Nov. 15, 1932. L. C. STRITE 1,887,966

ELECTRIC WAFFLE IRON

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Fig. 1

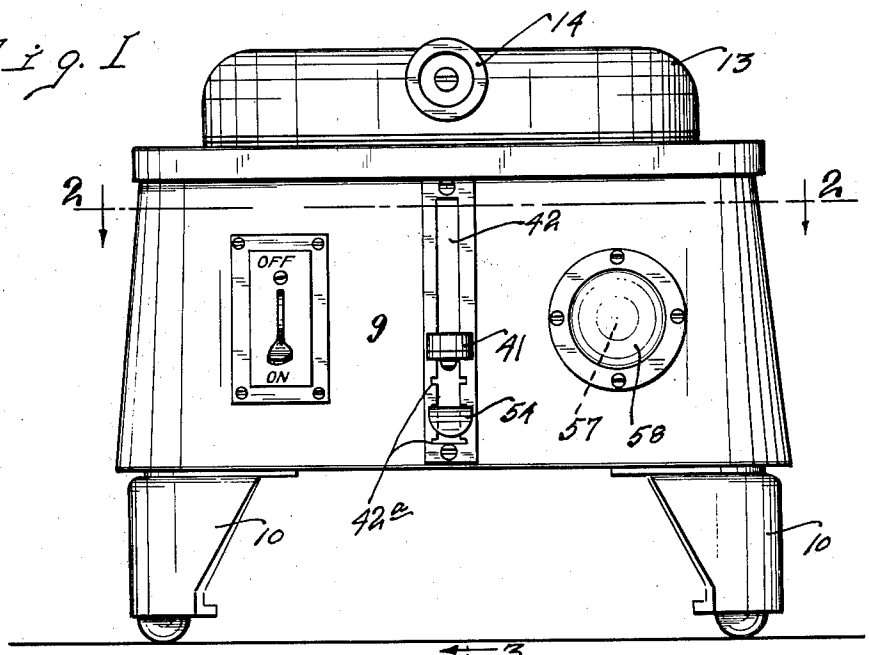
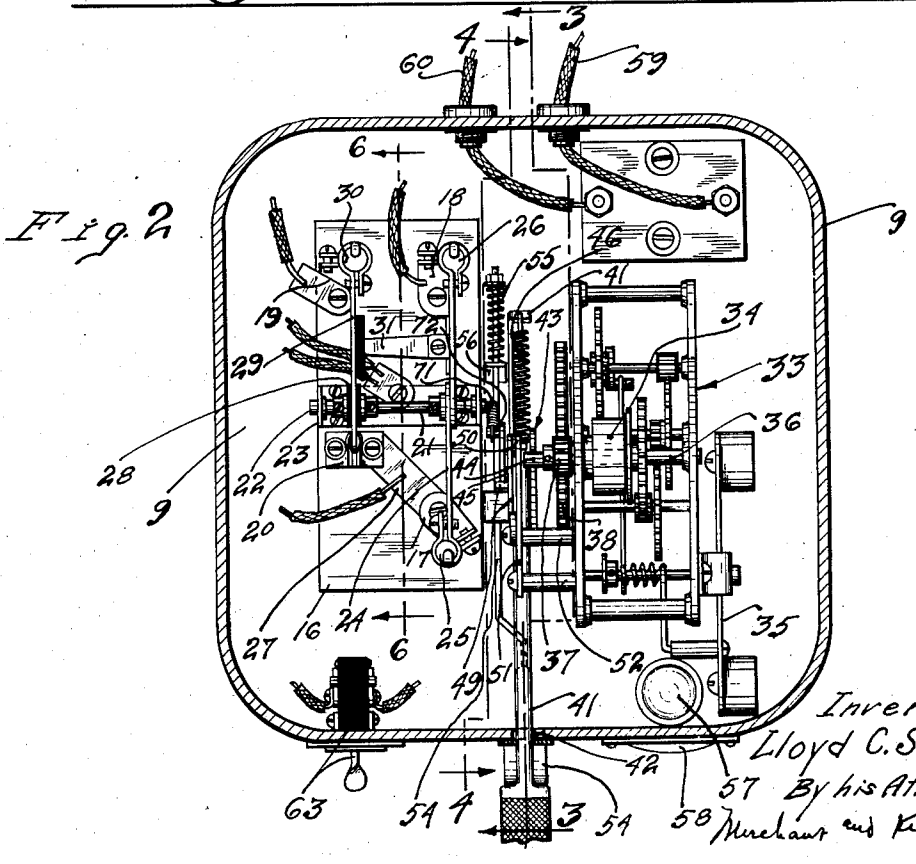


