United States Patent

[11] 3,582,582

[72] Inventors **Kurt Pauker; Joseph E. Wiser, both of Indianapolis, Idaho**

[21] Appl. No. **813,620**
[22] Filed **Apr. 4, 1969**
[45] Patented **June 1, 1971**
[73] Assignee **P. R. Mallory & Co. Inc. Indianapolis, Idaho**

[54] **TIMER UTILIZING MOMENTARY SWITCH OPERABLE FROM SEGMENTED TIMER SHAFT**
6 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **200/38,** 200/153
[51] **Int. Cl.** **H01h 7/08,** H01h 43/00
[50] **Field of Search** 200/4, 156, 157, 38, 16, 153.11, 153.13, 153.19

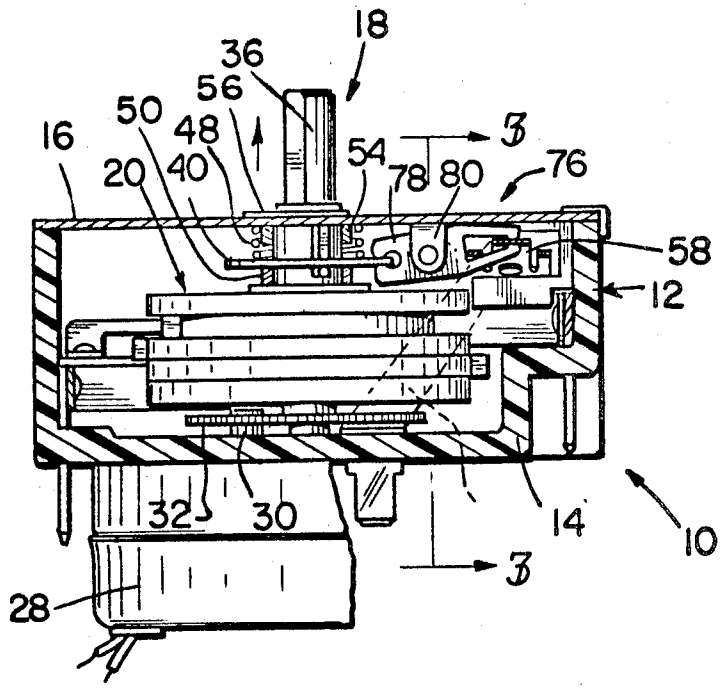
[56] **References Cited**

UNITED STATES PATENTS

2,889,419	6/1959	Miller et al.	200/38B1
3,126,759	3/1964	Cook	200/38B1X
3,330,918	7/1967	Linn	200/38
3,371,170	2/1968	Thomas et al.	200/38B

Primary Examiner—J. R. Scott
Attorneys—Richard H. Childress, Robert F. Meyer and Henry W. Cummings

ABSTRACT: The "push or pull" of a segmented shaft means which carries a cam means for actuating switches responsive to cams, actuates an actuator means which in turn actuates a contact blade to open and close electrical contacts. The shaft segments are coupled together through spring washer means. One segment carries the cam means, while the other segment axially moves to actuate the actuator means.



