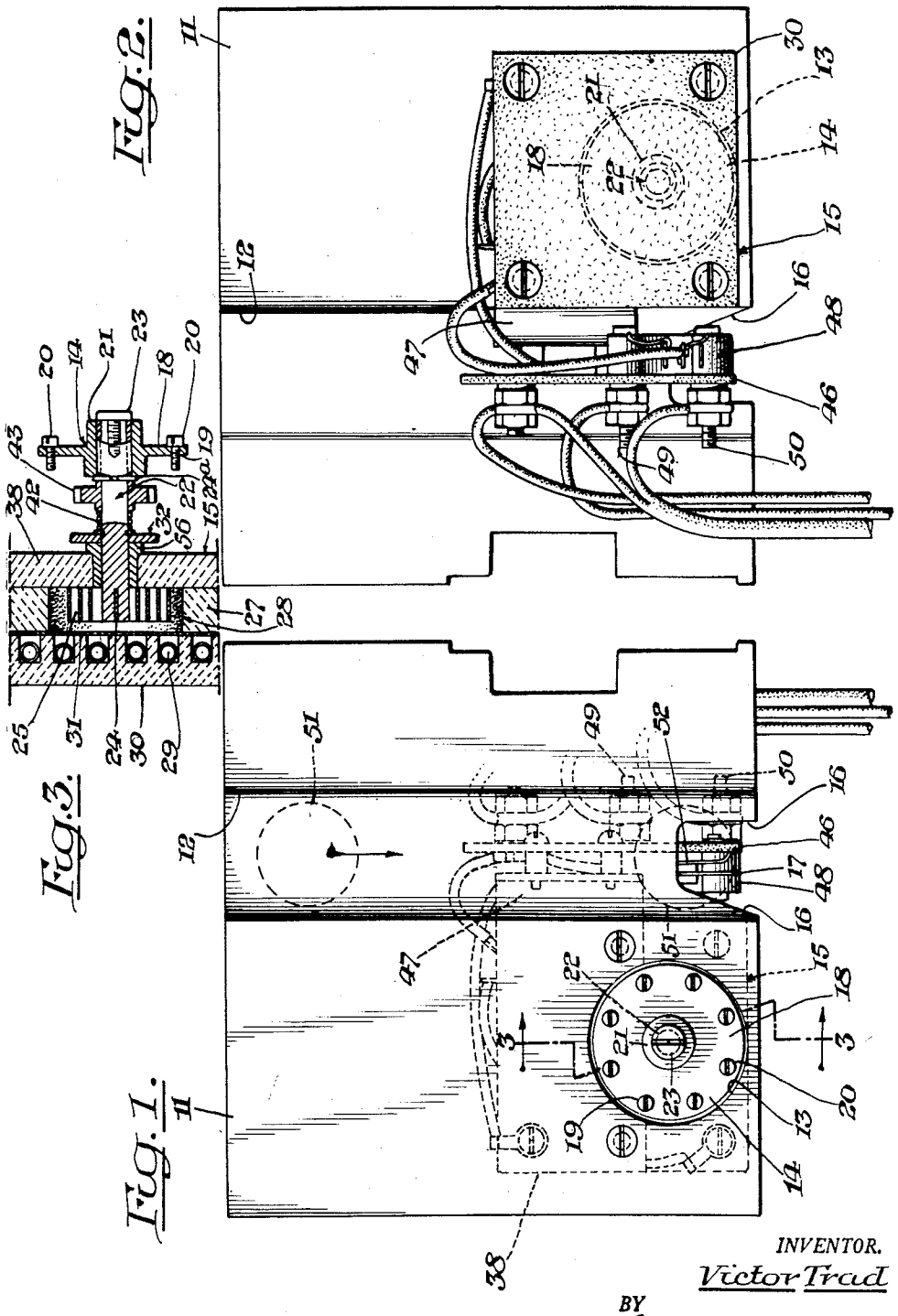
Jan. 20, 1953 V. TRAD 2,625,996

COIN-OPERATED TIMING DEVICE

Filed Oct. 16, 1947 3 Sheets-Sheet 1



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Filed Oct. 16, 1947 3 Sheets-Sheet 2

