June 25, 1957 A. E. YATES 2,797,270

TIME CLOCK

Filed June 30, 1955 4 Sheets-Sheet 1

Fig. 1

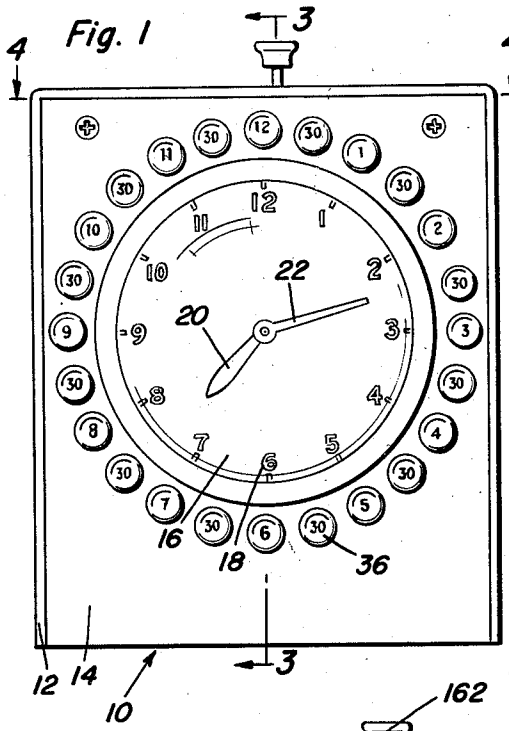
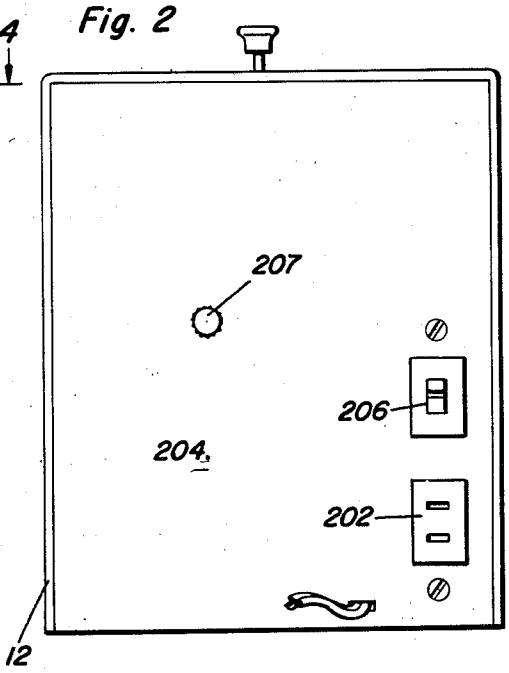