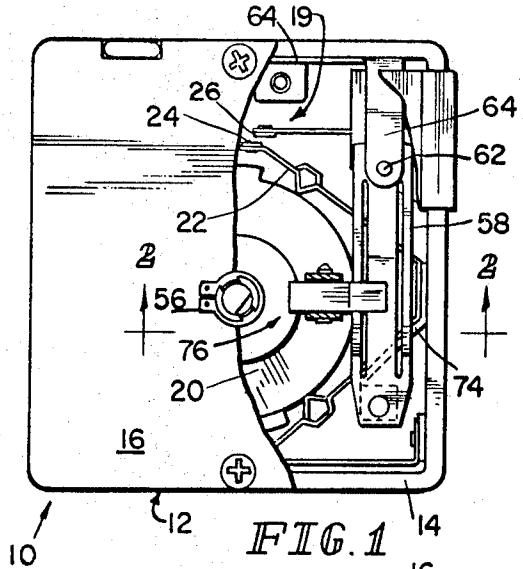


FIG. 1

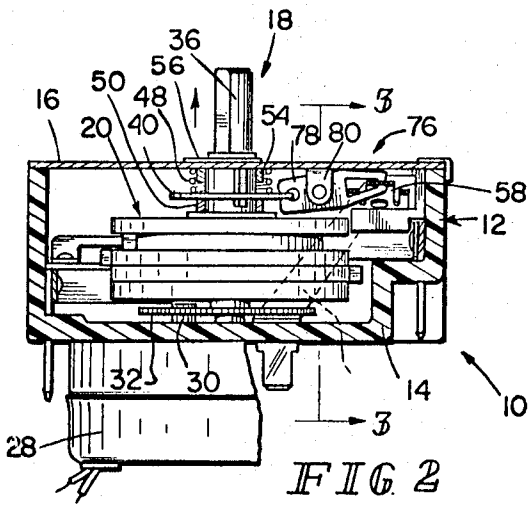


FIG. 2

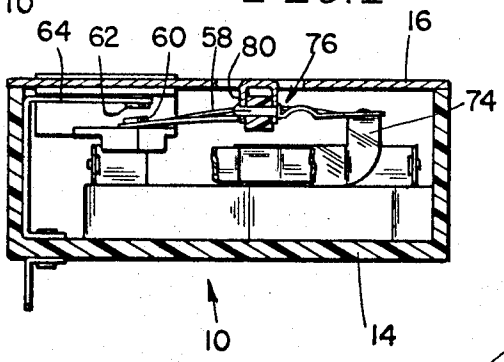


FIG. 3

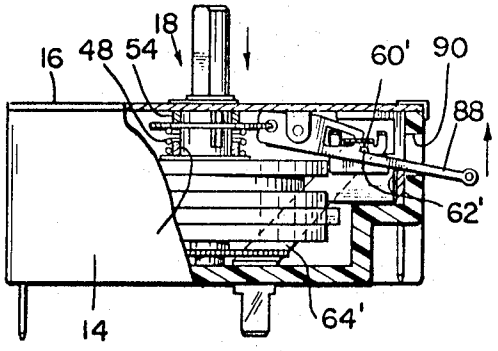
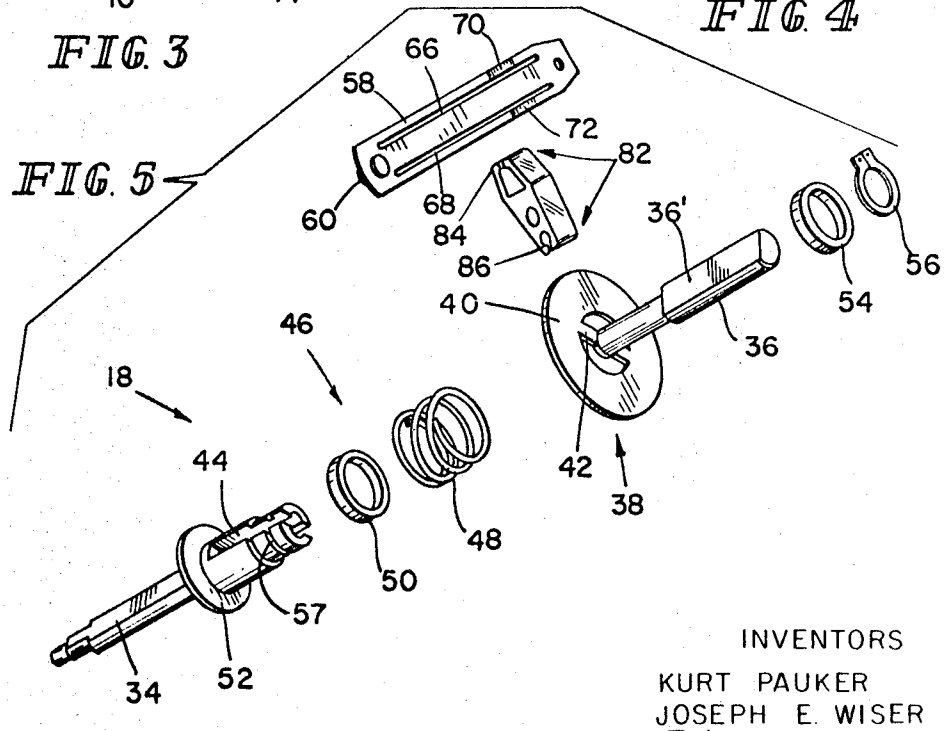


FIG. 4

FIG. 5



INVENTORS
KURT PAUKER
JOSEPH E. WISER
BY Robert J. Meyer
ATTORNEY

TIMER UTILIZING MOMENTARY SWITCH OPERABLE FROM SEGMENTED TIMER SHAFT

This invention relates to timers and more particularly to timers which are used in domestic clothes drying machines.

In domestic clothes dryers, a door switch is ordinarily provided in order to interrupt the rotation of the drive motor and tumbling drum whenever the door of the dryer is open. This is done in order to provide operator safety in the machine. In dryers using a timer motor to control the length of the dryer operations, the timer motor also is usually deenergized during this period.