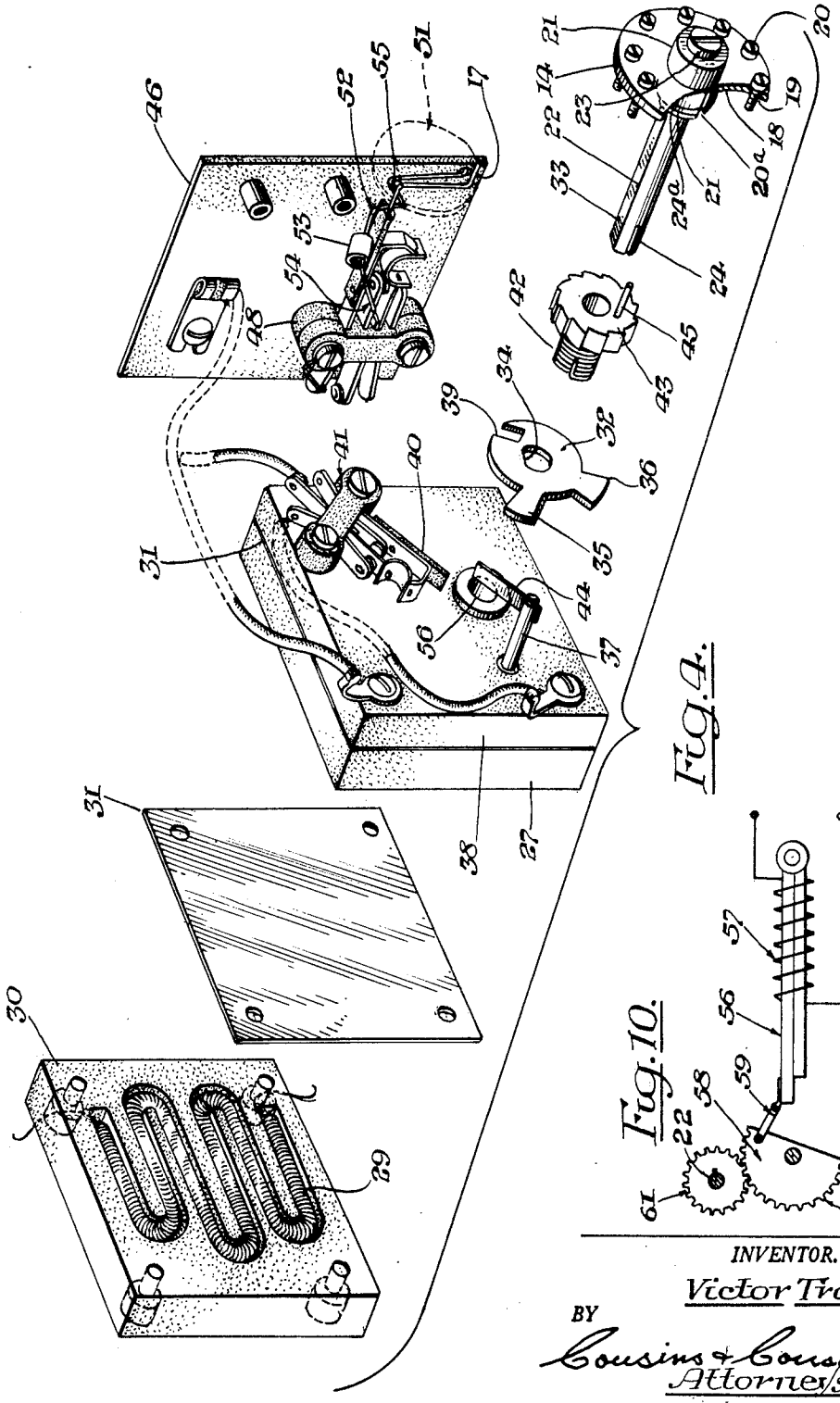


Fig. 4.

Fig. 10.

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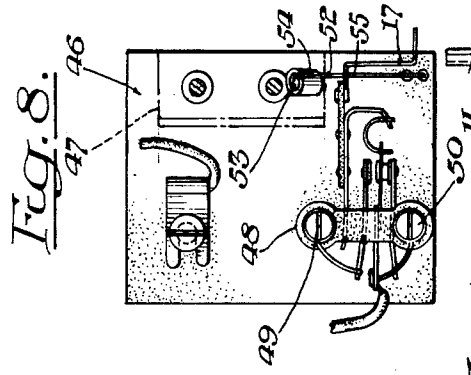


Fig. 8.

