July 31, 1962 J. BOWMAN 3,046,803

MECHANICAL MOVEMENT FOR COIN OPERATED TIMER

Filed April 9, 1958 2 Sheets-Sheet 1

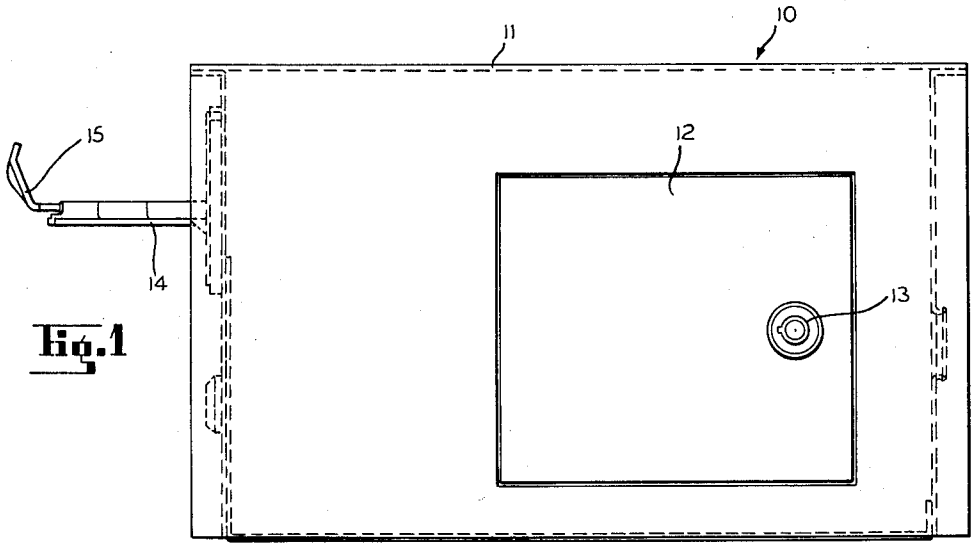


Fig. 1

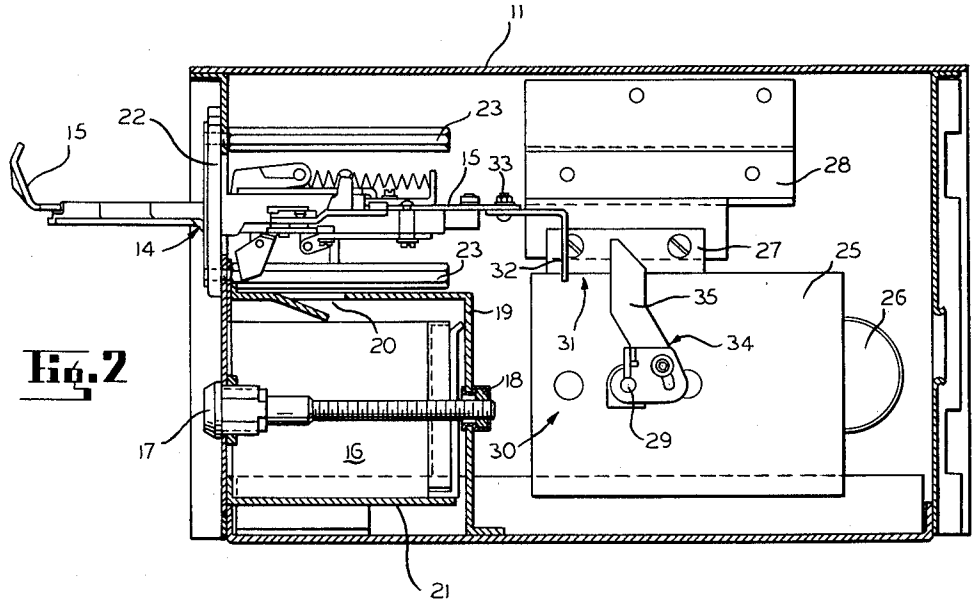


Fig. 2

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MECHANICAL MOVEMENT FOR COIN OPERATED TIMER

Filed April 9, 1958 2 Sheets-Sheet 2

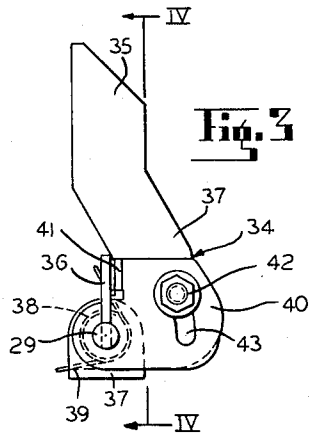


Fig. 3

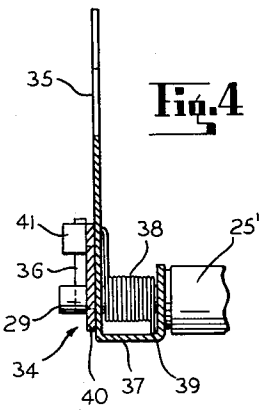


Fig. 4

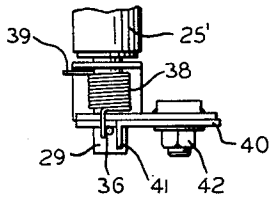


Fig. 5

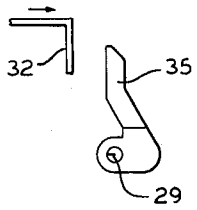


Fig. 6

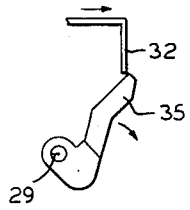


Fig. 7

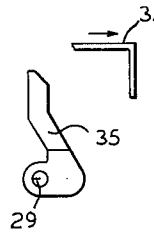


Fig. 8

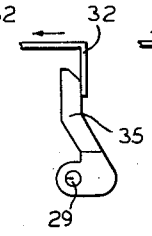


Fig. 9

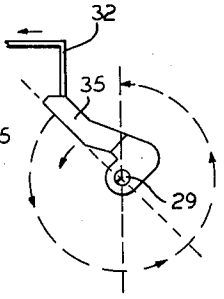


Fig. 10

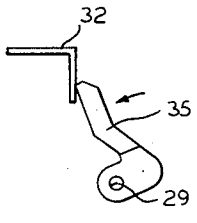


Fig. 11

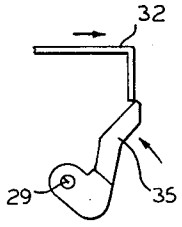


Fig. 12

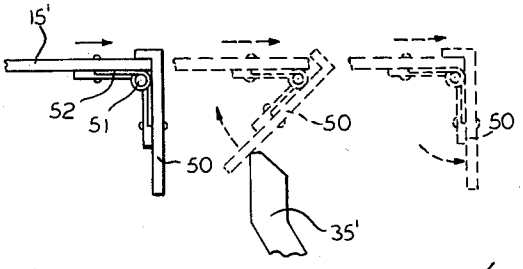


Fig. 13

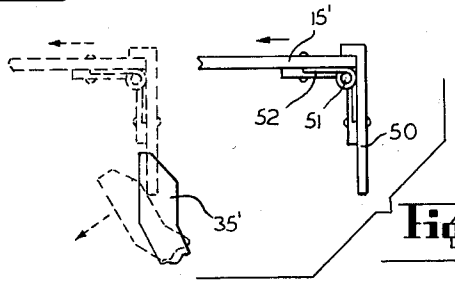


Fig. 14

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United States Patent Office 3,046,803 Patented July 31, 1962

3,046,803
MECHANICAL MOVEMENT FOR COIN OPERATED TIMER

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Filed Apr. 9, 1958, Ser. No. 727,424
9 Claims. (Cl. 74—104)

This invention relates generally to coin operated timers, such as may be used to control laundry machines, and more specifically to improved coordinating structures incorporated therein which render the timer assembly somewhat less susceptible to tampering.

Although the principles of the present invention may be included in various timers, a particularly useful application is made in a timer of the type that is employed with a coin mechanism, whereby a coin must be inserted therein to initiate the operation of the timer, which thereafter completes a program, such as a washing, rinsing, and drying program of a laundry machine.

It has been found that typical coin mechanisms may be operated without a coin if the mechanism is simultaneously jarred and its manual operator advanced. It appears that such a jar or blow causes internal components to shift due to their inertia as though a coin had been placed therein. Accordingly, certain coin mechanisms have been provided with a locking pin which drops into the operating member to lock it in an inward position in the event that it was moved to such a position without there being a coin inserted.