Fig. 2



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Fig. 4

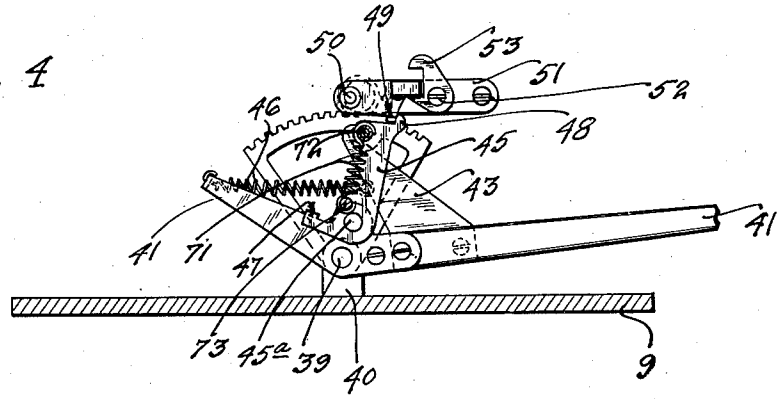
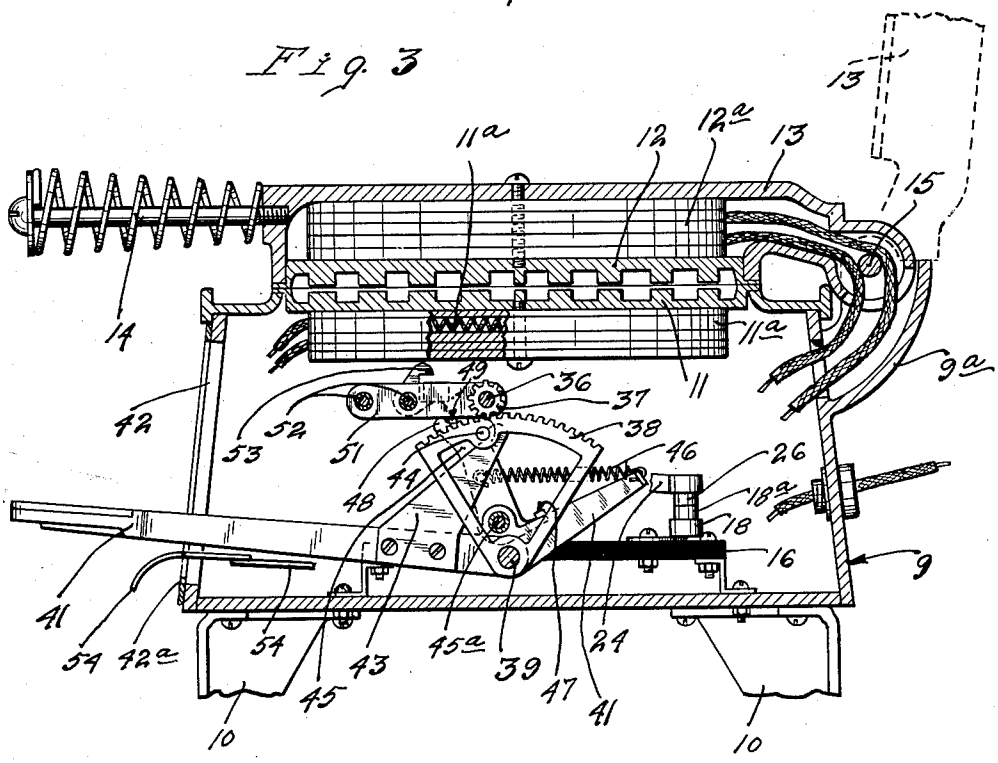