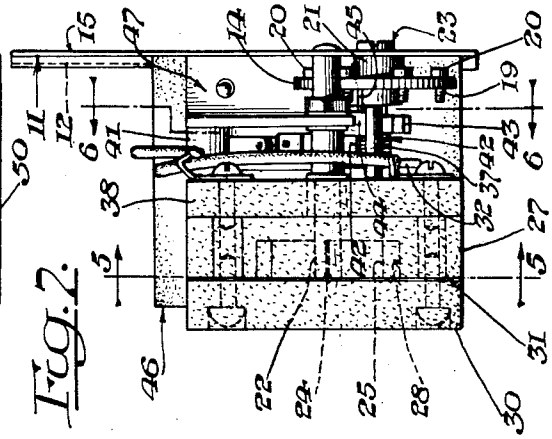


Fig. 7.

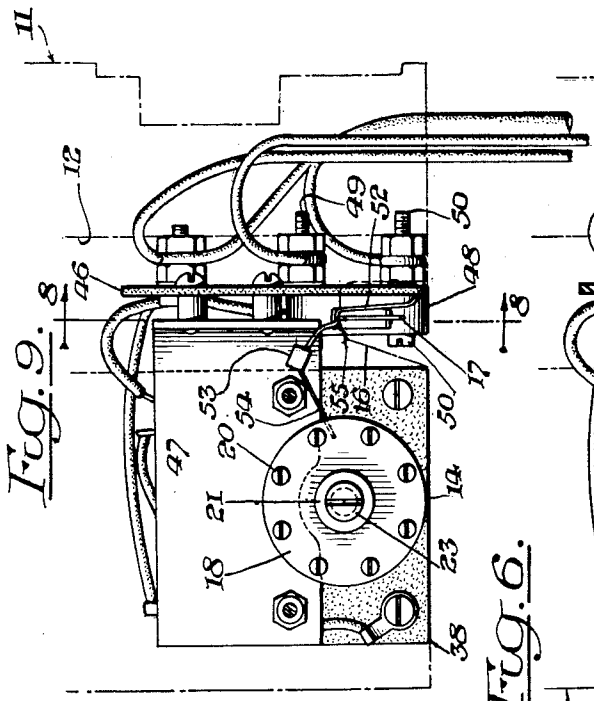


Fig. 9.

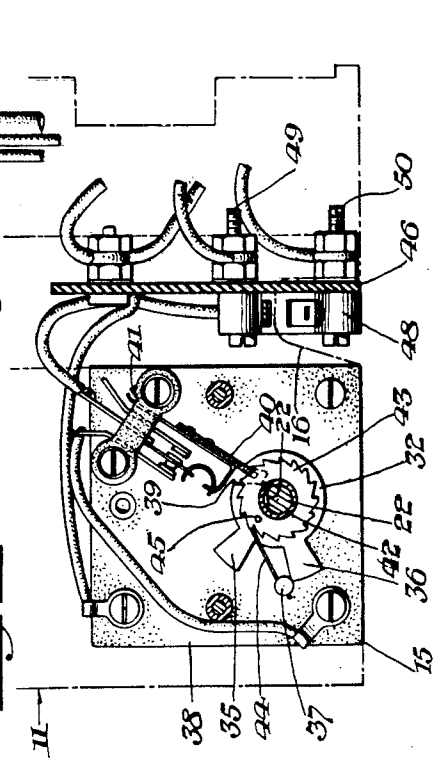


Fig. 6.

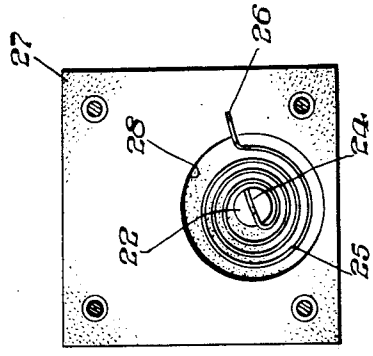


Fig. 5.

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UNITED STATES PATENT OFFICE

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COIN-OPERATED TIMING DEVICE

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Application October 16, 1947, Serial No. 780,233

5 Claims. (Cl. 161—1)

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

In U. S. Patent No. 2,533,410, dated December 12, 1950, there is shown a coin timer in which the interval of time is regulated by the heating and cooling cycle of a spirally shaped bimetallic strip. Where prolonged cycles are desired, however, this type of construction requires a bimetal of considerable size and the expenditure of a large amount of current.

Accordingly, it is an object of this invention to provide a coin timer capable of governing long intervals, which requires a small amount of electrical energy.

Another object of this invention is to provide a coin timer capable of ready adjustment so as to be operable for a variety of time intervals.

An object of this invention is to make a small coin timer which will stand up under repeated use.

A feature of this invention is its adjustable timing wheel.

