Oct. 2, 1962 J. BOWMAN 3,056,307

MECHANISM FOR COIN-OPERATED TIMER

Filed March 31, 1960 2 Sheets-Sheet 1

Fig. 1

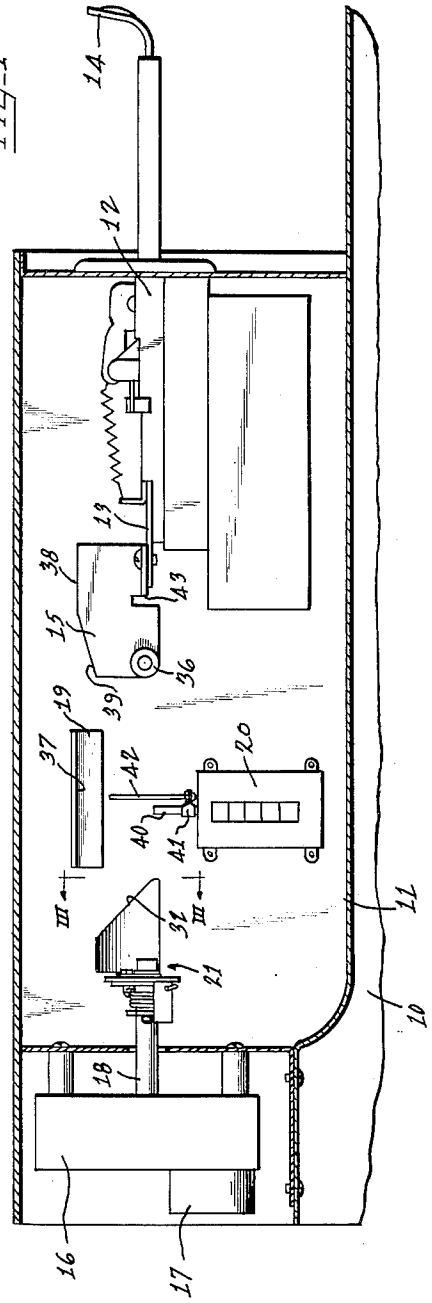
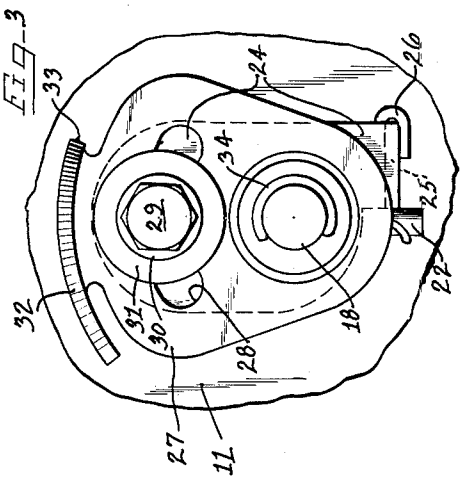



Fig. 3



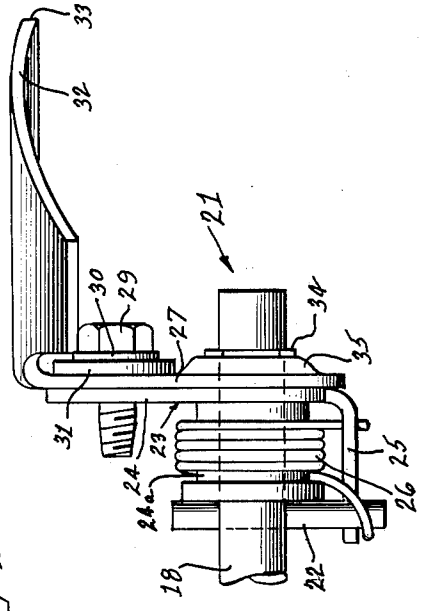




Fig. 2

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Oct. 2, 1962 J. BOWMAN 3,056,307

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Filed March 31, 1960 2 Sheets-Sheet 2

