Dec. 12, 1950 V. TRAD 2,533,410

TIMING DEVICE

Filed March 13, 1947 2 Sheets-Sheet 1

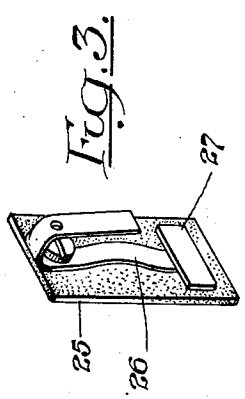

Fig. 3.

Fig. 1.

Fig. 2.

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TIMING DEVICE

Filed March 13, 1947 2 Sheets-Sheet 2

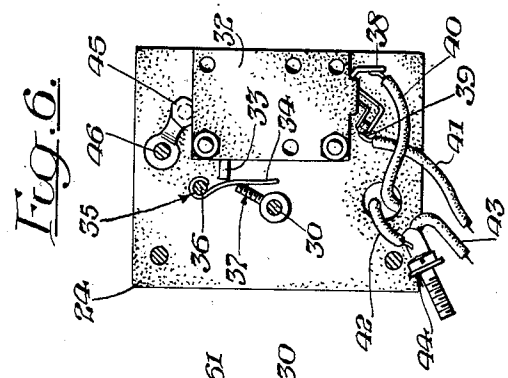

Fig. 6.

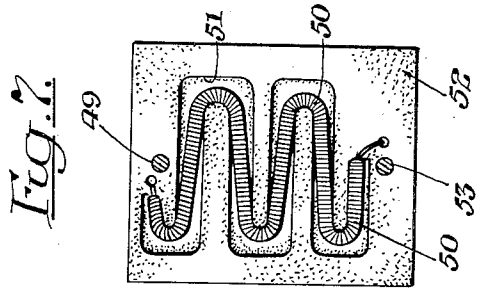

Fig. 7.

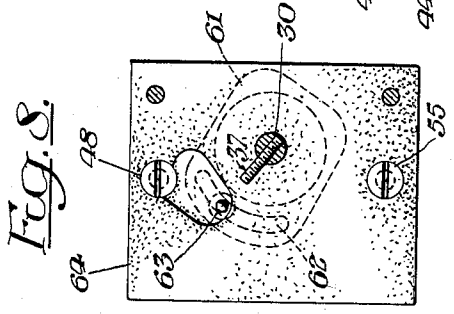

Fig. 8.

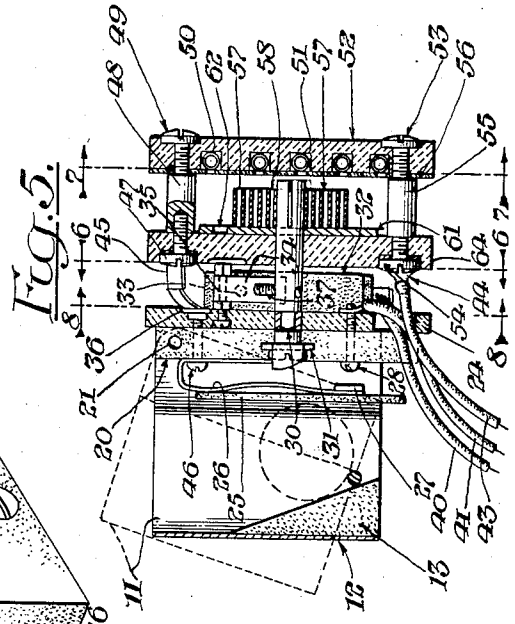

Fig. 5.

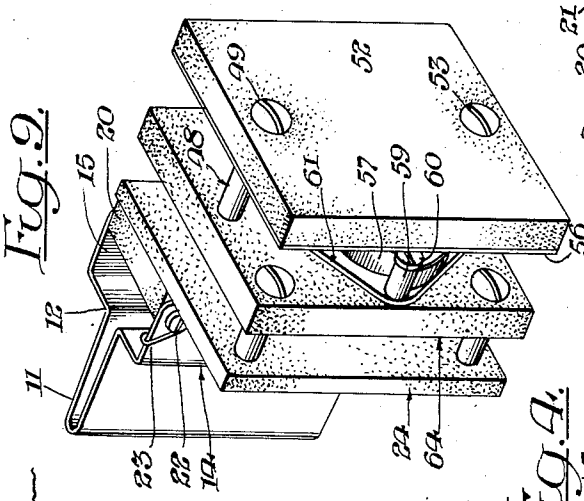

Fig. 9.