Another feature of this invention is its novel switch construction for actuating and stopping the timer.

A feature of this invention is the use of a binding spring to regulate the motion of the timing wheel.

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

In the accompanying drawings, forming part thereof, are illustrated two forms of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a front elevation of the timing device with the coin chute plate in position.

Figure 2 is a rear view in elevation of the timing device shown in Figure 1.

Figure 3 is a cross-sectional view of the timing device, taken on line 3—3 of Figure 1.

Figure 4 is an exploded view of the entire timing mechanism without the support plate shown in Figures 1 and 2.

Figure 5 is a view taken on line 5—5 of Figure 7, showing the bimetal structure.

Figure 6 is a view taken on line 6—6 of Figure 7, looking in the direction indicated by the arrows.

Figure 7 is a view of the coin timer in side elevation.

Figure 8 is a view taken on line 8—8 of Figure 9, looking in the direction indicated by the arrows.

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Figure 9 is a view taken in front elevation of the timing mechanism with the support plate cut away to show the timer construction.

Figure 10 is a somewhat diagrammatic view of an alternate form of bimetal structure according to this invention.

Referring to the drawings, and particularly to Figures 1 and 2, 11 indicates a support plate having a coin chute 12 pressed therein. The plate 11 is provided with a circular opening 13 to give ready access to the timing wheel 14 of a timer 15. An aperture 16 is also cut into the plate 11 to receive the trip arm 17 of the timer 15.

The construction of the timing wheel 14 is best shown in Figures 1, 3 and 4. This wheel 14 comprises a disc 18 having a plurality of spaced bores 19 near the rim thereof, and concentric therewith. Each bore 19 is threaded to receive a small screw 20, said screws serving to activate the timing switch, as hereinafter described. The timing wheel 14 is provided with a hub 21, the inner flange of which is slotted as indicated at 20a in Figure 4. The entire timing wheel is freely journaled upon a shaft 22 being held thereon between a screw 23 in the end of the shaft 22 and a snap ring 24a therearound proximate the inner end of the hub 21.

The end of the shaft 22 opposite the timing wheel 14 is slit as shown at 24 in Figures 4 and 5 to receive the end of a spirally shaped bimetal 25. The other end 26 of the said bimetal 25 is held by a dielectric block 27. The entire bimetal 25 is positioned within a recess 28 in the said block 27.

The heat necessary to cause the bimetal 25 to expand is supplied by a heating coil 29 mounted within a dielectric block 30. The block 30 is secured to the back of the timer 15, as shown in Figures 3 and 4, and is separated from the bimetal block 27 by a thin sheet of mica 31, or other similar material.

The amount of rotation of the bimetal controlled shaft 22 is governed by the limiting cam 32, best shown in Figure 4. This cam 32 is prevented from rotating on the shaft 22, on which it is mounted, by a flat 33 on the shaft 22 and a corresponding flat 34 on the cam 32. Spaced detents 35, 36 are provided on the cam 32. These detents straddle a pin 37 held by the front block 38 of the timer 15 and normal thereto. The shaft 22 may thus rotate within a sleeve 56 in the block 38 under the torque supplied by the bimetal 22, until the upper detent 35 bears against the pin 37.

A recess 39 is provided in the cam 32 to receive the dielectric arm 40 of a switch 41 mounted

upon the front block 38. This switch, best shown in Figures 4 and 6, is normally closed. However, as the bimetal 25 heats up, thereby causing the limit cam 32 to rotate, the wall of the recess 39 in the said cam, forces the switch open. The opening of the switch 41 with which the heating coil 29 is in series, causes the bimetal 25 to cool, but does not interrupt the current flowing to the appliance (not shown). The shaft then turns in a clockwise direction until the switch 41 again closes, thereby reheating the coil 29.

The alternate rotation of the shaft 22 caused by the repeated heating and cooling, is translated into a clockwise motion of the timing wheel 14 in the following manner:

A coil spring 42, shown in Figures 4, 6 and 7, is secured to a small ratchet wheel 43. The spring 42 and ratchet wheel 43 are then slipped upon the shaft 22. The spring 42 is wound in such manner as to operate in the manner of a ratchet so that the counterclockwise rotation of the shaft will expand the spring 42 and cause it to slip, whereas clockwise rotation of the shaft 22 will tighten the spring 42, which in turn will rotate the ratchet wheel 43. Any slight tendency on the part of the ratchet wheel 43 to turn counterclockwise is resisted by a small pawl 44, carried by the pin 37, which engages the teeth of the ratchet wheel 43. A small pin 45, best shown in Figure 4, is mounted on the front face of the ratchet wheel 43 normal thereto. This pin 45 fits within the slot 20a of the timing wheel 14, imparting the motion of the ratchet wheel 43 to the said timing wheel 14.