Fig. 3



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Fig. 5

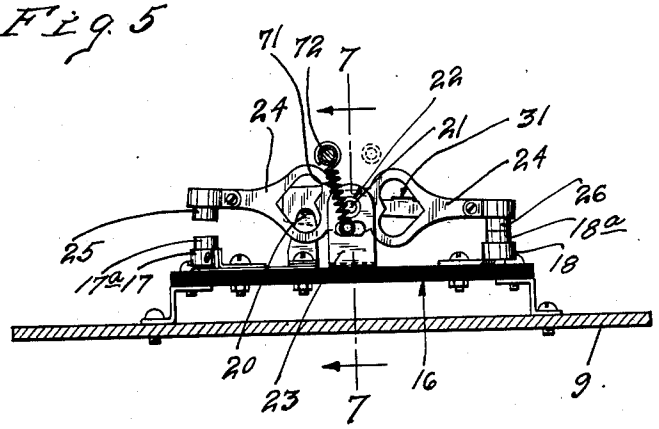


Fig. 6

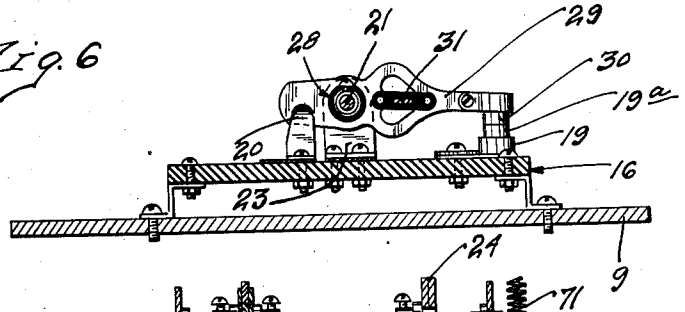
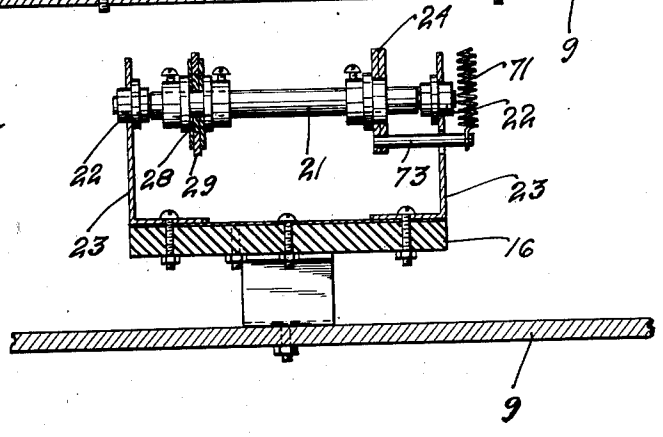