In some machines, the control system is so arranged that the dryer immediately goes back into operation as soon as the door is closed. In other machines, there is provided a manual switch, separate from the means to set the various washing and drying cycles, which must be operated after the door is closed in order to start the machine up again. The use of a manual start switch separate from the means to set the various washing and drying cycles, however, increases the amount of circuitry that is needed to operate the dryer and detracts from the systems compactness. In addition, the separate pushbutton switch, of necessity, calls for an extra switch.

The present invention is concerned with a timer, and more particularly a timer for a domestic clothes drying machine, and has as one of its objects the provision of a timer which includes means to start the operation of the dryer through the actuation of the shaft means which carries the cams of the timer.

Another object of the invention is to provide a timer having means to make and break electrical contacts through a "push or pull" of the shaft means which carries the cam programming means of the timer.

Another object of the invention is to provide a timer having means coupled to the cam carrying shaft means of the timer to actuate a contact blade for the making and breaking of electrical contacts.

Yet another object of the invention is to provide a timer wherein the same carrying shaft means is segmented into two segments, one of the segments carrying the cams of the timer, the other segment being coupled to the contact blade through an actuator means.

Still another object of the invention is to provide a timer having a shaft means segmented into two sections with means coupling the two sections together in desired angular relationship, the coupling means further providing a coupling means between a contact blade actuator means and the shaft means.

A further object of the invention is to provide a timer having a segmented shaft means wherein the means coupling the segments includes a washer means and a spring biasing means.

Still another object of the invention is to provide a timer having a segmented shaft means wherein one of the segments is spring biased against the other segment, or away from it.

Yet another object of the invention is to provide a timer having a contact blade responsive to a shaft means of the timer wherein the contact blade is a snap acting blade through slots lanced along the sides of the blade.

Another object of the invention is to provide a timer having an actuator means coupling a timer shaft means to the contact blade, the actuator means including a rocker means disposed between the shaft means and the blade.

These and other objects and the nature thereof will become apparent from the following description taken in conjunction with the accompanying drawings wherein like reference numbers describe elements of a similar function.

In the Drawings:

FIG. 1 is a top view of the timer with a portion thereof being removed for showing various elements of the timer;

FIG. 2 is a cross section taken along line 2–2 of FIG. 1;

FIG. 3 is a cross section taken along line 3–3 of FIG. 2;

FIG. 4 is a view similar to FIG. 2 showing another embodiment of the invention; and

FIG. 5 is an exploded view of the shaft means of the timer showing the relationship of the shaft means to the contact blade.

Generally speaking, the objects of the invention are accomplished by providing a timer including at least one switch means responsive to at least one cam means carried by a segmented cam carrying shaft means, a contact blade fixedly held at one end and including at least one electrical contact at the free end thereof, blade actuator means responsive to axial movement of the shaft means, the actuator means coupled to the contact blade substantially between the fixed and free ends of the blade, axial movement of the shaft means engaging the electrical contact with a second electrical contact.

Referring now to the drawings, there is shown a timer **10** having a housing **12** formed from an electrically insulative cup-shaped portion **14**, the cup-shaped portion being closed through cover member **16**. There is shown extending through the cover **16** and into the cup-shaped portion **14** a cam carrying shaft means **18**. A plurality of cam means **20** is carried by shaft means **18** such that rotation of the shaft means causes rotation of the cam means **20**. Switch means **19** are responsive to cam means **20**. Switch means **19** includes movable contact blades **22** which are responsive to cam means **20** such that contact **24** of the movable contact blade **22** can make and break with stationary contact **26**, which is also included as part of switch means **19**. Shaft means **18** is rotatably driven through motor means **28**, the motor means being coupled to the shaft means through pinion **30** and drive gear **32**. Motor means **28** may be of the synchronous motor type.

Referring to FIG. **5**, it can be seen that shaft means **18** includes first and second segments **34** and **36** coupled together through coupling means **38**. Coupling means **38** includes a washer means **40** having a web means **42** which is adapted to slidably engage diametrically opposed slots **44** of the segment **34**. Segment **36** is slidably coupled to segment **34** such that the segment **36** can be actuated to give a "push or pull" movement to the segment. Flat **36'** is located with respect to web means **42** such that a "zero" setting of the cam means **20** can be readily set. Segment **34** carries the plurality of cams **20**. Segment **36** and **34** are spring biased against or away from each other through spring means **46**. Spring means **46** includes a coil spring **48** which is adapted to fit over spacer **50**, the spacer **50** being fitted over the shaft segment **34** against stop washer **52**. The thickness of spacer **50** is such that upon compression of coil spring **48**, washer **40** will bottom against spacer **50** rather than against the spring **48**. Spacer **54** and C-clamp **56** fit over segment **34** with the C-clamp **56** being fitted into groove **57**. It is noted with reference to FIGS. **2** and **4** that the coil spring **48** is disposed on opposite sides of the washer **40**. In the case of FIG. **2**, the spring **48** will be disposed between washer **40** and cover **16**, with the spacer **54** serving as a spacer in the manner of spacer **50**. As will be described hereinafter, such location of the coil spring **48** determines the operation of the shaft means **18** to affect the make and break of electrical contacts **60** and **62** by a push or pull of the shaft means.