The current to operate the timing mechanism is supplied through a switch panel 46, best illustrated in Figures 4, 8 and 9. The panel is laterally held to the timer 15 by a bracket 47. An operating switch 48 is secured to the panel 46 in such manner that its terminals 49, 50 project through the said panel.

The switch 48 is open when the coin timer is not in operation. When a coin 51 (indicated in dotted lines in Figures 1 and 4) is inserted into the coin chute 12, it slides therethrough, depressing the trip arm 17 of the switch, which extends into the coin chute 12. A small wire latch 52 secured to the switch panel 46 is thus able to drop from the position shown in Figure 4, into that shown in Figure 9. A weight 53 secured to the latch 52 facilitates this dropping motion.

As shown in Figure 9, when the latch 52 is down, its outwardly extended end 54 lies in the path of the screws 20 on the timing wheel 14. When a screw 20 comes into contact with the end 54 of the latch 52, as a result of the rotation of the wheel 14, it carries the latch 52 downward until the end 54 of the said latch slips off the side of the screw 20. The wire latch 52 is preferably of spring steel so that as it is released from the screw 20 it will spring back and release the trip arm 17 from the small shoulder 55 of the said latch. This shoulder 55 holds down the said arm 17 once it is depressed by the coin 51. The released trip arm 17 springs upward and opens the switch 48, thereby cutting off the current to the appliance and also to the timing device.

If it is desired to lengthen the timing cycle of the appliance, it is merely necessary to remove one or more of the screws 20 in the timing wheel 14. This removal increases the interval between the screws 20 and the consequent time it will take the timing wheel 14 to rotate and bring one of the screws 20 to bear upon the end 54 of the latch 52.

Figure 10 illustrates an alternate bimetal structure for use in the coin timer in which the bimetal 56 is of the straight type. A heating coil 57 is positioned therearound to activate the said bimetal 56. The free end of the said bimetal is connected to a toothed cam 58 by a link 59. In this manner the travel of the free end of the bimetal 56, as it alternately heats and cools, is translated into rotary motion of the cam 58. The teeth 60 of the cam 58 in turn engage a small gear 61 which is keyed to the shaft 22. The motion of the bimetallic strip 56 is thus translated into the rotation of the shaft 22, necessary for the operation of the timing device, in the previously described manner.

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

1. An electrical timing mechanism comprising, a block, said block being provided with a recess therein, an electrical heating element in said block recess, a source of electrical potential connected to the heating element, a first switch inserted between the source of potential and the heating element, a bimetallic strip having one end thereof anchored to the block, said strip being adjacent and responsive to the heating element, a rotatable shaft, one end of said shaft being coupled to the free end of the bimetal, whereby the shaft may be rotated in alternately forward and reverse directions as the bimetal is heated and cooled, a cam carried upon the shaft, said cam being disposed so as to alternately open and close the first switch as the shaft rotates, said opening and closing of the first switch governing the passage of the electrical potential to the heating element whereby the bimetallic strip is alternately heated and cooled and the shaft connected thereto caused to rotate, a timing wheel journaled upon the end of the shaft opposite the bimetal, ratchet means rotated by the shaft and comprising a unidirectional rotating member upon the shaft between the timing wheel and bimetal, said rotating member being coupled to the timing wheel so as to turn the timing wheel in one direction, a second switch connected between the first switch and the source of potential, a trip arm secured to the second switch and a screw carried by the timing wheel, the path of said screw during the rotation of the wheel being such that it will encounter the trip arm and open the second switch.

2. An electrical timing mechanism comprising, a block, said block being provided with a recess therein, an electrical heating element in said block recess, a source of electrical potential connected to the heating element, a first switch inserted between the source of potential and the heating element, a spirally shaped bimetallic strip having one end thereof anchored to the block, said strip being adjacent and responsive to the heating element, a rotatable shaft, one end of said shaft being coupled to the free end of the bimetal, whereby the shaft may be rotated in alternately forward and reverse directions as the bimetal is heated and cooled, a cam carried upon the shaft, said cam being disposed so as to alternately open and close the first switch as the shaft rotates, said opening and closing of the first switch governing the passage of the electrical potential to the heating element whereby the bimetallic strip is alternately heated and cooled and the shaft connected thereto caused to rotate, a timing wheel journaled upon the end of the shaft opposite the bimetal, ratchet means

rotated by the shaft and comprising a uni-directional rotating member upon the shaft between the timing wheel and bimetal, said rotating member being coupled to the timing wheel so as to turn the timing wheel in one direction, a second switch connected between the first switch and the source of potential, a trip arm secured to the second switch and a screw carried by the timing wheel, the path of said screw during the rotation of the wheel being such that it will encounter the trip arm and open the second switch.