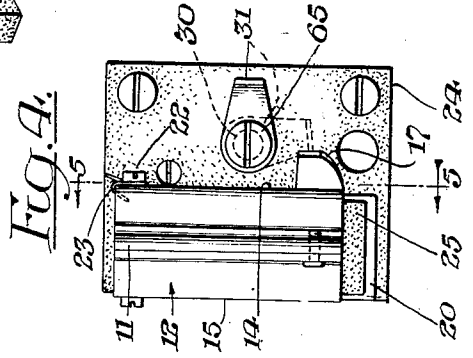

Fig. 4.

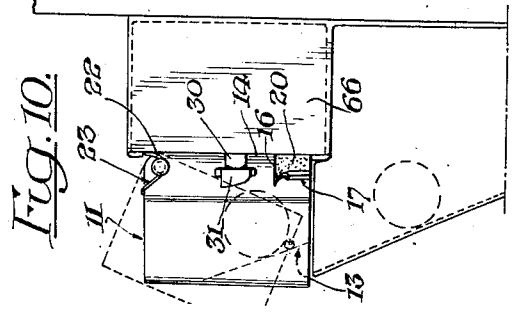

Fig. 10.

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TIMING DEVICE

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Application March 13, 1947, Serial No. 734,525

9 Claims. (Cl. 161—1)

1

This invention relates to timing devices, particularly such as are used on coin operated electrical appliances.

In the coin operated appliance industry it is often necessary to provide a means for supplying electrical current to the appliance for a specific period of time. This timing means must be of simple construction but capable of standing up under prolonged use.

Accordingly, an object of this invention is to provide a coin responsive timing device.

Another object of this invention is to provide a substantially noiseless timing device.

A further object of this invention is to provide a timer having a minimum number of moving parts.

A feature of this invention is its low operating cost.

Another feature of this invention is its compact structure, which makes it usable wtih small appliances.

A further feature of this invention is its adjustability by means of which the operating time cycle may be varied.

Another feature of this invention is its bi-metal construction, which enables the appliance to operate while the timer is heating up and while it is cooling off.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, is illustrated one form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is an exploded view of a preferred embodiment of the present invention.

Figure 2 is a view in perspective of the front plate of the timer.

Figure 3 is a fragmentary rear view in perspective of the switch contact leaf shown in Figure 2.

Figure 4 is a front elevation of the timer.

Figure 5 is a longitudinal section, taken on line 5—5 of Figure 4, looking in the direction indicated by the arrows.

Figure 6 is a view taken on line 6—6 of Figure 5, looking in the direction indicated by the arrows.

Figure 7 is a view taken on line 7—7 of Figure 5, looking in the direction indicated by the arrows.

Figure 8 is a view taken on line 8—8 of Figure 5, looking in the direction indicated by the arrows.

Figure 9 is a view in perspective of the assembled timer.

Figure 10 is a side elevation of the timer, shown as actually installed.

2

Referring to the drawings, and particularly to Figure 1, 11 indicates a chute-like member for receiving a coin (not shown). This chute is preferably formed from a single thin sheet of metal 12, bent upon itself, as shown in Figure 1. A triangular member 13 is incorporated within the chute 11 to direct the coins toward a switch. The extending portions 14, 15 of the metal sheet 12 are bent into a spaced parallel relationship with each other. The lower corner of the left-hand edge 14 is slit at 16, and the metal flared outwardly to form a tripping arm 17. The upper corners of the extending portions 14, 15 are pierced at 18, 19.

The chute member 11 is attached to a block 20 (shown in detail in Figure 2) secured to the front of the timer mechanism. This block is pierced and internally threaded at 21 to receive the machine screws 22 (see Figures 4 and 9), which hold the chute 11 to the timer. The chute 11 is thus able to swing upward, pivoting upon the said screws 22. A short length of spring wire 23 (shown in Figures 4, 9 and 10) however, normally holds the chute 11 against the front plate 24 of the timer, as shown in Figures 5 and 9.