Fig. 2



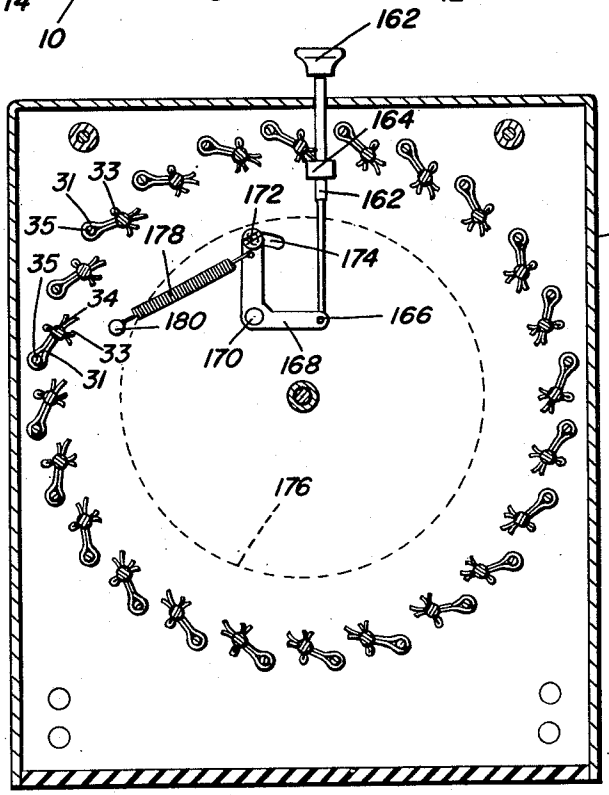


Fig. 8

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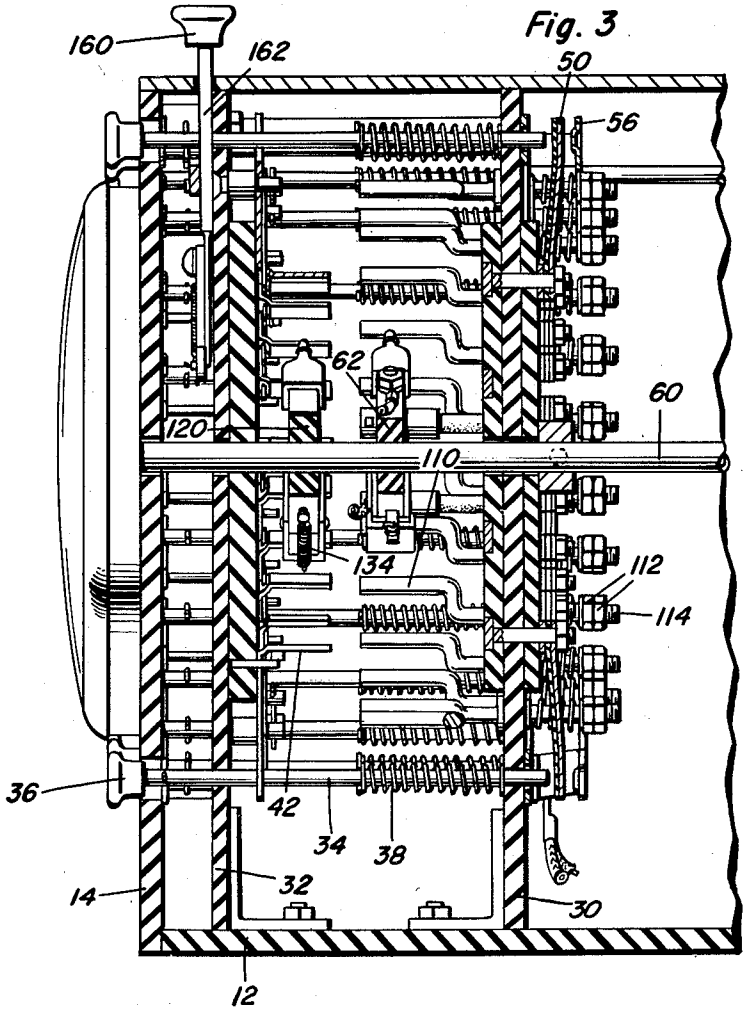
BY Clarence A. O'Brien and Harvey B. Jacobson
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TIME CLOCK