3. An electrical timing mechanism comprising, a block, said block being provided with a recess therein, an electrical heating element in said block recess, a source of electrical potential connected to the heating element, a first switch inserted between the source of potential and the heating element, a spirally shaped bimetallic strip having one end thereof anchored to the block, said strip being adjacent and responsive to the heating element, a rotatable shaft, one end of said shaft being coupled to the free end of the bimetal, whereby the shaft may be rotated in alternately forward and reverse directions as the bimetal is heated and cooled, a cam carried upon the shaft, said cam being disposed so as to alternately open and close the first switch as the shaft rotates, said opening and closing of the first switch governing the passage of the electrical potential to the heating element whereby the bimetallic strip is alternately heated and cooled and the shaft connected thereto caused to rotate, a timing wheel journaled upon the end of the shaft opposite the bimetal, ratchet means consisting of a ratchet wheel rotated by the shaft and forming part of a unidirectional rotating member upon the shaft between the timing wheel and bimetal, and a pawl carried by the block in engagement with the ratchet wheel, said rotating member being coupled to the timing wheel so as to turn the timing wheel in one direction, a second switch connected between the first switch and the source of potential, a trip arm secured to the second switch and a screw carried by the timing wheel, the path of said screw during the rotation of the wheel being such that it will encounter the trip arm and open the second switch.

4. An electrical timing mechanism comprising, a block, said block being provided with a recess therein, an electrical heating element in said block recess, a source of electrical potential connected to the heating element, a first switch inserted between the source of potential and the heating element, a spirally shaped bimetallic strip having one end thereof anchored to the block, said strip being adjacent and responsive to the heating element, a rotatable shaft, one end of said shaft being coupled to the free end of the bimetal, whereby the shaft may be rotated in alternately forward and reverse directions as the bimetal is heated and cooled, a cam carried upon the shaft, said cam being disposed so as to alternately open and close the first switch as the shaft rotates, said opening and closing of the first switch governing the passage of the electrical potential to the heating element whereby the bimetallic strip is alternately heated and cooled and the shaft connected thereto caused to rotate, a timing wheel journaled upon the end of the shaft opposite the bimetal, ratchet means consisting of a ratchet wheel rotated by the shaft and forming part of a unidirectional

rotating member upon the shaft between the timing wheel and bimetal, and a pawl carried by the block in engagement with the ratchet wheel, said rotating member being coupled to the timing wheel so as to turn the timing wheel in one direction, a second switch connected between the first switch and the source of potential, a trip arm secured to the second switch and a plurality of screws carried by the timing wheel, the path of said screws during the rotation of the wheel being such that they will successively encounter the trip arm and open the second switch.

5. An electrical timing mechanism comprising, a block, said block being provided with a recess therein, an electrical heating element in said block recess, a source of electrical potential connected to the heating element, a first switch inserted between the source of potential and the heating element, a bimetallic strip having one end thereof anchored to the block, said strip being adjacent and responsive to the heating element, a rotatable shaft, a gear secured to one end of said shaft, said gear being coupled to the free end of the bimetal by means comprising a link connected to the end of the bimetal and a gear segment rockably mounted upon a pivot, said gear segment being in mesh with the shaft gear, whereby the shaft may be rotated in alternately forward and reverse directions as the bimetal is heated and cooled, a cam carried upon the shaft, said cam being disposed so as to alternately open and close the first switch as the shaft rotates, said opening and closing of the first switch governing the passage of the electrical potential to the heating element whereby the bimetallic strip is alternately heated and cooled and the shaft connected thereto caused to rotate, a timing wheel journaled upon the end of the shaft opposite the bimetal, ratchet means rotated by the shaft and comprising a unidirectional rotating member upon the shaft between the timing wheel and bimetal, said rotating member being coupled to the timing wheel so as to turn the timing wheel in one direction, a second switch connected between the first switch and the source of potential, a trip arm secured to the second switch and a screw carried by the timing wheel, the path of said screw during the rotation of the wheel being such that it will encounter the trip arm and open the second switch.

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