United States Patent [19]

Weber et al.

[11] **3,741,019**

[45] **June 26, 1973**

[54] **SHAFT LOCKING DEVICE FOR A TIMER**

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[22] Filed: **Sept. 13, 1971**

[21] Appl. No.: **179,652**

[52] **U.S. Cl.** ..... **74/3.5**, 200/38 A

[51] **Int. Cl.** **F16h 5/74**

[58] **Field of Search** ..... 74/3.5, 3.52, 3.54; 200/38 A, 38 B, 38 D, 38 DA

[56] **References Cited**

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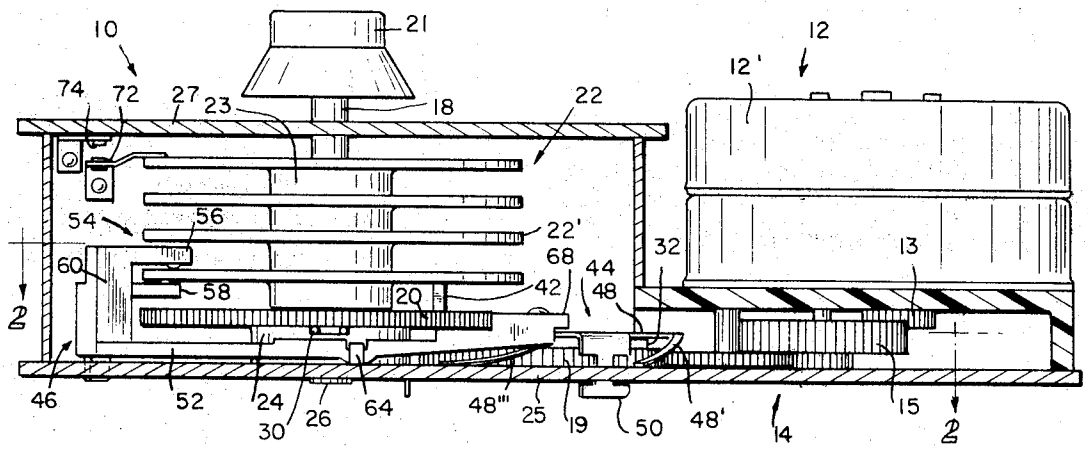
[57] **ABSTRACT**

When a cam carrying shaft of a timer is axially indexed, a lever is actuated to move a retaining means into engagement with a one-way clutch means to prevent manual rotation of the cam carrying shaft.