Fig. 4

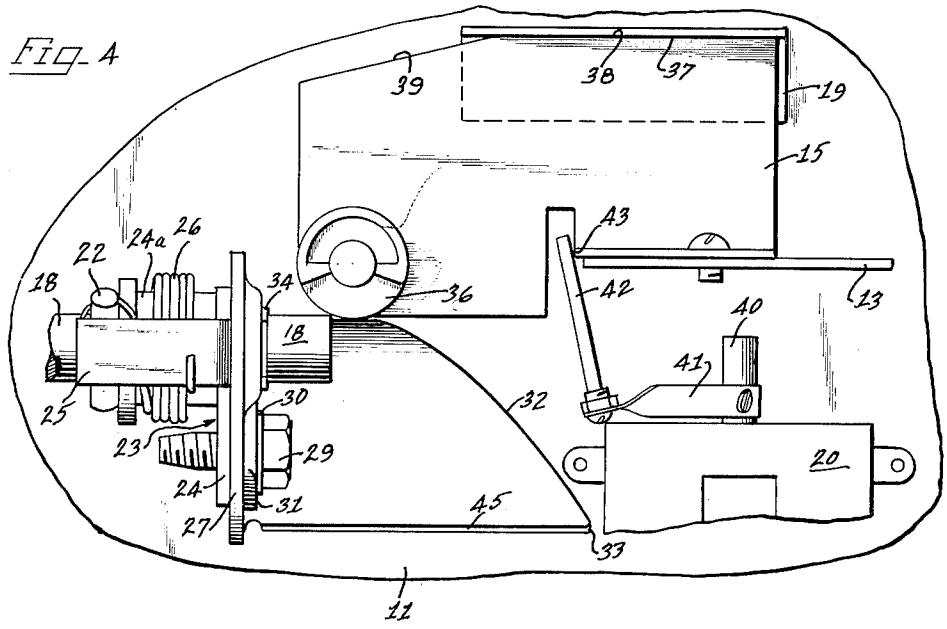
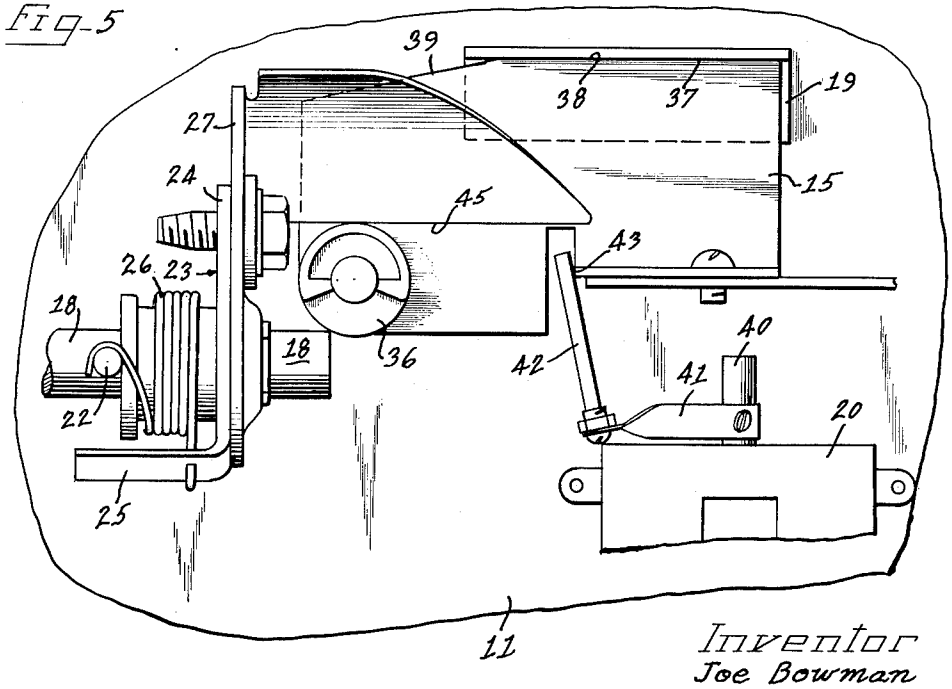



Fig. 5




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# MECHANISM FOR COIN-OPERATED TIMER

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5 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 mechanism incorporated therein for effecting initial movement of a timer shaft to a start position in response to movement of a reciprocable coin-releasable actuating member.

Although the principles of the present invention may be included in timers for various devices, a particularly useful application is made in a timer of the type that is employed on a machine in a coin laundry. In machines of this type, a coin is inserted to initiate the operation of the timer, and hence of the machine, which machine under the control of the timer, completes a predetermined program.