Prior known coin operated timers have been actuated from the finished position to a start position by the forward movement of the coin mechanism. In the event that a typical coin mechanism has been jarred, it thus becomes possible to obtain a free wash or other service, in that no coin was used to start the timer. If the coin mechanism has been provided with the above-mentioned locking pin to hold the operating means in an inward or forward position, the timer itself has nevertheless been advanced to the start position so that the service will have been obtained without the deposit of a coin.

Still further, coin operated timers typically are provided with two locked accesses thereto, one being to the coin box, the key to which the owner or his agent has custody, and the other being to the interior for routine service and maintenance, electrical connections, etc. The key to the latter is typically given to the building superintendent or his counterpart, some of whom have been found to manually advance an operating arm on the timer so as to achieve operation of the device controlled by the timer without the insertion of a coin.

In accordance with the principles of the instant invention, there is provided a novel coordinating or drive mechanism for the coin mechanism and the timer assembly itself. According to this invention, it is possible to advance the drive arm of the timer only by the return movement of the manual operating member of the coin mechanism, whereby even though the slide or operating member be moved to its inner or forward position, no operation of the timer will occur. Still further, the operating member of the coin mechanism is provided with an arm which interferes with the movement or shifting of the timer arm to a start position, whereby a person having access to the interior of the device cannot readily operate it without a coin.

Accordingly, it is an object of the present invention to provide an improved coin-operated timer coordinating mechanism.

Another object of the present invention is to provide a coin operated timer which is substantially foolproof insofar as ordinary type of operation without deposit of a coin is concerned.

Yet another object of the present invention is to provide a drive mechanism for connecting the coin and timer mechanisms of a timer assembly such that the timer mechanism or element will not be set by the forward movement of the coin mechanism, but be set by the return movement thereof.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

On the drawings:

FIGURE 1 is a side elevational view of a coin operated timer assembly;

FIGURE 2 is a view similar to FIGURE 1 but with certain parts removed or sectioned to show internal structure and components;

FIGURE 3 is an enlarged fragmentary view of a portion of FIGURE 2;

FIGURE 4 is a cross-sectional view taken along line IV—IV of FIGURE 3;

FIGURE 5 is a top view of the structure shown in FIGURE 3;

FIGURES 6–10 diagrammatically illustrate the operation of the coordinating drive mechanism of this invention;

FIGURES 11 and 12 diagrammatically illustrate how certain coin-free operation is obstructed; and

FIGURES 13 and 14 diagrammatically illustrate a slight modification of the invention and its operation.

As shown in the drawings:

The principles of this invention are particularly useful when embodied in a coin operated timer device assembly **10** such as shown in FIGURE 1. The device **10** includes a rugged case **11** having a service access door **12** on one side thereof which is openable whenever a lock **13** is opened. The case **11** also supports a coin mechanism **14** having a manual operating means **15** in which a coin is received.

Referring now to FIGURE 2, it will be noted that there is a coin box **16**, the access to which is under the control of a lock **17** which threads into a nut **18** loosely carried by an inner partition wall **19** which has an upwardly directed opening **20** disposed beneath the coin receiving mechanism **14** for receiving the coins therefrom. It will be noted that the coin chamber **16** is defined by a drawer **21** which is bolted and locked in place as described.

The coin mechanism **14** is flange mounted as at **22** to an end wall of the case **11** by a pair of studs **23** disposed inwardly of the case **11** and extending through a wall thereof into the flange **22** of the coin mechanism **14**.

The details of the coin mechanism **14** do not form a part of the instant invention, and are well known in the art. However, the coin mechanism **14** preferably is one of the type which has a pin or other lock for locking the slide **15** in an inward or forward position in the event that it is so positioned without the use of a coin. In this type of coin mechanism, the coin is released from the mechanism upon the return or outward movement of the operating means **15**.

The device further includes a timer assembly **25** driven by a motor **26** supported thereon. The timer **25** is secured by a pair of brackets **27**, **28** to an interior side wall of the case **11** as shown in FIGURE 2. The details of the timer element **25** do not form a part of the instant invention and the timer preferably includes a feature wherein an output shaft **29** may be driven in only one direction, in this instance counter-clockwise, as viewed in FIGURE 2.

An example of the timer **25** is shown in the United States patent to Constantine No. 2,703,347. In timers of this type, the shaft is rotatable for 360°. A series of cam operated switches are provided to control the program of the device to which the timer **25** is electrically connected. The timer is so internally wired that when the shaft **29** reaches the angular position shown in the drawing, power to the motor **26** is interrupted. To restart the timer, it is necessary to advance the shaft **29** in a counterclockwise direction to a starting position from which it will be operated by the motor **26** to the finish position as drawn in FIGURE 2.

