycle timer incident to the deposit of one or more coins.

The general arrangement above mentioned may be employed, by way of example, in laundry service establishments where clothing washers and dryers are coin-operated, and automatically timed as to their operating cycles. Proper operation of the laundry machines depends, of course, upon the deposit of proper coins into a coin slide, and proper manipulation of the coin slide after deposit of the required coin or coins. Thus, if a patron deposits proper coins, and then fails to impart a full advancement to the slide plate of the coin slide, the cycle timer may not receive the necessary impulse to place the laundry machine in operation. The patron then believes himself cheated of his coins, and reports the laundry machine out of order, when in fact the fault resides merely in failure on the part of the patron to fully advance the coin slide plate. Such incidents result in poor customer relations, and unnecessary servicing expenses, to be avoided by means of the present invention.

An object of the present invention is to provide in a cycle timer starter mechanism, improved means whereby the cycle timer is started or placed in operation with a positive force that is recognized by the patron as a force to be overcome by the slide plate in advancing to a projection limit, thereby inducing the patron to complete the slide plate advancement rather than stop the slide plate at an intermediate stage of advancement with disappointing results.

Another object of the invention is to provide in a cycle timer starter mechanism of the character stated, a simple yet effective safety means to preclude damage

to operating parts in the event that the mechanism is subjected to abuse in the attempt to control the cycle timer in unauthorized manner, or without a deposit of proper coins.

A further object of the present invention is to facilitate and expedite coordination of a coin slide with a cycle timer in achieving a working arrangement which is accurate and reliable in service, as well as durable.

Another object is to provide a starter mechanism attachment which is readily applicable to many different types of coin slides, for use in starting or initiating operation of a cycle timer or the like, one of the virtues of the starter mechanism attachment being its simplicity of construction and operation.

The foregoing and other objects are attained by the means described herein and illustrated upon the accompanying drawing, in which:

FIG. 1 is a perspective view of a cycle timer and a coin-controlled starter mechanism therefor, arranged in cooperative relationship according to the teaching of the present invention.

FIG. 2 is an enlarged elevational view taken on line 2—2 of FIG. 1, showing the timer shaft shifter element applied to the timer shaft and disposed in a normal target position with relation to a starter plunger.

FIG. 3 is a top plan view taken on line 3—3 of FIG. 1, showing the starter plunger in alternative positions relative to a carrier therefor.

FIG. 4 is a fragmentary side elevation of FIG. 1, showing the starter plunger retracted from the shaft shifter element of the cycle timer.

FIG. 5 is a view similar to FIG. 4, showing the starter plunger partially advanced against the shifter element.

FIG. 6 is a view similar to FIG. 5, showing the timer shaft shifter element axially projected with the timer shaft, as a result of a full advancement of the starter plunger.

FIG. 7 is a top plan view of FIG. 6.

In the drawing, **10** indicates generally a coin slide or coin chute, which includes a reciprocable elongate slide plate **12** having a handle or finger piece **14** whereby the slide plate may be manually shifted between a position of full retraction, illustrated by FIGS. 1 and 4, and a position of full advancement depicted by FIGS. 6 and 7. The slide plate **12** may be provided with one or more coin-receptive apertures **16**, into which a patron may deposit one or more coins or tokens as required, to condition the coin slide for full advancement of its slide plate **12**. The coin slide, as is usual, may be equipped with various devices for the detection and rejection of spurious coins, so that the slide plate is inoperable unless proper coins or tokens are deposited therein.

To simplify the description herein, let it be assumed that slide plate **12** has but one aperture **16** gauged to receive a genuine coin acceptable to the detection devices of the coin slide. If an acceptable coin is deposited in aperture **16**, the slide plate will be permitted a full advancement. If on the other hand the coin proves spurious, or is missing from aperture **16**, advancement of the slide plate will be prevented or substantially limited. All of the foregoing is common practice in the art pertaining to coin slides.

The numeral **20** indicates generally a conventional cycle timer, which usually comprises a synchronous electric motor **21** and reduction gear **22**, and a housing **24** containing a multiplicity of electric contactors (not shown). The contactors are to be open-circuited and closed-circuited in a predetermined order as the electric motor operates throughout a time cycle, to govern the actions of a dispensing machine or the like connected thereto. The dispensing machine may dispense articles or services. In a typical case, the contactors of the cycle timer may control

the several sequential operations of a laundry machine which washes, rinses, and perhaps otherwise treats clothing deposited therein. The cycle timer may be supported by a bracket **26** as shown.