It has been found that the user of a machine of this type frequently will insert a coin in the coin mechanism, and force the coin mechanism or actuating member forward, doing so at a time when the timer has not yet entirely completed the prevoius program. In all prior structures of which I am aware, there is a portion of the cycle, toward the end thereof, during which there is presented toward the actuating member, certain structure which is not adapted to cooperate at that time with the actuating member for initiating a new timer cycle. The presence of such structure constitutes a physical obstruction within the device, such obstruction precluding full inward movement of the actuating member or coin slide. When this occurs, not infrequently the operator or user appplies additional force, and to such an extent that bending, jamming, or other damage ensues.

I have also noted that commercially available coin mechanisms are constructed with a considerable amount of clearance so that the coin slide or actuating member may be caused to tilt at its ends as a first class lever, much in the nature of a teeter-totter. The presence of a considerable amount of vertical freedom at the inner or actuating end of this member causes an uncertainty in the amount that the timer shaft is initially advanced when the force exerted by the actuating member is other than a straight push.

Certain devices of this general type have previously been constructed without provision for adjustment of the effective spacing between the actuating member and the drive or driven arm on the timer shaft. This has required during manufacture a close control of tolerances so as to avoid any undesirable buildup thereof. Further, such construction renders it impossible to make any adjustment of the angular magnitude of the initial timer shaft movement. Where the timer controls the duration of the filling of an appliance, such as water into a washer, this has made it impossible to compensate for the difference in water pressure from locality to locality, and hence impossible to adjust the depth to which water is initially admitted.

The inclusion of a counter mechanism to register the accumulated number of cycles which a device of this type is operated is common. However, where suitable adjustments are provided to compensate for tolerance buildups and water pressure variation, a problem arises as to maintaining the correct relationship between the counter mechanism and other parts of the device.

Accordingly, it is a principal object of this invention to provide structure by which the timer may be moved to the start position in which structure there is no deadspot, whereby binding or jamming of the mechanism is absolutely precluded when prematurely actuated.



It is a further object of the present invention to provide structure of the type described wherein the deadspot is eliminated, and wherein the structure is so made that the timer may advance through a full cycle even though the actuating member may have become jammed in an interfering position.

A further object of the present invention is to provide structure of the type described wherein the deadspot is eliminated, and wherein the structure is so made that an adjustment may be selectively varied to compensate for tolerance buildups, water pressure variation, and the like.

A still further object of the present invention is to provide structure of the type described having substantially no deadspot, and wherein means are provided to preclude any teeter-tottering such as may be inherent in the actuating member.

Yet another object of the present invention is to provide structure which is torsionably yieldable to permit greater travel of the actuating member to move the timer to a start position than is needed to move a counter to its limiting position.

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, partly broken away, of a structure embodying the principles of the present invention;

FIGURE 2 is an enlarged elevational view of certain structure shown in FIGURE 1;

FIGURE 3 is an end elevational view of the structure shown in FIGURE 2, taken along line III—III of FIGURE 1;

FIGURE 4 is an enlarged fragmentary view of a portion of FIGURE 1 showing the parts immediately after the timer shaft has been advanced to a start position; and

FIGURE 5 is similar to FIGURE 4, and shows the relationship between the parts at the end of a timer cycle when the actuating member has been left in an inward or non-retracted position, such as by jamming.

As shown in the drawings:

The principles of this invention are particularly useful when embodied in a structure including a timer which is adapted to be set into motion in response to movement of a coin-releasable actuating member, such structure being generally indicated by the numeral **10** in FIGURE 1. The structure **10** includes a rugged case **11** which supports a coin mechanism **12** having a coin-releasable slide **13** which is manually actuatable as at **14**, the inner end of which supports an actuating member **15**. The specific details of the coin mechanism **12** and slide **13**, which support the coin-releasable actuating member **15**, do not form a part of this invention, and are known in the art. To understand the instant invention, it is sufficient to state that the proper coin or coins are inserted in the slide **13**, externally to the case **11**, which slide is then manually advanceable. In commercially available coin mechanisms **12**, there is usually a considerable amount of vertical freedom or play of the inner end of the slide **13** where the actuating member **15** is supported, so that by raising and lowering the portion of the slide **13** indicated by the numeral **14**, some corresponding but oppositely directed vertical movement of the actuating member **15** may be expected.