The block 20, in addition to supporting the chute 11, holds a switch comprising a dielectric leaf 25 mounted upon a flat spring 26 secured to the said block 20. The bottom of the leaf 25 is provided with a conducting bar 27, as shown in Figures 2 and 3. The spring 26 is connected to the bar 27 for a hereinafter described purpose. Two terminals 28, 29 are provided on the block 20 at a point which will cause them to be joined when the bar 27 is pushed against them. The position of the flat spring 26, when the timer is not in use, is such as to hold the bar 27 away from the contacts 28, 29.

A snap switch (not shown) may be substituted for the above construction, without departing from the spirit of this invention.

The front plate 24 is pierced to allow a shaft 30 to pass therethrough, as shown in Figures 4 and 5. A cammed lever 31 is attached to the end of the shaft 30. The said shaft 30 extends into the mechanism of the timer and is the actuating member of the device, as shown by the longitudinal section of Figure 5.

The rear of the front plate 24, shown in Figure 6, supports a momentary contact or microswitch 32, having a small push button 33 thereon. The operation of the switch 32 is such that it permits the flow of current only while the push button 33 is released. A thin leaf of metal 34 is pivotally mounted at 35 upon a stud 36, set into the plate 24. The leaf 34 is engageable by a small

stud 37, set into the shaft 30. When the stud 37 bears against the leaf 34 it presses upon the push button 33, thereby opening the switch 32.

The terminals 38, 39 of the switch 32 are connected to the circuit so that one terminal 38 is soldered to one of the lines 40 leading from the power source, and the other terminal 39 is joined to one of the wires 41, leading to the appliance (not shown). The remaining two lines 42—43 are connected to a common terminal 44, hereinafter more particularly described.

A terminal 45 is secured above the switch 32 and is in electrical contact with the spring member 26. This terminal 45 is connected, by means of a screw 47, an internally threaded sleeve 48, and a second screw 49, to one end of a heating coil 50, as shown in Figure 5. The heating coil 50 is incorporated within a sinuous groove 51 in an asbestos plate 52, which forms the rear plate of the timer and is shown in detail in Figure 7. The other end of the heating coil 50 is similarly connected to the common terminal 44 by two screws 53, 54 and a sleeve 55.

A perforated mica sheet 56, best shown in Figure 1, overlays the front of the asbestos plate 52, and permits the heat from the heating element 50 to pass therethrough. This heat is directed toward a helically wound bi-metal strip 57, one end of which is secured within the bifurcated end 58 of the shaft 30. The other end of the helix 59 is crimped to a machine screw 60 which is fastened to a metal support plate 61.

The support plate 61, indicated by dotted lines in Figure 8, is provided with an arcuate slot 62 at the upper end thereof. A small screw 63 passes through this slot and enters the asbestos supporting member 64, upon which the plate 61 rests. Since the support plate 61 is centrally pierced to receive the shaft 30 therethrough, the said plate 61 may be rotated about the shaft 30 by loosening the screw 63. In this manner, the timing cycle of the mechanism may be changed, as a result of the moving of the end 59 of the bi-metal 57.

Another form of adjustment is provided in this timing mechanism by reason of the construction of the cammed lever 31. This lever is held to the shaft 30 by a screw 65. By loosening the screw 65 and changing the position of the cam 31, the timing cycle may be altered, as hereinafter shown.

When the timer is assembled, as shown in Figures 5 and 9, a heat insulating cover 66 is placed therearound. This cover 66, shown in Figure 10, operates to lengthen the timing cycle, as described below.

The timing device is activated by dropping a coin into the chute 11. The coin is forced toward the switch on the front of the block 20, thereby closing the said switch. Power is thus supplied to the appliance and the heating coil 50 at the rear of the timer. As the heat from the coil 50 warms the bi-metal 57 it causes the helix to expand and rotate the shaft 30 to which it is attached. The shaft 30 thereby turns the stud 37 mounted thereon. The stud 37 releases the leaf 34 which in turn allows the push button 33 of the microswitch 32 to snap out. The microswitch 32, which is in parallel with the switch on the front of the block 20, is thereupon closed. The shaft 30 continues to turn until the cammed lever 31 strikes the trip arm 17 on the chute 11.