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Fig. 3



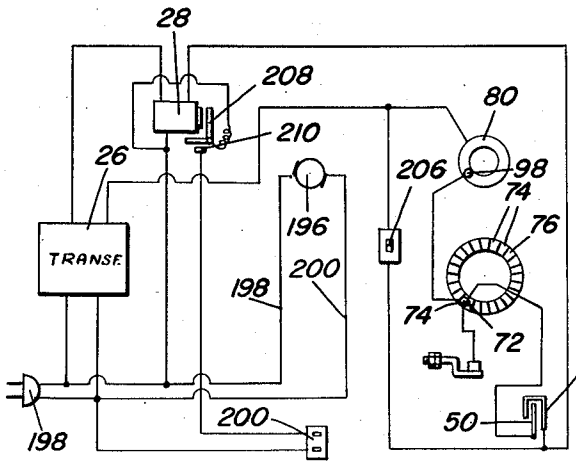


Fig. 9

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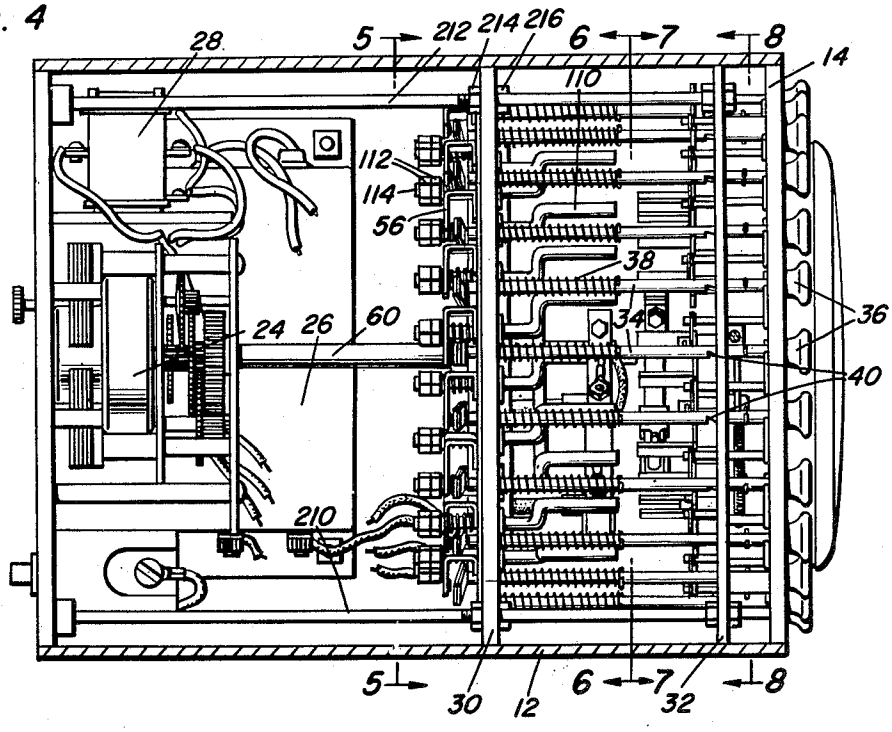
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TIME CLOCK