The structure **10** further includes a timer illustrated

schematically at **16**, which includes a timer motor **17** operatively connected to drive a timer shaft **18** which is spaced from and parallel to the path in which the actuating member **15** is reciprocable. The timer **16** is secured in any convenient manner to the case **11**, and includes function control means such as electrical switches operated by the rotation of the shaft **18**. The internal details of the timer **16** do not form a part of this invention, there being several such timers well known in the art, an example of which is illustrated in the patent to Constantine, No. 2,703,347. For a complete understanding of the relationship of the timer **16** to the present invention, it is sufficient to state that upon rotation of the shaft **18** to a start position, a circuit to the motor **17** is closed so that the motor thereafter drives the shaft **18** together with the various function control means operated thereby, such operation continuing from the start position through the cycle and up to the end of the program cycle, a position illustrated by FIGURE 1.

The structure **10** further preferably includes a guide member generally indicated by the numeral **19** and a counting mechanism or counter indicated by the numeral **20**. The guide member **19** and the counter **20** are each secured in any convenient manner to the case **11** in a rigid or fixed position.

A drive structure generally indicated at **21** is secured to the end of the shaft **18**. The details of the drive structure **21** are more clearly seen in FIGURES 2 and 3.

A pin **22** is rigidly carried by the shaft **18** and extends radially therefrom. Adjacent to the pin **22** there is a bracket member generally indicated at **23** which has a hub portion **24***a* slidably and rotatably carried on the shaft **18**, the bracket **23** also having a plate portion **24** secured to the hub portion **24***a*, for example by staking. The plate portion **24** has an integral ear, stop, or stop portion **25** which extends generally parallel to the shaft **18** in radially spaced relation thereto, and which normally engages the pin **22**. Spring means, illustrated here as a torsion spring **26**, acts between the stop portion **25** and the pin **22** to yieldably bias or urge the stop portion **25** against the pin **22**.

To the plate portion **24** of the bracket **23**, there is secured a drive arm portion **27**. Since this is a rigid type of attachment, the drive arm portion **27** is normally rotatable with the bracket **23**. In order to establish the relative angular relationship between the drive arm portion **27** and the stop portion **25**, the drive arm portion **27** is slotted as at **28**, shown in FIGURE 3, and through the slot there extends a screw **29** provided with a lock washer **30** and washer **31**.

In a preferred embodiment, this adjustment feature is present. It is to be understood, however, that certain features of this invention may be utilized without the employment of the adjustment feature. Where this is done, it is to be understood that the drive arm portion would be integral with the stop, and therefore the drive arm portion **27** and the stop portion **25** may be jointly referred to as a drive arm.

In this embodiment, the drive arm is provided with means defining an arcuate cam surface **32** which is substantially concentric with the shaft **18** and which cam surface **32** is directed toward the actuating member **15** for engagement thereby. It is to be particularly noted that the portion of the drive arm which defines the cam surface terminates at the end of the cam surface **32** which is closer to the actuating member **15** in a point **33**. Thus it is apparent that during the rotation of the cam surface **32** by the timer shaft **18**, there is presented substantially no surface directed toward the actuating member **15** with which the actuating member **15** could engage, other than the cam surface **32**.

The drive arm assembly **23** is held on the shaft **18** in a manner to preclude removal thereof by a C-shaped snap ring **34**, so that the assembly **23** is disposed between the pin **22** and the snap ring **34**. The drive arm portion **27** is embossed as at **35** to provide clearance, if needed, for the type of attachment used between the hub portion **24***a* and the plate portion **24**.

In this embodiment, the actuating member **15** is provided with a roller **36** or other antifriction means, the outer periphery of which is engageable with the cam surface **32**. As the actuating member **15** is forced toward the timer **16**, a torque is thereby applied by the drive arm assembly **23** to the pin **22** to effect initial rotation of the shaft **18** to the start position.

Recognizing that there is inherently a certain amount of vertical movement possible at the roller **36**, it can be seen that the actual amount of rotation of the shaft **18** would in part be dependent upon whether the user were applying an upward or a downward force to the point **14** at the inner end of the stroke. To obviate such a possibility, the guide member **19** is provided with a downwardly directed surface **37** which overhangs the path in which the actuating member **15** is reciprocable. The actuating member **15** is similarly provided with an upwardly directed surface **38**, the surfaces **37** and **38** being slidably engageable with each other, and being so located with respect to each other as to prevent any significant vertical movement of the roller **36**. When the instant structure is employed, it is preferable to further provide a cam surface **39** as a part of either of the guide surfaces **37** or **38**, to serve as a lead-in, which of course could be omitted if the surface **37** were suitably extended. It is thus apparent that the actuating member **15** actually wedges its way in between the guide surface **37** and the cam surface **32** to effect rotation of the drive arm assembly **23**.