Since the motor **26** is powered through one of the switches within the timer **25**, it can be seen that the total duration of the timing program is partly dependent upon the angular distance that the shaft **29** is initially manually advanced at the start of the program. Obviously, therefore, the angular distance between the starting and the finishing positions of the shaft **29** is less than 360°. It is further to be noted that the shaft **29** of the timer element **15** is disposed transversely and laterally offset from the path in which the operating means or slide member **15** of the coin mechanism **14** may move.

To coordinate the movements of the coin mechanism **14** and the timer mechanism **25**, there is provided a one-way drive generally indicated at **30** having a lost motion connection generally indicated at **31**. The drive **30** includes a first drive arm **32** which is connected to the manual operating means **15** and which is reciprocably movable therewith in a path above the shaft **29**. The drive arm **32** extends angularly and downwardly from the manual operator **15** and is bolted thereto by a pair of bolts and nuts **33**. As the manual operating means **15** is reciprocably moved from its illustrated return position in an inward or first or forward direction, the first drive arm **32** is likewise also moved fom the illustrated return position to an extreme inner position.

The drive **30** also includes a second drive arm **34** which is carried by the shaft **29**. The drive arm **34** has an upper portion **35** which extends radially for a distance which intersects the path of the first drive arm **32**, the length of the portion **35** being greater than the distance from the shaft **29** to the drive arm **32**, no matter at what point along its path the drive arm **32** is disposed. This is an essential relationship if all of the preferred features of the instant invention are to be utilized. However, as will be apparent later, this relationship is not entirely essential if a certain one of the features of the instant invention be omitted.

Referring now to FIGURES 3–5, the structural details of the second drive arm **34** and the outer end of the shaft **29** are shown in greater detail. Shaft **29** projects from and is journalled in a boss **25'** and is cross-drilled adjacent to its outer end, to receive a pin **36** which extends radially therefrom. The drive arm **34** includes a generally J-shaped member **37** which is provided with a pair of apertures through which the shaft **29** projects whereby the member **37** may be received on the shaft **29** between the pin **36** and the boss **25'**. The longer leg of the J-member **37** comprises the upper portion **35**. A torsion spring **38** is also received on the shaft **29** between the legs of the J-member **37**, one end of the torsion spring **38** bearing against the J-member as at **39**, and the other end of the spring **38** bearing against the pin **36**. A stop bracket **40**, having an abutting ear **41**, is carried flatwise against the outer side of the J-shaped member **37**, one side of the ear **41** being engageable with the pin **36**. The bracket member **40** is secured to the J-member **37** as by a nut and bolt assembly **42**. Preferably, the ear **41**, while it may be an integral part of the J-member **37**, is a part of such separate member **40** which is slotted as at **43** so that the angular relationship between the bracket **40** and the J-shaped member **37** may be selected.

With the shaft **29** held against clockwise movement by the timer **25**, any rotation of the upper portion **35** by a clockwise force drives the bracket **40** and ear **41** with it away from the pin **36**. The lower portion of the J-member, engaging the spring **38** as at **39**, slightly increases the tension of the spring **38**. Upon release of such clockwise force on the upper portion **35**, the spring **38**, acting between the pin **36** and the J-portion **37**, returns the J-member **37** and the ear **41** secured thereto in a counterclockwise direction to the position shown in FIGURE 3 where the ear **41** engages the pin **36**. A counterclockwise movement from the position illustrated in FIGURE 3 causes the ear **41** to act on the pin **36**, which, in acting as a lever, rotates the shaft **29** in a counterclockwise direction.

It is now apparent that the distance **31** shown in FIGURE 2 may be varied by the setting of this adjustment. This variation may be accomplished for the purpose of taking up manufacturing tolerances, but more importantly, the adjustment is of such magnitude that the amount that the arm **35** will be moved by the arm **32** in either direction may thereby be adjusted.