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Fig. 4



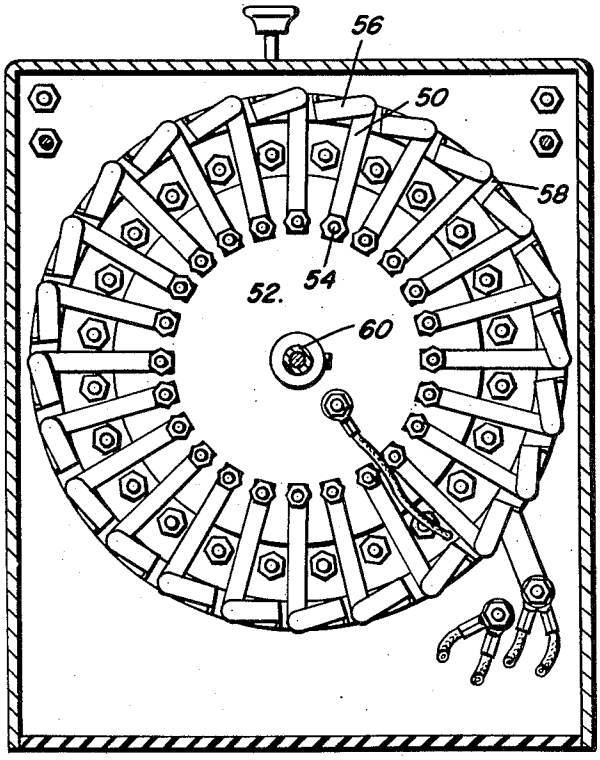


Fig. 5

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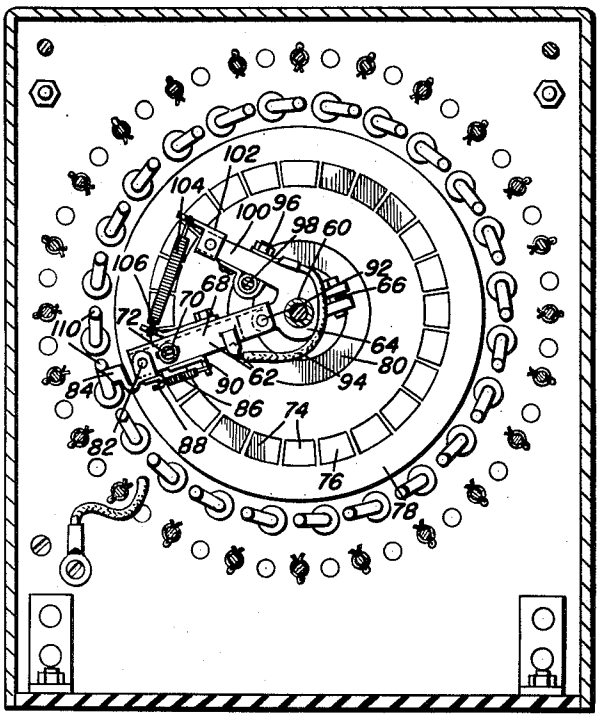
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TIME CLOCK

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Fig. 6



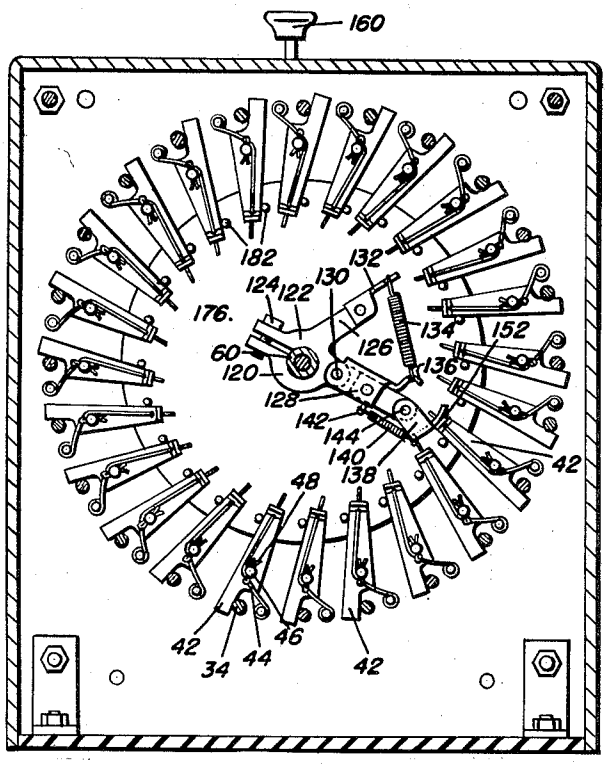


Fig. 7

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United States Patent Office

2,797,270

Patented June 25, 1957

2,797,270

TIME CLOCK

Albert E. Yates, Monterey, Tenn., assignor of twenty-five percent to Lewis W. Dykes, McMinnville, Tenn.

Application June 30, 1955, Serial No. 519,081

3 Claims. (Cl. 200—37)

This invention relates to a novel switch mechanism, and more particularly to a time clock.

The primary object of the present invention resides in the provision of a time clock including a clock work actuated switch mechanism for automatically turning on a television or radio set at a selected time or times in a convenient manner.

The construction of this invention features a plurality of push-button actuated switches which are arranged so as to correspond with specified intervals during the day, such as a switch for each half-hour or quarter-hour interval. These switches are so arranged as to complete an operative electrical circuit to an electrical connector wherein a drive shaft connected to a clock work mechanism is rotated a predetermined amount.