The counting mechanism **20** has a counter shaft **40** extending therefrom. The detailed structure comprising the mechanism **20** is known in the art and forms no part of the instant invention. However, it is sufficient to state, for purpose of understanding the instant invention, that the shaft **40** is rotatable or rockable to a limited extent to a limiting position, and is resiliently biased to return to the position illustrated. A feature of the instant embodiment includes a torsion member **41** secured rigidly at one end to the counter shaft **40**, and extending radially therefrom. A rigid finger **42** is rigidly secured to the torsion member **41** at a point remote from the counter shaft **40**, and the finger **42** normally extends in a direction generally parallel to the counter shaft **40**, and is disposed in the path of the reciprocable actuating member **15** which has an abutment portion **43** engageable therewith.

Referring now to FIGURE 4, there is shown the relationship between the components at the end of the inward movement of the actuating member **15**. The roller **36** has engaged the cam surface **32** to rotate the drive arm assembly **23** in a manner wherein the stop portion **25** has acted through the pin **22** to rotate the shaft **18** to a start position. During this travel of the actuating member **15**, the abutment portion **43** of the actuating member **15** engages the finger **42** to effect rotation of the counter shaft **40**. However, the counter shaft **40** reaches its limiting position before the actuating member **15** has reached its inner limit of travel. At this point, namely when the counter shaft **40** has reached its limiting position, further movement of the actuating member **15** applies a torsional force to the torsion member **41**. In this embodiment, the torsion member **41** is a blade which has a ninety degree twist, and the torsional force applied thereto by the actuating member **15** effects a resilient yielding of the same, since it comprises spring material, thereby avoiding the necessity for any accurate coordination of travel between the actuating member **15** and the counter shaft **40**. Upon retraction of the actuating member **15**, the finger **42** is returned to its normal position by the torsion member **41**, which in turn is restored to its

normal position by the internal bias on the counter shaft 40.

Attention is now directed to FIGURE 5. In the event that the coin mechanism 12 becomes jammed with the actuating member 15 disposed in an inward position, such as shown in FIGURE 5, or in the event that a prankster deliberately holds it in the inner position, the timer shaft 18 will continue to be rotated by the motor 17 until an edge portion 45 of the drive arm assembly 23 comes into engagement with the roller 36 such as shown. At this point, the drive arm portion becomes stalled, but the shaft 18 is not stalled since the spring 26 resiliently yields in response to continued rotation of the timer shaft 18 through a force applied by it through the pin 22. Thus, the motor 17 is sufficiently strong not only to operate the timer but to further load the spring 26, thereby permitting the timer shaft 18 to continue to rotate to the end of the operating cycle. Upon subsequent retraction of the reciprocating member 15, the spring 16 unwinds and places the structure immediately in condition for reuse. Thus by this structure, the timer motor is not stalled, the timer program is permitted to be completed, and the drive arm assembly and timer as well as the actuating member 15 are not in any way thereby damaged.

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 structure adapted for connecting a reciprocable coin-receiving mechanism with a timer mechanism of the type having a motor-driven shaft and wherein its motor is energized in response to movement of the shaft to a start position, said structure comprising: an actuating member adapted to be connected to and reciprocably moved by the coin-receiving mechanism; a drive arm adapted to be mounted on the shaft for having rotational driving engagement therewith; said drive arm having a cam surface adapted to be disposed in radially spaced relation to the shaft and to be directed toward said actuating member for engagement thereby, said drive arm terminating in a point at that end of said cam surface which is closer to said actuating member; said actuating member being engageable with said cam surface to apply a force to the shaft to move the shaft angularly to the start position, thereby enabling the motor to drive the shaft.

2. A structure adapted for connecting a reciprocable coin-receiving mechanism with a timer mechanism of the type having a motor-driven shaft and wherein its motor is energized in response to movement of the shaft to a start position, said structure comprising: an actuating member adapted to be connected to and reciprocably moved by the coin-receiving mechanism; a bracket adapted to be mounted on the shaft for having rotational driving engagement therewith; a drive arm separate from said bracket; means normally rigidly securing said drive arm to said bracket, said securing means being constructed to enable the relative position between said drive arm and said bracket to be selectably varied about the axis of the shaft; said drive arm having a cam surface radially offset from the shaft and directed toward said actuating member for engagement thereby, said drive arm terminating in a point at that end of said cam surface which is closer to said actuating member; said actuating member being engageable with said cam surface to apply a force to the shaft by means of said bracket to move the shaft angularly to the start position, thereby enabling the motor to drive the shaft.