The lever 31 lifts the chute 11, as shown in dotted lines in Figures 5 and 10, and releases the coin. This relieves the pressure upon the spring 26 of the switch and breaks the contact. The heating coil circuit is thus opened and it cools. The microswitch 32, however, is closed and the appliance (not shown) continues to receive power. When the bi-metal 57 cools to the extent that the shaft 30 resumes its original position, shown in Figure 1, the microswitch will be opened and the timing cycle completed. The cover 65, previously described, prolongs the timing cycle by retarding the cooling rate of the bi-metal 57. This effects an economy of operation of the timing mechanism.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. In a timing device for electrical appliances, a heating element, means comprising a switch to activate the said element, means comprising a bi-metallic strip, a shaft attached thereto and a cammed arm held by the said shaft to control the period of said activation and means comprising a second switch in parallel with the first switch, and a stud held by the said shaft and adapted to close the said switch to prolong the operation of the said appliance for the duration of the heating cycle.

2. In a timing device for electrical appliances, a heating element, means to activate the said element, means comprising a bi-metallic strip, a shaft attached thereto and a cammed arm held by the said shaft to control the period of said activation, means adapted to retard the rate of cooling of the bi-metallic strip and means comprising a switch cooperating with the activating means to prolong the operation of the said appliance for the duration of the heating cycle.

3. In a timing device for electrical appliances, a heating element, means to activate the said element, means comprising a bi-metallic strip, a shaft attached thereto and a cammed arm held by the said shaft to control the period of said activation, means consisting of a heat insulating case surrounding the said timer adapted to retard the rate of cooling of the bi-metallic strip and means comprising a switch cooperating with the activating means to prolong the operation of the said appliance for the duration of the heating cycle.

4. In a timing device for electrical appliances, a heating element, coin responsive means comprising a switch to activate the said element, adjustable means to control the period of said activation and means comprising a switch cooperating with the activating means to prolong the operation of the said appliance for the duration of the heating cycle.

5. In a timing device for electrical appliances, a heating element, coin responsive means comprising a switch to activate the said element, means comprising a helically wound bi-metallic strip, a shaft attached thereto and a cammed arm held by the said shaft to control the period of said activation and means comprising a switch cooperating with the activating means to prolong the operation of the said appliance for the duration of the heating cycle.

6. In a timing device for electrical appliances, a heating element, means to activate the said element, means comprising an axially adjustable plate supporting a helically wound bi-metallic strip, a shaft attached thereto and a cammed arm held by the said shaft to control the period of said activation and means comprising a switch cooperating with the activating means

to prolong the operation of the said appliance for the duration of the heating cycle.

7. In a timing device for electrical appliances, a heating element, means to activate the said element, means comprising a helically wound bi-metallic strip, a shaft attached thereto and an axially adjustable cammed arm held by the said shaft to control the period of said activation and means comprising a switch cooperating with the activating means to prolong the operation of the said appliance for the duration of the heating cycle.

8. In a timing device for electrical appliances, a heating element, coin responsive means comprising a switch to activate the said element, means comprising an axially adjustable plate supporting a helically wound bi-metallic strip, a shaft attached thereto and an axially adjustable cammed arm held by the said shaft to control the period of said activation and means comprising a second switch in parallel with the first switch to prolong the operation of the said appliance for the duration of the heating cycle.

9. In a timing device for electrical appliances,

a heating element, coin responsive means comprising a switch to activate the said element, means comprising an axially adjustable plate supporting a helically wound bi-metallic strip, a shaft attached thereto and an axially adjustable cammed arm held by the said shaft to control the period of said activation, means consisting of a heat insulating case surrounding the said timer adapted to retard the rate of cooling of the bi-metallic strip, means comprising a second switch in parallel with the first switch, and a stud held by the said shaft and adapted to close the said switch to prolong the operation of the said appliance for the duration of the heating cycle.

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The following references are of record in the file of this patent:

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