The cycle timer **20** includes a rotary shaft **28** driven by gear box **22**. Said timer shaft has both a slow rotary motion, and a limited axial shiftability of one-quarter inch more or less. Inside the housing **24** is a pair of contactors (not shown), having electrical connection with motor **21**, for energizing and de-energizing said motor. Said contactors are mechanically connected with shaft **28**, so that the shaft when shifted axially to the left in FIG. 1, will close the circuit of the contactors and motor **21**, to effect a slow rotation of said shaft in one direction as indicated by the arrow in FIG. 2.

Rotation of shaft **28** as stated, is limited to one full turn, or 360 degrees, whereupon the motor **21** becomes de-energized to terminate the shaft rotation. This is accomplished by means of a cam arrangement, preferably, which acts to shift the shaft axially to the right as the shaft approaches the end of its 360 degree travel, this resulting in mechanically separating the motor control contactors and breaking the motor circuit.

The cam arrangement above mentioned may comprise a pin **30** fixed upon shaft **28** and extended laterally therefrom, to execute a circular sweep as the shaft rotates. Near the end of its 360 degree circular sweep, pin **30** will strike an inclined stationary cam **32**, which cam may be carried by bracket **26**. As pin **30** rides up the incline of cam **32**, the pin will be cammed away from bracket **26** so as to shift the shaft **28** axially to the right, thereby resulting in separating the motor control contactors and stopping the motor **21**. The parts will thereupon bear the relationship illustrated by FIGS. 1, 2 and 4.

It may here be noted that pin **30** in FIG. 4 is shown advanced slightly beyond the face of cam **32**, after having left the cam face. This is due to the fact that shaft **28**, inside the housing **24**, is subject to snap-action disposition to its opposite extremes of shiftability as by means of a toggle or ball locator. This however is of no particular importance to the present invention.

FIG. 5 shows shaft **28** disposed to its outer limit of shiftability, whereas FIG. 6 shows it shifted to its inner limit. In the FIG. 6 position of shaft **28**, the driving motor **21** is operative to rotate the shaft and actuate the electrical contactors of the cycle timer **20**.

In accordance with the present invention, a starter plunger **34** movable with slide plate **12** is employed for shifting the timer shaft **28** to the inner or operative position of FIG. 6. Plunger **34** is adapted to strike the forward face **36** of a target member **38** mounted upon the shaft, for shifting the target member and the shaft in the direction of timer housing **24**, according to FIG. 6. In this position of the shaft, the driving motor is operative as above stated.

The target member **38** may comprise a lever radially extended from shaft **28** as shown, with its face **36** exposed to the leading end of plunger **34**. Adjacent to the target member or lever **38** is a collar **40** which is fixed upon shaft **28**, and said collar carries a fixed extending stud **42**. An offset arm or finger **44** of member **38** is yieldingly held in abutment against stud **42**, as by means of a coiled spring **46** having opposite ends thereof anchored upon the collar **40** and lever member **38**, and tensioned constantly to maintain said state of abutment. The target member or lever **38**, as will be understood, is rotatable relative to shaft **28** subject to the restraining influence of spring **46**.

By referring to FIG. 2, it will be seen that spring **46** keeps arm **44** in abutment against stud **42**, so that under normal conditions the shaft **28** in rotating clockwise will carry with it the collar **40** and lever or target member **38**. However, should member **38** encounter any obstruction, it may remain stationary without stopping the rotation of shaft **28**, since in that event the stud **42** will merely move away from arm **44** and continue its rotational movement with collar **40** and shaft **28** until the shaft completes a full turn and stops automatically as previously explained. The spring **46** will of course remain under increased tension until the obstruction is removed, allowing the spring to restore the parts to the normal position of FIG. 2.

To further explain FIG. 2, it is noted that member **38** may be grasped and rotated in counter-clockwise direction, without imparting rotation to shaft **28**. Such rotation of member **38** will progressively wind up the spring **46** and increase the tension thereof. If now the grasp on member **38** be released, the spring **46** will return member **38** to the normal position of FIG. 2. Under normal conditions of operation, shaft **28** rotates clockwise to drive the member **38** in the same direction, with spring **46** acting as a resilient coupler between shaft **28** and member **38**. When member **38** is at rest, with shaft **28** stationary at the end of a cycle, member **38** is in the path of advancement of plunger **34**.

Plunger **34** may be formed as an L-shaped flat metal stamping which is mounted for reciprocation upon a carrier plate or carrier member **48**, the latter being secured upon the leading end portion of slide plate **12** in any suitable manner as by means of screws **50**. Carrier **48** may include a pair of spaced substantially parallel ears or bearing members **52** and **54**, each of which is slotted to slidingly accommodate the plunger **34**. The slot **56** of ear **54** slightly exceeds in length the width of plunger **34**, whereas slot **58** of ear **52** is elongated considerably to permit a lateral swinging of the leading end of plunger **34** while the rear end portion of the plunger pivots in slot **56** according to the broken line position of the plunger in FIG. 3.