3. A structure adapted for connecting a reciprocable coin-receiving mechanism with a timer mechanism of the type having a motor-driven shaft and wherein its motor is energized in response to movement of the shaft to a start position, said structure comprising: an actuating member adapted to be connected to and reciprocably moved by the coin-receiving mechanism; a drive arm adapted to be mounted on the shaft and to have rotational driving engagement therewith, said drive arm having a surface directed toward said actuating member for engagement thereby; a rigidly supported counting mechanism having a shaft which is angularly movable about its axis to a limiting position; a torsion member rigidly secured to said counter shaft and extending radially therefrom, said torsion member being resiliently yieldable about its axis; a rigid finger rigidly secured to said torsion member at a point remote from said counter shaft and normally extending generally parallel to said counter shaft and into the path of said reciprocable actuating member; said actuating member being engageable with said drive arm surface and with said finger to apply forces both to the motor-driven shaft to move the motor-driven shaft angularly to the start position, thereby enabling the motor to drive the motor-driven shaft, and also to said finger to operate said counting mechanism; said counting mechanism being so constructed that said counter shaft reaches said limiting position before the motor-driven shaft reaches the start position; said torsion member being yieldable about its axis in response to movement of said actuating member while said counter shaft is in said limiting position.

4. A structure adapted for connecting a reciprocable coin-receiving mechanism with a timer mechanism of the type having a motor-driven shaft and wherein its motor is energized in response to movement of the shaft to a start position, said structure comprising: an actuating member adapted to be connected to and reciprocably moved by the coin-receiving mechanism; a bracket adapted to be mounted on the shaft and to have rotational driving engagement therewith; a drive arm separate from said bracket; means normally rigidly securing said drive arm to said bracket, said securing means being constructed to enable the relative position between said drive arm and said bracket to be selectably varied about the axis of the shaft; said drive arm having a cam surface radially offset from the shaft and directed toward said actuating member for engagement thereby; a rigidly supported counting mechanism having a shaft which is angularly movable about its axis to a limiting position; a torsion member rigidly secured to said counter shaft and extending radially therefrom, said torsion member being resiliently yieldable about its axis; a rigid finger rigidly secured to said torsion member at a point remote from said counter shaft and normally extending generally parallel to said counter shaft and into the path of said reciprocable actuating member; said actuating member being engageable with said drive arm surface and with said finger to apply forces both to the motor-driven shaft to move the motor-driven shaft angularly to the start position, thereby enabling the motor to drive the motor-driven shaft, and also to said finger to operate said counting mechanism; said counting mechanism being so constructed that said counter shaft reaches said limiting position before the motor-driven shaft reaches said start position; said torsion member being yieldable about its axis in response to movement of said actuating member while said counter shaft is in said limiting position, whereby said relative position between said drive arm and the motor-driven shaft may be selectably varied about the motor-driven shaft axis without readjusting the relation between said actuating member and said finger.

5. A structure adapted for connecting a reciprocable coin-receiving mechanism with a timer mechanism of the type having a motor-driven shaft and wherein its motor is energized in response to movement of the shaft to a start position, said structure comprising: an actuating member adapted to be connected to and reciprocably moved by the coin-receiving mechanism; a bracket including an apertured hub portion adapted to be slidably received directly on the timer shaft for rotation about the shaft axis, and

a plate portion secured to an end of said hub portion, said plate portion having an integral stop and a mounting portion extending radially from the axis of said hub; a drive arm separate from said mounting portion; means normally rigidly securing said drive arm to said mounting portion, said securing means being constructed to enable the relative angular relation between said drive arm and said stop to be selectably varied about the axis of the shaft; a pin adapted to be secured in the shaft at a point remote from said hub for extending radially from the shaft and normally in engagement with said stop; a spring yieldably biasing said pin and said stop together; said drive arm having a cam surface radially spaced from said hub, and directed toward said actuating member for engagement thereby, said drive arm terminating in a point at that end of said



cam surface which is closer to said actuating member; said actuating member being engageable with said cam surface to apply a force to the shaft by means of said bracket and said pin to move the shaft angularly to the start position, thereby enabling the motor to drive the shaft.


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