Still further objects and features of this invention reside in the provision of a time clock that is simple in construction, can be readily constructed at a relatively low cost for wide distribution so as to be adapted for use by owners of television sets for automatically turning on the television set at particular intervals as may be desired, yet which may be made in a manner so as to be highly attractive in appearance and easy to use.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this time clock, a preferred embodiment of which has been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a front elevational view of the time clock comprising the present invention;

Figure 2 is a rear elevational view of the time clock;

Figure 3 is an enlarged partial vertical sectional view as taken along the plane of line 3—3 in Figure 1;

Figure 4 is an enlarged horizontal sectional detail view as taken along the plane of line 4—4 in Figure 1;

Figure 5 is a vertical sectional view, as taken along the plane of line 5—5 in Figure 4 illustrating the arrangement of the pair of contacts provided for each of the push-button switches;

Figure 6 is a vertical sectional detail view as taken along the plane of line 6—6 in Figure 4 illustrating in particular the arrangement of the brush means and the split contact ring;

Figure 7 is a vertical sectional detail view as taken along the plane of line 7—7 in Figure 4 illustrating the construction of the push-button switch release mechanism;

Figure 8 is a vertical sectional detail view as taken along the plane of line 8—8 of Figure 4 illustrating in particular the construction and arrangement of the release mechanism for the push-button switches; and

Figure 9 is a circuit diagram of the various component electrical elements of this invention.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate the time clock comprising

the present invention. This time clock 10 includes a casing 12 of any suitable configuration and having a face plate 14 provided with an opening for a glass cover plate 16 overlying a dial 18 about which an hour hand 20 and a minute hand 22 are designated to move in the conventional manner. The hour hand 20 and the minute hand 22 are driven through suitable concentric shafting, as is conventional, by a clock work mechanism 24 of conventional construction, as can be seen best in Figure 4. Mounted within the casing 12 is a transformer 26 as well as an electromagnetic relay 28 each of which is of conventional construction.

Mounted in the casing 12 are partitions 30 and 32 of suitable electrically insulative material.

Extending through the face plate 14, as well as the partitions 32 and 30, are a plurality of rods 34 each of which is substantially similar in construction. Stops 31 and 33 are provided for the rods 34 with the stops 31 being slidable on guide rods 35 to prevent rotation of the rods 34. This can be best seen in Figure 8.

Mounted on each of the rods 34 outwardly of the face plate 14 are a plurality of push-buttons 36 adapted to be pushed inwardly so as to actuate the rods 34. Mounted about the rods 34 and resisting the inward push of the rods 34 are coil springs 38 which engage the partition 30.

Each of the rods 34 is provided with a cam locking notch 40 therein adapted to seat detents 42 which are urged by springs 44 against the rods 34 and into the notches 40. The detents 42 are pivotally mounted on shafts 46 and held in place by cotter keys 48.

As can be readily seen, if a push-buton 36 is pressed, the shaft will move inwardly and the action of the spring 44 will cause the detent 42 to seat in the cam locking notch 40 associated therewith so as to hold the rod 34 in an inwardly disposed position. Actuation of the rod 40 causes the rod 40 to push inwardly upon movable contacts 50 mounted on an insulative disk 52 by means of suitable threaded fasteners 54, the disk 52 being carried by the partition 30. This causes the movable contacts 50 to engage the fixed contacts 56, the fixed contacts 56 being of generally U-shape, as can be best seen in Figures 4 and 9, the fixed contacts 56 being electrically connected to and held in place on a collector ring 58 mounted on the partition 30.

Concentrically disposed about the power shaft 60 which rotates the hour hand 20 are brush means 62. This brush means 62, the construction of which can be best seen in Figure 6, includes a clamping member 64 secured by means of a threaded fastener 66 in clamping engagement about the shaft 60. Pivotally mounted on the clamping member 64 is a brush carrying member 68 carrying a brush holder 70 within which a spring loaded brush 72 is positioned. This spring loaded brush is adapted to engage the separately individually insulated contacts 74 of a split contact ring 76. The split contact ring 76 is mounted on the insulative disk 78, as is a commutator ring 80. Pivotally mounted on the brush holding member 62 by means of a pivot pin 82 is a pawl head 84 which is resiliently held by means of spring 86 engageable with an ear 88 mounted on the head 84 and with a bracket 90 on the brush holding arm 62. The brush holding arm 62 is pivotally mounted on the clamp member 64 by means of a pivot pin 92 and is electrically connected by means of a conductor 94 to a brush holder 96 which carries a carbon brush 98 engageable with the commutator ring 80. The clamp means 64 further includes an arm 100 carrying a mounting member 102 to which one end of a coil spring 104 is secured, the other end of the coil spring being connected to a bracket 106 on the pivotally mounted arm 62. As the shaft 60 is rotated, the clamp means 64 and its associated arm 100 will be rotated correspondingly. However, since the head 64 will engage