The normal position of the plunger **34** is depicted by full lines in FIG. 3, wherein the plunger is seen to include a finger **60** extended at right angles to the major axis of the plunger, said finger being engaged by one end of a tension spring **62** whose opposite end **64** is anchored to ear **52**. Spring **62** is always under tension, and performs the dual function of projecting the plunger forwardly, and maintaining it at one end of slot **58** in parallelism with the path of longitudinal reciprocation of slide plate **12**. The plunger can be swung to the broken line position of FIG. 3, fulcruming at the slot **56**, but spring **62** acts constantly to return the plunger to the full line position shown.

Means is provided for limiting longitudinal travel of plunger **34** in one direction, said means being in the form of a stop member fixable at selected locations along the length of the plunger. The stop member may comprise an inverted U-shaped element **66** having depending legs slotted to slidably receive the plunger, and a set screw **68** to bind against an edge of the plunger for locking the stop member thereon. FIG. 7 illustrates the stop member **66** in abutment against the stationary ear **54** of carrier **48**, for limiting retraction of plunger **34** relative to the carrier. The stop member is applied to the plunger intermediate the carrier ears **52** and **54**, and remote from the leading end of the plunger. Movement of the plunger to the extended or projected position may be limited by finger **60** abutting the ear **54** as depicted by full lines in FIG. 3.

FIG. 1 illustrates a typical arrangement wherein the cycle timer **20** and the coin-controlled starter mechanism are installed in a box-like casing **70**, with the plunger **34** of the starter mechanism aligned with shifter member or lever **38** to actuate the latter. Casing **70** may house a coin receptacle **72** receptive of coins accepted and released by the coin slide. The coin slide may be provided with the customary tension spring **74** arranged to return the slide plate **12** to the retracted position of FIG. 1 after each manual advancement of the slide plate.

As was previously mentioned herein, the coin slide mechanism may be of any approved type, so long as it includes a slide plate such as **12** upon which may be

mounted the plunger and carrier unit **48**. Moreover, the coin slide mechanism and timer **20** may be supported otherwise than by means of box **70**, if desired.

The operation of the device is as follows. Assuming all elements of the apparatus to be disposed in the normal position as depicted by FIGS. 1 and 4, a coin may be deposited at **16** in coin slide plate **12**, whereupon, if the coin is acceptable, the slide plate may be manually advanced by means of the handle **14**. Plunger **34** will of course be extended forwardly by means of spring **62** (see FIGS. 1, 3 and 4), and its forward end will yieldingly contact the face **36** of stationary target member or lever **38** during advancement of the coin slide plate. The force of spring **62** is relatively weak, according to the present invention, so that advancement of plunger **34** by the slide plate will not effect a longitudinal shifting of timer shaft **28** to the operative position (FIGS. 6 and 7), until stop member **66** abuts the carrier member ear **54**. Thus it will be understood that a positive force, rather than the resilient force of spring **62**, is required in the shifting of shaft **28** to the operative position.

FIG. 5 shows the slide plate and plunger **34** advanced to a position short of full advancement, at which the shaft **28** remains in inoperative or extended position although plunger **34** is fully depressed by reason of its abutment against lever **38**. The stop member **66** has just lightly touched carrier member ear **54**, in FIG. 5. A further advancement of the slide plate causes ear **54** to positively advance the stop member **66** and plunger **34**, as in FIGS. 6 and 7, to enforce a positive axial shifting of timer shaft **28** to the operative position there shown. Such shifting of the timer shaft effects energization of motor **21** as previously explained, thereby rotating the timer shaft and lever **38** in the direction indicated upon FIG. 2.

Should the patron start the cycle timer as above related, and attempt to abuse the mechanism by holding the slide plate in fully advanced position, no damage will result because in that event the plunger **34** will either be driven to the displaced position shown by broken lines in FIG. 3, or alternatively, the plunger force against lever **38** will merely immobilize lever **38** while shaft **28** completes its 360 degree cycle of rotation. This will of course wind up the spring **46**, the force of which will return lever **38** to the normal starting position as soon as slide plate **12** is permitted to retract.

If an attempt be made to abuse the mechanism by jamming the slide plate in advanced position after lever **38** has begun to cycle normally with shaft **28**, no damage will result for then the plunger obstructing movement of the lever will be biased to the broken line position of FIG. 3, or in the alternative, lever **38** may be temporarily immobilized until the obstruction is removed. In either case, shaft **28** will complete its operating cycle, thereby to effect delivery of the goods or services paid for prior to the abuse.