Fig. 7



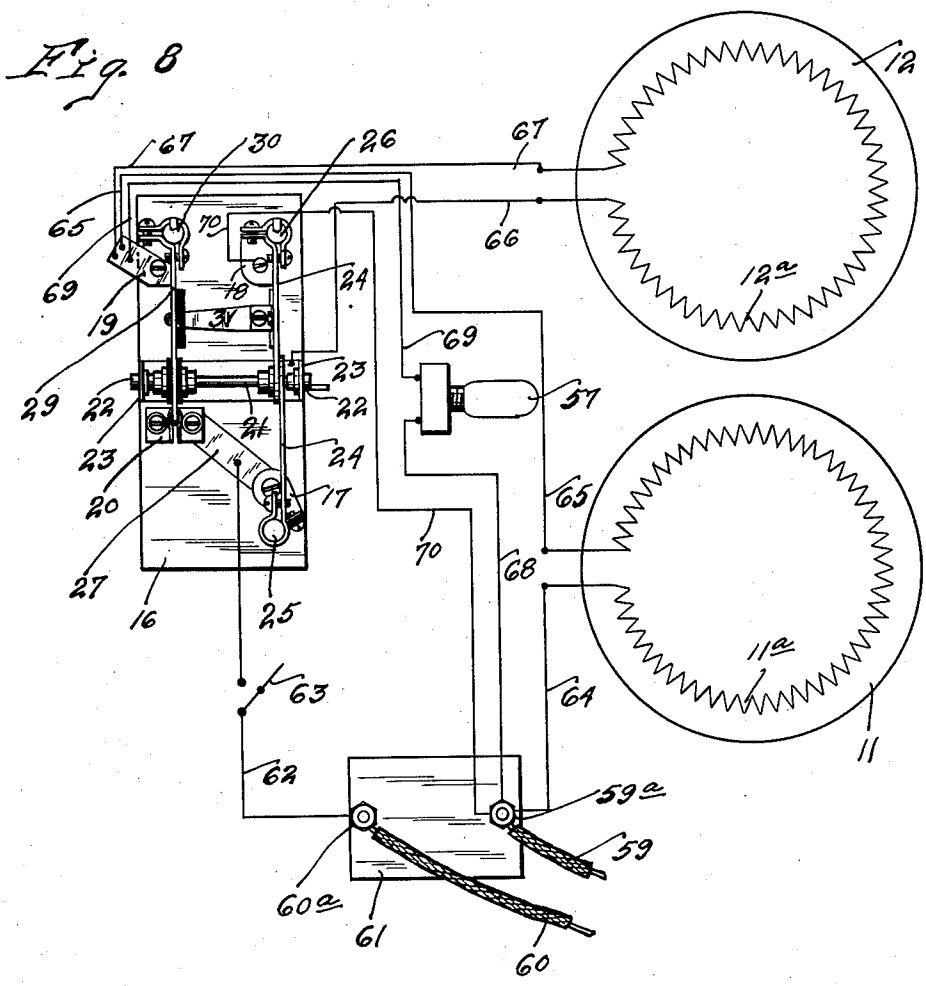
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Filed March 12, 1927 4 Sheets-Sheet 4

Fig. 8



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Patented Nov. 15, 1932

1,887,966

UNITED STATES PATENT OFFICE

LLOYD C. STRITE, OF MINNEAPOLIS, MINNESOTA

ELECTRIC WAFFLE IRON

Application filed March 12, 1927. Serial No. 174,783.

This invention is directed particularly to the provision of an improved electric waffle iron and, generally stated, consists of the novel devices, and combinations of devices hereinafter described and defined in the claims. More particularly stated, the invention is directed to an improved electric heating system wherein relatively high and low temperatures may be produced; to electric indicating means for indicating when the heating temperature of the circuit has been cut from high down to low; to improve time-controlled switch-actuated mechanism whereby, after a predetermined heating interval, the heating temperature will be cut from high down to low; and to improved mechanism for setting the time mechanism into action.

In the accompanying drawings, which illustrate what is at present believed to be a preferred form of the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a front elevation of the improved electric waffle iron;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken through the device on the line 3—3 of Fig. 2, looking at the parts from the right toward the left in respect to Fig. 2;

Fig. 4 is a fragmentary vertical section taken on the line 4—4 of Fig. 2, looking at the parts from the left toward the right in respect to Fig. 2;

Fig. 5 is a section taken on the same line as Fig. 4 but looking at the parts shown from the right toward the left in respect to Fig. 2;

Fig. 6 is a fragmentary vertical section taken on the line 6—6 of Fig. 2;

Fig. 7 is a transverse vertical section taken on the line 7—7 of Fig. 5; and

Fig. 8 is a diagrammatic view showing the heating circuit, signalling circuit and switches of the device.

Preferably, the mechanism of the device is mounted in a cast or otherwise formed box-like base 9 shown as supported by legs 10. The top of the box-like base 9, as shown, is formed with a large opening in which is rigidly secured a grid or waffle-forming member 11. The upper grid or waffle-forming member 12 is a relatively movable member and is rigidly secured to the inverted pan-shaped portion of a lifting lever 13 that is provided with a projecting handle 14 and is pivotally connected by a pin 15 to a hollow elbow portion 9^a of the base 9. The opposing faces of the grids 11 and 12 are shown as formed with the customary ribs for giving the waffle its checkered formation and the said two members are formed with chambered backs to receive the electric heating elements 11^a and 12^a, respectively. These heating elements may be of the usual or any suitable form and they are connected in circuits hereinafter to be described.