one of a series of stops **110** arranged annularly about the disk **78** and held in place by lock nuts **112** on the threaded ends **114** thereof, see Figure 4, the arm **100** will not rotate continuously. This will cause the arm **62** to be pivoted and eventually cause the withdrawal of the head **62** beneath and inwardly of the respective stop **110** until such period of time that the spring tension on the spring **104** will cause the arm **62** to be snapped forwardly to the next stop. Hence, while the brush **98** is continuously engaging the commutator ring **80**, the brush **72** will successively but in a step-by-step manner engage the respective contacts **74** of the split contact ring **76**, the action of the spring **104** causing the arm **62** to be moved occurring at preset intervals depending upon the number of intervals provided by the respective pairs of contacts **56** and **50**.

Also mounted on the shaft **60**, see Figure 7, is a detent disengaging means **120** which is adapted to disengage the detents **42** from the notches **40** of the rods **34** in which they may be engaged due to actuation of the push-buttons **36**. This detent disengaging means includes a clamping member **122** held in place by means of a threaded fastener **124** and having a rigidly affixed arm **126** and a pivotally mounted arm **128** attached by means of a pivot pin **130** to the clamping member **122**. The rigid arm **126** carries a bracket **132** on which one end of a coil spring **134** is mounted, the other end of the coil spring **134** being connected to an ear **136** of the arm **126**. The arm **126** carries a spring loaded head **138** to which one end of a spring **140** is connected, the other end of the spring being carried by a lug **142** on the arm **126**. The head **138** is pivotally mounted, as at **144**. The head is engageable with the individual detents **42** which include portions **152** projecting substantially parallel with the axis of the shaft **60**, the detents **42** being pivotally mounted, as at **45**, and urged by the spring **44** into the notches **40** in the rods **34** will be disengaged by the spring loaded head **138** when the spring loaded head **138** is driven into the projecting portion **152** of the detents **42** when the arm **126** is moved sufficiently to exert enough tension on the spring **134** to cause the head **138** which has, by pivotal action, begun to underlie the previous detent to snap into engagement with the next detent **42** to thereby disengage the detent from the notch and permit the shaft **32** to be urged outwardly by the spring **38** to its initial non-actuated position.

If it is desired to open all of the switches, that is, the pairs of contacts **50** and **56**, it is merely necessary to press the release button **160**. The push-button **160** is mounted on a rod **162** which, as can be best seen in Figure 8, extends through a guide **164** and is pivotally attached as at **166** to a crank arm **168** pivotally mounted as at **170**. The crank arm has a pin **172** attached thereto mounted in a slot **174** in a disk **176**. A spring **178** is connected to the crank arm **168** and to an anchor member **180** mounted on the partition **32**. Hence, upon depression of the button **162**, the crank arm **168** is rotated, causing rotation of the disk **176**. Since the disk **176** has a plurality of stops **182** mounted thereon which are engageable with the detents **42**, the detents will be lifted out of the notches **40** upon actuation of this disk **176**. This also can be best seen in Figure 7.

As can be seen best in Figure 9, the clock work mechanism is powered through a suitable plug **194** which is connected to a source of electrical energy so as to provide means for powering the motor **196** of the clock work mechanism **24**. The conductors **198** and **200** connected to the plug are connected to the motor **196**. Connected across these conductors is the transformer **26** and the relay **28** is actuated when an operative electrical circuit is completed between the contacts **50** and **56** of a respective pair of the contacts and when the respective contact element **74** of the split contact **76** is engaged by the brush **72**, the brush **98** engaging the commutator ring **80**.