5 Claims, 3 Drawing Figures



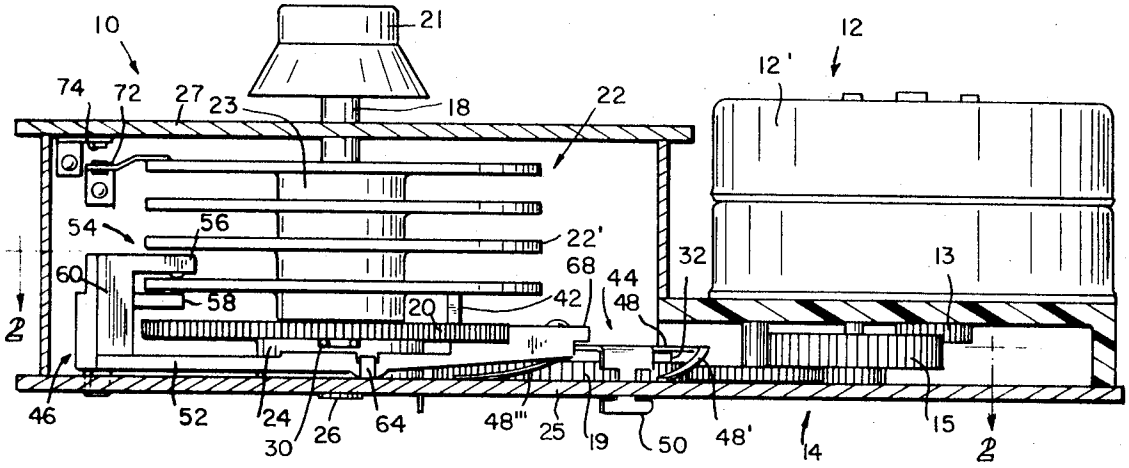


FIG. 1

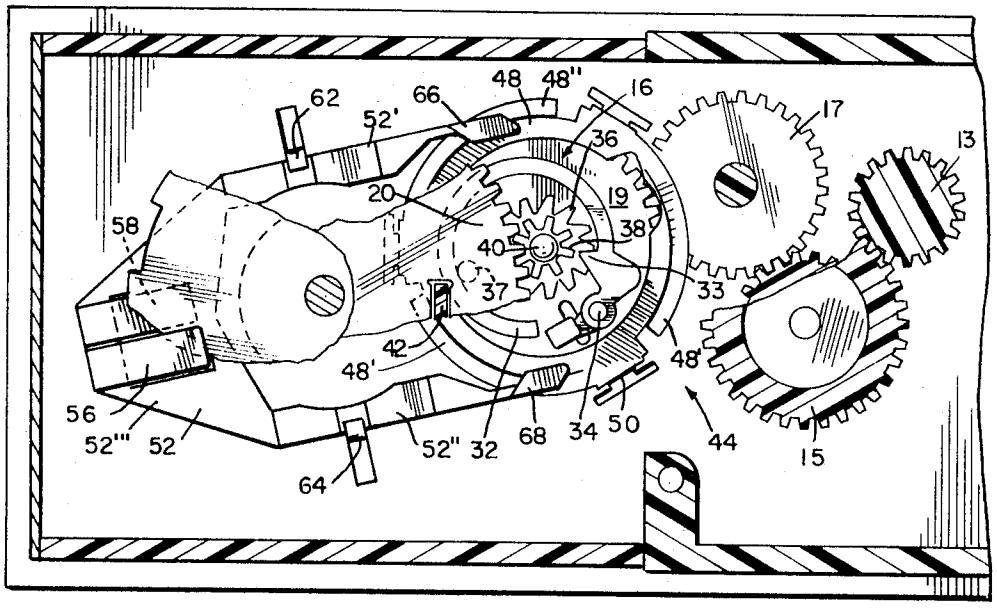


FIG. 2

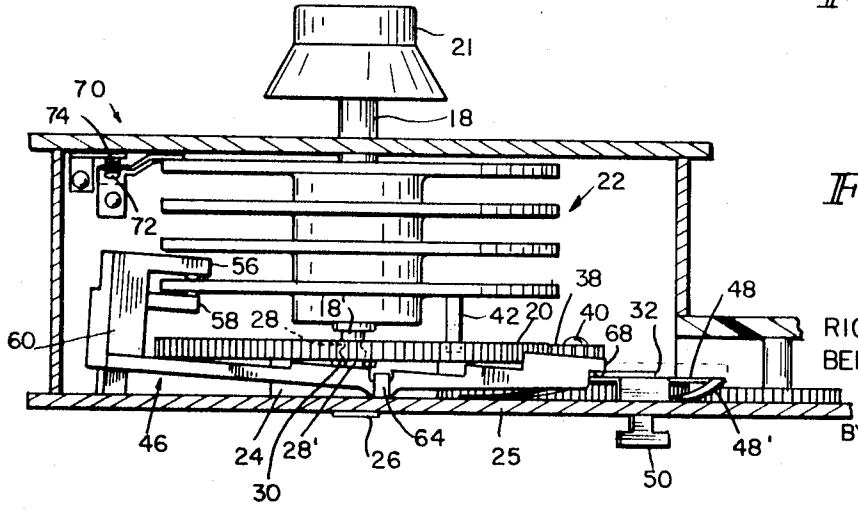


FIG. 3

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SHAFT LOCKING DEVICE FOR A TIMER

This invention relates to timing mechanisms such as those used in the appliance field; and more particularly to a means preventing manual rotation of a cam carrying shaft when the shaft is under power driven rotation.