Located within the base 9 and supported from the bottom thereof is a switch base plate 16 of insulating material. Mounted on this base plate 16 and insulated thereby from each other are flanged contact sockets 17, 18 and 19 and a spring blade contact 20. The sockets 17, 18 and 19, as shown, are arranged to hold fixed carbon contacts 17^a, 18^a and 19^a.

The numeral 21 indicates a short transverse lever-supporting shaft shown as mounted at its ends in bearings 22 supported by brackets 23 secured on the insulatng base 16. For co-operating with the contacts 17 and 18 a switch lever 24 is secured on the shaft 21 and at its ends is provided with sockets that hold movable carbon contacts 25 and 26 for co-operation, respectively, with the carbon contacts 17^a and 18^a. As shown, the lever 24 is made up of two metallic sections rigidly secured together and to the shaft 21. Here it should be noted that the contact socket 17, by a metallic strip 27, is electrically connected to the spring contact blade 20. Loosely mounted on the rock shaft 21, but insulated therefrom by insulating washers 28, is a second contact lever 29, the short end of which moves always in engagement with the contact blade 20, but the long end of which is provided with a socket that holds a movable carbon contact 30 arranged for co-operation with the fixed carbon contact 19^a. The two contact levers 24 and 29 are yieldingly connected for common rocking movements, that is, as shown, being accom-

plished by a spring arm 31 carried by the lever 24 with its free end engaged with the insulating block 32 on the lever 29. By this connection the two levers will be given simultaneous rocking movements but the spring arm will yield to permit the carbon contacts of the two arms to properly seat themselves.

Located within the box-like base 9 but offset laterally from the switch mechanism above described is a spring motor such as that afforded by an ordinary clock mechanism indicated as an entirety by the numeral 33. Of the parts of this clock mechanism, it is only desirable to further particularly note the clock spring 34, customary escapement mechanism 35 and a spring-impelled shaft 36, to the projecting end of which latter is secured a small pinion 37. This pinion 37 is in mesh with a gear segment 38 (see particularly Figs. 2, 3 and 4) that is loosely mounted on a shaft 39 mounted in a suitable bearing 40 on the bottom of the base 9.

As a feature of this invention, the timing mechanism is set and operated by a single control lever 41 that is located adjacent to the gear segment 38 and is also pivoted on the shaft 39. The long end of this lever projects through a slot 42 in the front of the base and is adapted to be engaged by the hand of the operator. Forward of its pivot, lever 41 is provided with a thin blade-like upstanding arm 43, the upper end of which is engageable with a pin 44 projected from the gear segment 38. Pivoted at 45^a to a portion of the controlling lever 41 that projects above the pivot of the latter is a trip arm 45 that is connected to the extended rear end of lever 41 by a tension spring 46 (see Figs. 3 and 4). Trip arm 45, at its base, has a laterally projecting log 47 that overlies the rearwardly projected end of the lever 41. At the free upper end of the trip arm 45 is a projecting latch lug 48, which, when the mechanism is set for timed action as illustrated in Figs. 3 and 4, is engaged and held by a latch dog 49. The latch dog 49 is pivoted at 50 to a bar 51 which latter, as shown, is rigidly supported from the clock frame by horizontal posts 52 (see Fig. 2). Latch dog 49 has a weighted front end, the movements of which are limited by a notched stop clip 53 rigidly secured to the bar 51. Here it will be noted that the latch lug 48 is beveled so that under movement from the right toward the left in respect to Fig. 3 or from the left toward the right in respect to Fig. 4 it will lift the latch dog and pass under the same into the secured position in respect thereto shown in said Figs. 3 and 4.

As a gauge for setting the controlling lever 41 for varying timed action, an adjustable lever stop is preferably provided. This stop may take various forms, but, as shown, is afforded by a rod 54 that is yieldingly drawn rearward by a spring 55 that presses against a guide 56 on the bottom of the base 9. The front end of this stop rod or device 54 is flattened, is projected through the slot 42 where it may be engaged by the fingers, and its flattened portion is arranged to be interlocked with any one of several vertically spaced pairs of notches 42^a formed in the sides of the slot 42.

For a highly important purpose, a small signal lamp 57 is applied preferably in the front wall of the base 9 and is covered by a glass lens 58.