An outlet receptacle or female connector **202** is provided on the end wall **204** of the casing **12** and a switch **206** is provided for by-passing the sets of contacts **50** and **56** to actuate the relay **28**. An actuating member **207** is provided for setting the clock work mechanism and hands **20** and **22**. The relay **28** includes contacts **208** and **210** which complete an operative electrical circuit from the source of electrical power through the plug **194** to the outlet or female connector **202** to which a suitable appliance, such as a television set, may be connected.

As can be readily seen from an inspection of the drawings, the partitions are held in place by various tie rods **210** and **212** held in place by suitable threaded members, as at **214** and **216**, etc.

A complete sequence of operation of this invention is quite complex and is as follows:

In order to make it simple for the user of this apparatus the various push-buttons **36** are arranged about the dial **16** and may be provided at intervals, such as a quarter-hour or a half-hour. Suitable indicia may be provided on the push-buttons **36**. When any push-button **36** is actuated, corresponding to the selected period of time for completing an operative electrical circuit to the appliance to be turned on, the rod **34** associated therewith is depressed, causing the respective detent **42** to engage in the notch **40** in the rod. This causes the spring **38** associated with the rod **34** to be compressed and causes the contact **50** to engage the contact **56**. When the shaft **60** is rotated by the clock work mechanism **24** to the position where the brush **72** engages the associated contact element **74** of the split contact ring **76**, an operative electrical circuit to the female outlet receptacle **202** will be completed, due to actuation of the relay **28**.

After the shaft **60** has rotated a sufficient amount to correspond to the period indicated by the push-button **36**, the brush **72** will no longer engage the associated contact **74**, and therefore, an operative electric circuit to the relay **28** will no longer exist, and the contacts **208** and **210** will no longer be in electrical contact with each other. Further, the detent disengaging means **120** will be actuated so as to cause the head **138** to engage the associated detent **42** to disengage the detent, allowing the spring **38** to return the rod **34** to its initial position.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resored to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A timer comprising a plurality of push-button actuated switches, each of said switches having a pair of contacts with one of each of said pair of contacts being connected to a split contact ring, the other contacts of said pairs of contacts being connected to a collector ring, a commutator ring, brush means engageable with said split contact ring and said commutator ring, a shaft, said brush means being mounted on said shaft, and a clock work mechanism for rotating said shaft, each of said push-button switches being separately actuated to a closed position, and means for simultaneously opening all of said push-button switches, said last recited means including a disk, a plurality of lugs on said disk for engaging said detents, and means for rotating said disk.

2. A timer comprising a plurality of push-button actuated switches, each of said switches having a pair of contacts with one of each of said pair of contacts being connected to a split contact ring, the other contacts of said pairs of contacts being connected to a collector ring, a commutator ring, brush means engageable with said split contact ring and said commutator ring, a shaft, said brush means being mounted on said shaft, and a clock work mechanism for rotating said shaft, each of said push-buttom switches including a movable rod having a

cam locking notch therein, spring loaded detents engageable in the notches in said rods, said rods individually urging one of said pairs of contacts into engagement when said rods are actuated to a switch closed position, means carried by said shaft for selectively progressively disengaging said detents, and means for simultaneously opening all of said push-button switches, said last recited means including a disk, a plurality of lugs on said disk for engaging said detents, and means for rotating said disk.

3. A timer comprising a pluarlity of push-button actuated switches, each of said switches having a pair of contacts with one of each of said pair of contacts being connected to a split contact ring, the other contacts of said pairs of contacts being connected to a collector ring a commutator ring, brush means engageable with said split contact ring and said commutator ring, a shaft, said brush means being mounted on said shaft, and a clock work mechanism for rotating said shaft, said brush means including a spring loaded ratchet arrangement for causing intermittent step-by-step movement of said brush

means in response to continuous rotary movement of said shaft, each of said push-button switches including a movable rod having a cam locking notch therein, spring loaded detents engageable in the notches in said rods, said rods individually urging one of said pairs of contacts into engagement when said rods are actuated to a switch closed position, means carried by said shaft for selectively progressively disengaging said detents, and means for simultaneously opening all of said push-button switches, said last recited means including a disk, a plurality of lugs on said disk for engaging said detents, and means for rotating said disk.

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