Timing mechanisms are used in the appliance field to operate an appliance in accordance with a programmed sequence. For example, automatic washers and dryers perform their sequences of operation in accordance with the operation of a timing mechanism. In such applications, the program desired, such as a particular wash or drying cycle, may be manually set by the operator of the appliance. However, where such manual rotation or setting of a timing mechanism is provided for, means must also be provided to insure that there is no manual setting of the timer when it is under power driven operation.

The present invention, therefore, relates to a timing mechanism and has as one of its objects the provision of a timing mechanism having a means to prevent manual rotation of a cam carrying shaft when the shaft is under power driven rotation.

Another object of the invention is the provision of a timing mechanism having a one-way clutch means coupling a motor to a cam carrying shaft and means engaging the one-way clutch means to prevent manual rotation of the cam carrying shaft when the timer is under power driven rotation.

These and other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawings wherein: 1

FIG. 1 is a side elevation of a timer employing the principles of the invention;

FIG. 2 is a view taken along the line 2—2 of FIG. 1; and

FIG. 3 is a partial side elevation of the timer in another operating mode.

Generally speaking, the objects of the invention are accomplished by providing a timer which, in general, comprises a motor drive means, a manually rotatable and axially indexable cam carrying shaft and cam means carried by the shaft, a one-way clutch means coupling the motor drive means to the cam carrying shaft for power driven rotation, and lever means coupled to the cam carrying shaft and to a retaining means, indexing of the cam carrying shaft actuating the lever means to engage the retaining means with the one-way clutch means.

Referring to the drawings, there is shown a timer **10** which, in general, includes a motor drive means **12**, a speed reducing means **14**, and a one-way clutch means **16** which couples the speed reduction means **14** to a cam carrying shaft **18** through a gear **20**. Gear **20** is carried by cam carrying shaft **18**. Cam means **22** includes a plurality of cams **22'** carried by a hub portion **23** which is fixedly carried by the cam carrying shaft **18**. Although not shown, rotation of cam means **22** opens and closes appropriate switches in a manner well known in the art. Gear **20** includes a hub portion **24** which is rotatably journalled on bushing **26**. Cam carrying shaft **18** includes a reduced portion **18'** which is rotatably journalled in bushing **26**. The other end of the shaft is journalled in top plate **27**. Also included as part of the cam carrying shaft **18** are detents **28, 28'** adapted to receive a hair-pin **30** when the shaft is axially indexed. The hair-pin, in combination with the detents, limit the axial indexing of the shaft.

Motor drive means **12** includes a synchronous motor **12'** having an output pinion **13** to which is coupled speed reducing means **14**, speed reducing means **14** including a plurality of gears and pinions in accordance with the amount of speed reduction required. By way of example, output pinion **13** engages gear **15** which in turn meshes with gear **17** which in turn meshes with gear **19**.

One-way clutch means **16** includes a substantially circular spring arm or pawl **32** one end of which is pivotally carried on gear **19** through post **34**, ratchet **36**, and output pinion **38**. Pawl **32** includes a tooth **33** engaging ratchet **36**. It is resilient with its free end sprung about post **37**. Ratchet **36** and output pinion **38** are integral and are carried by axle **40**.