In normal usage, the slide plate **12** is advanceable by the patron without noticeable resistance other than the gradually increasing resistance of slider spring **74**, until stop member **66** moves into abutting relationship with carrier ear **54**. When this added resistance is encountered, the patron at once senses the need for a final push on the slide plate to activate the dispenser, and will instinctively supply the final push needed. Under the circumstances, complaints of inoperativeness resulting from failure to impart a manual full advancement to the slide plate, will rarely occur.

To achieve the desirable operation mentioned above, the force of spring **62** is deliberately reduced to a value such that it cannot under any conditions translate to the timer shaft a force sufficient to axially shift said shaft to the operative position. The shaft is shiftable only by reason of the positive advancement of plunger **34** resulting from stop member **66** striking the ear **54**.

In assembling the composite device of FIG. 1, or in the replacing of units **20** or **10** when necessary, operating coordination of the units is quickly and easily effected by simply fixing the adjustable stop member **66** at the proper location upon plunger **34**. The carrier for the plunger is readily applicable to many different types or makes of coin slides.

It is to be understood that various modifications and changes may be made in the structural details of the device without departing from the spirit of the invention.

What is claimed is:

1. A coin-controlled starter mechanism for a cycle timer, which latter includes a motor-driven shaft rotatable in one direction, and shiftable in the direction of its length for initiating rotation thereof, said shaft carrying a radially extended shift lever movable bodily with the shaft both longitudinally and rotationally, said starter mechanism comprising: a plunger carrier in the form of a body having bearing means thereon, and a plunger longitudinally reciprocable in said bearing means, said plunger having a leading end to strike and move the shift lever upon advancement of the plunger in one direction; means mounting the carrier upon one end of a reciprocable coin-controlled slide plate, with the plunger extended in substantial parallelism with the line of reciprocation of the slide plate and in substantial alignment with the shift lever; resilient means on the carrier yieldingly advancing said plunger end toward the shift lever with a limited force insufficient in value to effect shifting of the shift lever longitudinally of the timer shaft; and means including a stop member carried by the plunger, for predetermining the distance said plunger may retract from the position of advancement thereof before longitudinally shifting said shift lever.

2. The starter mechanism as specified by claim **1**, wherein the means last mentioned incorporates an adjustment for varying the distance of retraction of the plunger.

3. The starter mechanism as specified by claim **1**, wherein is provided means permitting a temporary displacement of the leading end of the plunger laterally of its normal line of reciprocation.

4. The starter mechanism as specified by claim **2**, wherein is provided yielding means permitting a temporary displacement of the leading end of the plunger laterally of its normal line of reciprocation, said yielding means tending constantly to return the plunger end to the normal line of reciprocation.

5. The starter mechanism as specified by claim **3**, wherein said means permitting temporary displacement of the plunger end is incorporated in the bearing means.

6. A coin-controlled starter mechanism for a cycle timer, which latter includes a motor-dirven shaft rotatable in one direction, and shiftable in the direction of its length for initiating rotation thereof, said shaft carrying a radially extended shift lever movable bodily with the shaft both longitudinally and rotationally, said starter mechanism comprising: a plunger carrier in the form of a body having a pair of perforated bearing members spaced apart; an elongate plunger longitudinally reciprocable in the perforations of said bearing members, the plunger having a leading end to strike and move the shift lever upon advancement of the plunger in one direction; means mounting the carrier upon one end of a reciprocable coin-controlled slide plate, with the plunger extended in substantial parallelism with the line of reciprocation of the slide plate and in substantial alignment with the shift lever; resilient means on the carrier yieldingly advancing said plunger end toward the shift lever with a limited force insufficient in value to effect movement of the shift lever longitudinally of the timer shaft; a stop member fixed upon the plunger intermediate the opposite ends thereof; and abutment means on the carrier engageable by said stop member, to limit retraction of the plunger from the advanced position thereof relative to the carrier.

7. The starter mechanism as specified by claim 6, wherein the stop member is selectively adjustable and fixable at selected locations along the length of the plunger.

8. The starter mechanism as specified by claim 7, wherein the stop member is adjustable within limits imposed by the spacing of the bearing members from one another.

9. The starter mechanism as specified by claim 6, wherein the perforation of that bearing member which supports the leading end of the plunger is enlarged in a direction transverse to the line of reciprocation of the slide plate, to the extent of permitting a lateral displacement of said plunger end from said line of reciprocation; and means acting to yieldingly urge the plunger from said displaced position to a position of substantial parallelism with said line of reciprocation.

10. The starter mechanism as specified by claim 9, wherein the stop member is adjustable within the space between the bearing members.

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U.S. Cl. X.R.

194—92