There is a switch contact blade **58** carrying an electrical contact **60**, the electrical contact being adapted to engage electrical contact **62** of stationary contact **64**. As is more particularly shown in FIG. **5**, contact blade **58** is of the snap acting type having elongated slots **66** and **68** formed along the sides of the blade. Also included as part of the contact blade are depressions **70** and **72** formed between the slots and the edge of the blade so as to facilitate the snap acting characteristics. The blade is fixedly held at the end opposite the end carrying the contact **60** by a support means **74**. There is an actuator means **76** coupling the contact blade **58** to the shaft means **18** through washer **40**. Actuator means **76** includes a rocker means **78** pivotally carried by cover plate **16** through hinge **80**. Rocker means **78** includes gripping means **82**, gripping means **82** including jaws **84** and **86** which slidably couple the rocker means to the washer **40** and the contact blade **58** respectively.

The operation of the timer is as follows: the operator of the appliance, for example a dryer, sets the desired program through shaft means **18** through a suitable knob (not shown). If the running of the appliance is stopped for some reason, for

example opening the door to the dryer, then the operator again has to start the timer after the door has been closed. Such operation is started by completing the circuit between contacts **60** and **62**. Referring to FIG. **2**, this is done by pulling shaft means **18** such that actuator means **76** causes movement of contact blade **58** to close the contact, actuator means **76** being actuated through washer **40**. The closing of contact **60** and **62** energizes motor **28** to again continue the operation of the timer. Upon release of the shaft means **18** by the operator, spring means **46** returns the shaft means **18** to its original position and opens contact **60** and **62**. In FIG. **4**, the "pull-push" action is reversed. That is, contact **60** and **62** are closed by pushing shaft means **18**. In this embodiment stationary contact **64'** with contact **62'** would be beneath contact **60'**.

As can be seen, therefore, the location of the spring **48** permits the following operational possibilities:

1. With spring **48** between cover plate **16** and washer **40**, and switch blade contact **60** in the normally open position with respect to contact **62**, shaft means **18** is pulled to close the contacts.
2. With spring **48** between washer **40** and washer **52**, and switch blade contact **60** normally closed with respect to contact **62**, shaft means **18** is pushed to open contacts.
3. With spring **48** between washer **40** and washer **52**, and switch blade contact **60'** normally open with respect to contact **62'**, shaft means **18** is pushed to close the contacts.
4. With spring **48** between washer **40** and cover plate **16**, and switch blade contact **60'** normally closed with respect to contact **62'**, shaft means **18** is pulled to open the contacts.

FIG. **4** also shows an embodiment of the invention wherein the contacts **60** and **62** can be closed in accordance with the movement of blade **58** with the opening and closing of the contacts being controlled electrically rather than the manual operation of the shaft means **18**. As shown, actuator means **76** includes a lever means **88** extending from the actuator means through aperture **90** of cup-shaped member **14**. The lever means **88** could be connected to a suitable actuator means such as a solenoid (not shown). In this embodiment, spring biasing means **46** need not be used.

Thus there is described a timer having a separate circuit means from the primary cam programming means, the circuit means being actuated in accordance with the "push or pull" movement of the shaft means carrying the cam means.

What I claim is:

1. A timer comprising:

a. a housing;

b. rotatable shaft means extending through said housing, drive means coupled to said shaft means, said shaft means including first and second segments, and means coupling said segments together;

c. a plurality of cam means carried by said first segment, and switch means responsive to said cam means;

d. a contact blade fixedly connected to said housing at one end, and having an electrical contact disposed at the opposite free end thereof;

e. actuator means, means coupling one end of said actuator means to said shaft means, means coupling the opposed end of said actuator means to said contact blade between the ends of said blade;

f. electrical contact means disposed in alignment with said electrical contact of said contact blade, axial movement of said shaft means causing engagement between said electrical contacts.

2. A timer according to claim **1**, wherein said means coupling said segments includes a washer connected to said second segment, said washer including web means engaging slots in said first segment.

3. A timer according to claim **1**, wherein said actuator means includes a rocker means, said rocker means pivotally mounted between its end portions.

4. A timer according to claim **3**, wherein said rocker means includes gripping means disposed at opposed ends thereof, said gripping means slidably engaging said contact blade and a washer carried by said second segment.

5. A timer according to claim **1**, wherein said segments are spring biased against each other.

6. A timer according to claim **1**, wherein said segments are spring biased away from each other.