As previously noted, cam carrying shaft **18** may be manually rotated to set a desired program for the cam means **22**. Such manual rotation may be effectuated through a knob **21** fixedly carried by the cam carrying shaft **18**. However, means must be provided to insure that such manual rotation does not occur when the cam means **22** is being power driven through the motor means **12**. In the present invention, such prevention of the manual rotation is achieved through retaining means **44** which is actuated by lever means **46**. Retaining means **44** includes a substantially flat and circular spring **48** which substantially surrounds unidirectional means **16** and which is spring biased against bottom plate **25** through tangs **50**. The leaf portions **48'**, **48''**, and **48'''** tend to bias the spring upwardly, or away from the plate. Lever means **46** includes a yoke **52** having arms **52'** and **52''** extending from a central portion **52'''**. The central portion also includes a gripping means **54** which includes a pair of arms **56** and **58**, each carried by a post **60**, and each engaging one of the cams **22'**. Each of the arms **52'** and **52''** are pivotally mounted about the hub **24** through tangs **62** and **64** which are lanced from base plate **25**. Tabs **66** and **68** carried at the ends of the arms engage spring **48** to actuate the spring in accordance with the movement of the yoke.

In operation, when cam carrying shaft **18** is indexed "in" as shown in FIG. **1**, the central portion **52'''** will be actuated downward with the ends **52'** and **52''** being actuated upward. Spring **48** will be biased upward out of an engaging position with respect to pawl **32**. Manual rotation of the cam carrying shaft **18** in a clockwise direction will cause pinion **38** to rotate counterclockwise and tooth **33** of pawl **32** will disengage from ratchet **36**, thus permitting the gear **20** and pinion **38** to be "free wheeling" in that direction. Because of the orientation of the ratchet teeth, however, tooth **33** will not disengage the ratchet when the ratchet is rotated clockwise (cam carrying shaft-counterclockwise).

With the cam carrying shaft indexed outwardly as shown in FIG. **3**, spring **48** will be actuated downwardly into engaging position with respect to pawl **32**. The one-way clutch will now be "locked in" permitting motor drive means **12** to drive the cam means **22** through reduction means **14**, the one-way clutch means **16** and gear **20**. Manual rotation of the cam carrying shaft will be prevented in either direction because the operator would be forced to rotate the cam carrying shaft through the speed reduction means.

There is also provided in the timer a switch means **70** which operates as a line switch to close electrical contacts **72** and **74** to complete an electrical circuit to the motor for power driven rotation in a manner well known in the art.

What is claimed is:

1. A timer comprising:

a. motor drive means

b. a manually rotatable and axially indexable cam carrying shaft and cam means carried by said shaft,

c. a one-way clutch means coupling said motor drive means to said cam carrying shaft for power driven rotation, and

d. a yoke having a central portion and arms centrally pivoted about said cam carrying shaft, said central portion of said yoke having means engaging a cam of said cam means, and

e. a retaining means coupled to said arms,

f. whereby indexing of said cam carrying shaft actuating said arms to engage said retaining means with said one-way clutch means.

2. A timer according to claim **1** wherein said retaining means includes a spring engaging said one-way clutch means.

3. A timer according to claim **1** wherein said one-way clutch means includes a pawl engaging a ratchet, said spring intermittently engaging said pawl in response to movement of said lever means to hold said pawl in engagement with said ratchet means.

4. A timer according to claim **3** wherein said pawl includes a substantially circular spring arm surrounding said ratchet and having a tooth extending inwardly to engage said ratchet, and said spring is substantially circular, actuation of said lever engaging an inner surface of said spring with an outer surface of said pawl.

5. A timer comprising:

a. motor drive means,

b. a manually rotatable and axially indexable cam carrying shaft, cam means and a gear means carried by said shaft,

c. speed reduction means coupled to said motor drive means, including a gear mounted on an axle,

d. a one-way clutch means coupling said speed reduction means to said gear means, including a substantially circular spring arm carried by said gear and substantially surrounding a ratchet carried by said axle and having a tooth engaging said ratchet,

e. a substantially circular spring substantially surrounding said circular spring arm, and

f. a lever pivotally mounted about said cam carrying shaft, one end of said lever engaging said cam means, the other end including means engaging said substantially circular spring,

g. whereby indexing said cam carrying shaft pivoting said lever causing engagement of said substantially circular spring with said circular spring arm.

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