Referring now to FIGURES 6–10, there is schematically shown the first drive arm **32**, the second drive arm **35**, and the shaft **29**. Since relative motion is possible between the arm **35** and the shaft **29**; an index mark has been added to the drawings to facilitate this explanation. In FIGURE 6, the drive arm **32** is in its return position as shown in FIGURE 2, while the second drive arm **35** is in its drive attitude as shown in FIGURES 2 and 3. As the drive arm **32** advances to the right in response to movement of the manual operating means **15**, it engages the upper portion **35** and causes the drive arm **35** to rotate clockwise with respect to the shaft **29** which remains stationary. Eventually the drive arm **32** clears the upper end of the drive arm **35** and moves on to its inner position as shown in FIGURE 8. Upon such disengagement, the pivotably supported arm **35**, being resiliently biased by the spring **38** immediately moves in an angular direction back to the drive attitude. Since no movement of the shaft **29** occurs during this motion of the upper arm **32**, it can be seen that if the movement of the drive arm **32** is attained by jarring of the coin mechanism **14**, such inward movement of its slide member **15** does not initiate operation of the timer. Moreover, the slide becomes locked in the inner position in a well-known manner.

However, if there be a coin in the slide member **15** of the coin mechanism **14**, the member **32** may be retracted until it engages the lower drive arm **35** as shown in FIGURE 9. Thereafter, further retraction of the drive arm **32** effects an angular shift of the shaft **29** as indicated in FIGURE 10. This angular shift sets the timer by advancing it to the beginning of the program whereupon the motor **26** becomes energized in a conventional way, and so that the arm **35** may be driven thereby as indicated by the broken lines to the drive attitude illustrated in FIGURE 6 whereupon the timer is stopped.

Referring again to FIGURE 6, if an attempt be made to start the timer by manually advancing the drive arm **35** in a counter-clockwise direction, access being had through the side door **12**, it will be noted that the arm **35** may be advanced only a few degrees, such as indicated in FIGURE 11. Preferably, the program of the timer is so arranged that this small angular advance does not energize the timer. However, in the event that this small movement does energize the timer motor **26**, the power obtained therefrom is so slight and the components driven by it are so rugged that the motor is merely stalled after the slack in the gear train has been taken up. Thus, this type of manual tampering will be of no avail to operate the device without a coin. Moreover, if there has been such tampering, the situation is readily corrected by the insertion of a coin in the normal manner by the next user, there being sufficient angular movement between the drive arm **35** and the shaft **29** to accomplish this purpose.

In the event that the coin mechanism **14** be operated without a coin so that the drive arm **32** becomes locked near its inner position as shown in FIGURE 12, then of

course the arm **35** may be manually advanced by someone who is able to gain access through the door **12**. However, such access will still not produce a complete timing cycle since the arm **35** will eventually strike the drive arm **32** as shown in FIGURE 12. It is apparent that the last portion of the cycle is thus not provided. This arrangement is deliberately calculated to effect any one of several things, such as failure of the machine to shut-off, failure of the machine to emptly the water, failure of the machine to spin-dry the clothing therein, and the like, the correction of any one of which would undoubtedly require the services of someone other than the wrong-doer who could then investigate the tampering.

Referring now to FIGURES 13 and 14, there is shown a slight modification of the instant invention wherein the advantageous condition described in behalf of FIGURE 8 may be obtained. In this embodiment, a downwardly depending drive arm **50** is pivotally secured as at **51** to the manual operating means **15'**. The arm **50** is biased to a normal drive attitude as shown in solid lines by a torsion spring **52**. The second drive arm **35'**, with this structure, may be secured positively and directly to the shaft **29** in any known manner. In the operation of this device, the upper drive arm **50** yields as shown in broken lines when the member **15'** is advanced to the right, and when the arm **50** clears the second arm **35'**, the spring **52** unwinds to reposition the arm **50** in the drive attitude as shown to the right of the arm **35'**. This position is thus analogous to FIGURE 8 so that advancement of the arm **35'** may be obtained as shown in FIGURES 9 and 10 if a coin has been deposited. Likewise, the arm **50** is locked in the right hand position by the coin mechanism if it was so advanced due to mere jarring of such mechanism. This return movement is shown in FIGURE 14.

Although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism, said means comprising:

(*a*) a slide member adapted to be secured to and reciprocated by the coin mechanism;

(*b*) a first rigid drive arm extending angularly and rigidly from said slide member and movable therewith in a path;

(*c*) a rotatable shaft adapted to be always co-movable with the timer mechanism and disposed with its axis in offset relation to said path; and

(*d*) a second drive arm carried by said shaft and extending radially therefrom to intersect said path, said second drive arm being pivotally supported on said shaft for relative angular movement, and being resiliently biased in only one angular direction to a drive attitude (1) in such a manner that when said first arm is reciprocated in a first direction, to engage said second arm, said one arm will yieldably pivot about said shaft in one direction out of the way and thereafter immediately return by pivoting on said shaft in the opposite direction to said drive attitude, (2) and in such manner that when said first arm is returned, said arms will engage to effect an angular shift of said shaft in response thereto.

2. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism, said means comprising:

(*a*) a slide member adapted to be secured to and reciprocated by the coin mechanism;

(*b*) a first rigid drive arm extending angularly and rigidly from said slide member and movable therewith in a path;

(*c*) a rotatable shaft adapted to be always co-movable with the timer mechanism and disposed with its axis in offset relation to said path; and

(*d*) a second drive arm comprising an assembly of two portions, one of which is attached to said shaft for joint rotational movement therewith, and the other of which is pivotally supported with respect to said one portion and extends radially from said shaft to intersect said path, said other portion being resiliently biased in only one angular direction to a drive attitude (1) in such a manner that when said first arm is reciprocated in a first direction to engage said other arm portion, said other portion of said second arm will yieldably pivot with respect to said shaft in one direction out of the way and thereafter immediately return in the opposite direction to said drive attitude, and (2) in such manner that when said first arm is reciprocatingly returned, said arms will engage to effect an angular shift of said shaft in response thereto.

3. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism, said means comprising:

(*a*) a slide member adapted to be secured to and reciprocated by the coin mechanism;

(*b*) a first rigid drive arm extending angularly and rigidly from said slide member and movable therewith in a path;

(*c*) a rotatable shaft adapted to be always co-movable with the timer mechanism and disposed with its axis in offset relation to said path;

(*d*) a second drive arm comprising an assembly of two portions, one of which is attached to said shaft for joint rotational movement therewith, and the other of which is pivotally supported with respect to said one portion and extends radially from said shaft to intersect said path, said other portion being resiliently biased in only one angular direction to a predetermined angular drive attitude for cooperating with said first arm in response to reciprocation thereof in only one direction to effect an angular shift of said shaft, and to yield by pivoting with respect to said shaft in response to reciprocation of said first arm in the opposite direction; and

(*e*) means comprising a part of at least one of said portions for adjusting said drive attitude of said other portion with respect to said shaft in a manner that the amount of said angular shift of said shaft effected by the movement of said first arm may be selected.

4. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism, said means comprising:

(*a*) a slide member adapted to be secured to and reciprocated by the coin mechanism;

(*b*) a first rigid drive arm extending angularly and rigidly from said slide member and movable therewith in a path;

(*c*) a rotatable shaft adapted to be always co-movable with the timer mechanism and disposed with its axis in offset relation to said path;

(*d*) a second drive arm comprising an assembly of two portions, one of which is attached to said shaft for joint rotational movement therewith, and the other of which is pivotally supported with respect to said one portion and extends radially from said shaft to intersect said path, said other portion being resiliently biased in only one angular direction to a predetermined angular drive attitude for cooperating with said first arm in response to reciprocation thereof in only one direction to effect an angular

shift of said shaft, and to yield by pivoting with respect to said shaft in response to reciprocation of said first arm in the opposite direction; and

(*e*) means acting between said portions and operative to vary the angular relation therebetween in said drive attitude for varying the amount of said angular shift.

5. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism where the timer mechanism is adapted to be operated in only one direction and has a program beginning at a starting position and terminating at a finish position less than 360° from said starting position, said means comprising:

(*a*) an operating means adapted to be secured to and manually moved by means of the coin-receiving mechanism;

(*b*) a first rigid arm extending angularly from said operating means and being reciprocably movable therewith in a path extending from a return position to an inner position;

(*c*) a rotatable shaft adapted to be always corotatable with the timer mechanism and disposed with its axis offset from said path; and

(*d*) a second drive arm carried by said shaft, said second drive arm having a portion pivotally supported for movement with respect to said shaft and being resiliently angularly biased in only said one direction to a drive attitude, said portion of said second arm being yieldably pivotable in an opposite direction with respect to said shaft and also self-returnable in response to movement of said first arm to said inner position, and operative to effect an angular shift of said shaft in response to movement of said first arm to said return position; said second arm being movable into engagement with said first arm when said first arm is in said return position to preclude any further movement of said second arm, and to preclude movement of the timer mechanism to its starting position, if the same be manually attempted.

6. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism where the timer mechanism is adapted to be operated in only one direction and has a program beginning at a starting position and terminating at a finish position less than 360° from said starting position, said means comprising:

(*a*) an operating means adapted to be secured to and and manually moved by means of the coin-receiving mechanism;

(*b*) a first rigid arm extending angularly from said operating means and being reciprocably movable therewith in a path extending from a return position to an inner position;

(*c*) a rotatble shaft adapted to be always corotatable with the timer mechanism and disposed with its axis offset from said path; and

(*d*) a second drive arm carried by said shaft, said second drive arm having a portion pivotally supported for movement with respect to said shaft and being resiliently angularly biased in only said one direction to a drive attitude, said portion of said second arm being yieldably pivotable in an opposite direction with respect to said shaft and also self-returnable in response to movement of said first arm to said inner position, and operative to effect an angular shift of said shaft in response to movement of said first arm to said return position; said second arm being engageable during timed movement with said first arm when said first arm is in said inner position to preclude any further movement of said second arm, and to preclude movement of the timer mechanism to its finish position.

7. A mechanical means adapted for connecting and coordinating a coin-receiving mechanism and a timer mechanism where the timer mechanism is adapted to be operated in only one direction and has a program beginning at a starting position and terminating at a finish position less than 360° from said starting position, said means comprising:

(*a*) an operating means adapted to be secured to and manually moved by means of the coin-receiving mechanism;

(*b*) a first rigid arm extending angularly from said operating means and being reciprocably movable therewith in a path extending from a return position to an inner position;

(*c*) a rotatable shaft adapted to be always corotatable with the timer mechanism and disposed with its axis offset from said path; and

(*d*) a second drive arm carried by said shaft, said second drive arm having a portion pivotally supported for movement with respect to said shaft and being resiliently angularly biased in only said one direction to a drive attitude, said portion of said second arm being yieldably pivotable in an opposite direction with respect to said shaft and also self-returnable in response to movement of said first arm to said inner position, and operative to effect an angular shift of said shaft in response to movement of said first arm to said return position; said second arm being movable into engagement with said first arm when said first arm is in either said return position or, during timed movement, said inner position to preclude any further movement of said second arm, and to preclude movement of the timer mechanism, to its starting or finish positions respectively.

8. In a timer structure including a timer motor, a function control shaft rotatable by siad motor, said motor being energized in response to movement of said shaft to a start position, the improvement of means for rendering said shaft responsive to a rigid reciprocable coin-releasable actuating member for initially moving said shaft to the start position, comprising:

(*a*) a drive arm rotatably mounted on said shaft for relative angular movement with respect to said shaft;

(*b*) a pin carried by said shaft and extending radially therefrom for engagement with said drive arm;

(*c*) spring means yieldably biasing said drive arm against said pin;

(*d*) said drive arm being adapted to be engaged by the rigid actuating member for applying a force to said shaft through said pin to move said shaft angularly toward the start position, thereby enabling said motor to drive said shaft;

(*e*) said drive arm being further adapted to thereafter be rotated by said shaft into engagement with the rigid actuating member, only if the rigid actuating member has not been fully retracted, for effecting yielding of said spring means to enable continued rotation of said shaft by said motor.

9. In a timer structure including a timer motor, a function control shaft rotatable by said motor, said motor being energized in response to movement of said shaft to a start position, the improvement of means for rendering said shaft responsive to a rigid reciprocable coin-releasable actuating member for initially moving said shaft to the start position, comprising:

(*a*) a bracket mounted on said shaft for rotation about said shaft, said bracket having a stop portion;

(*b*) a drive arm;

(*c*) attachment means rigidly securing said drive arm to said bracket for rotation therewith;

(*d*) means enabling the effective angular relation about the shaft axis between said drive arm and said stop portion to be selectably varied;

(*e*) a pin carried by said shaft and extending radially therefrom for engagement with said stop portion;

(*f*) spring means yieldably biasing said stop portion against said pin;

(*g*) said drive arm being adapted to be engaged by the rigid actuating member for applying a force to said shaft through said bracket and said pin to move said shaft angularly toward the start position, thereby enabling said motor to drive said shaft;

(*h*) said drive arm being further adapted to thereafter be rotated by said shaft into engagement with the rigid actuating member, only if the actuating member has not been fully retracted, for effecting yielding of said spring means to enable continued rotation of said shaft by said motor.

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