The current for supplying the heat to the electric elements 11^a and 12^a may be supplied from any suitable source such as main leads 59 and 60 which, as shown, are attached, respectively, to binding posts 59^a and 60^a on an insulating block 61 shown as secured within the base 9. Binding post 60^a is connected to the metallic bar 27, and hence to the contact 20 and contact socket 17, by a lead 62. A switch 63 is interposed in the lead 62 and, as shown, this switch (see Figs. 1 and 2) is applied to the front wall of the base 9 and has an operating lever that projects at the front of the device. One terminal of the electric heating element 11^a is connected to binding posts 59^a by leads 64 and the other terminal of said heating element is connected by a lead 65 to the extended flange of the contact socket 19. One terminal of the electric heating element 12^a is connected by a lead 66 to the extended base of the inner metallic bearing bracket 23 and hence is electrically connected to the rocking contact lever 24. The other terminal of said heating element 12^a is connected by a lead 67 to the flange of contact socket 19. One side of the light bulb 57 is connected to binding post 59^a by a lead 68, and the other side of said bulb is connected to the flange of contact socket 19 by a lead 69. The flange of contact socket 18 is connected to the binding post 59^a by a lead 70.

For imparting quick vibratory movements to the trip arm 45 there is provided a spring device arranged to be thrown from one side to the other of a dead center. This spring device, as shown, comprises a coil tension spring 71 attached at its upper end to a stud 72 (see Figs. 3 and 4) projected from the upper portion of said trip arm, and attached at its lower end to the outer end of a stud 73 that is secured to a lower intermediate portion of the contact lever 24 and works through a slot in the adjacent bracket 23.

Operation

When the switch 63 is open, the waffle iron will be cut entirely out of action so that it cannot receive current under its automatic control, and of course before the device can be rendered operative, switch 63 must be closed, and hence throughout the following description of the operation, this switch 63 will be assumed to be closed. Before follow-

ing the operation of the device in detail it may be advantageously stated that during the waffle baking operation the electric heating elements 11^a and 12^a will be connected in multiple and that when the waffle has been baked to a predetermined or desired extent the automatic switch mechanism will then connect the two heating elements in series, thereby increasing the resistance and decreasing the current flow with the result that heat will be cut down so materially that it will do little if any more than keep the waffles warm or hot. This cutting down rather than absolutely cutting off the entire current when the waffle has been substantially baked has been found very desirable for the reason that frequently a waffle, after having been baked, must be left in the molds or on the grids for some time before it is to be eaten. Moreover, the grids are kept warm so that they may be quickly brought to the baking temperature when the current is turned fully on for the baking of other waffles.

Figures 3 and 4 show the control lever 41 and parts moved thereby and subject thereto in the position that they will occupy when the lever has been depressed and the timed baking operation has just been started. In the above noted position of the parts the rear ends of the rocking contact levers 24 and 29 will be depressed so that contact carbons 26 and 30 will be engaged, respectively, with contact carbons 18^a and 19^a; and the two heating elements and the signal lamp 57 will then be connected in multiple. On one side, the two heating elements and the light bulb are connected to the binding post 59^a and on the other side they are all connected to the flange of the contact socket 19 and all find a common return to binding post 60^a through lever 29, contact 20, bar 27 and lead 62. This manner of connection of course gives the maximum heating effect to the grids and as long as the bulb 57 remains bright the attendant will know that the baking operation proper is being continued.

Under the condition above noted, the spring motor or clock mechanism will be retarded in its movement by the escapement 35, will slowly rotate pinion 37 in a counter-clockwise direction in respect to Fig. 3, thereby slowly moving gear segment 38 from the left toward the right in respect to Fig. 3 or from the right toward the left in respect to the reverse side view Fig. 4. When gear segment 38 is then moved, its stud 44, operating on the upper end of arm 43, will cause the long end of the control lever 41 to rise in the slot 42 with a timed action. Under such movement of the lever 41 the upper end of trip arm 45 will, by the latch dog 49 which engages the lug 48, be held against movement; but the pivot 45^a at the lower end of said trip arm will be moved rearward, or from the left toward the right in respect to Fig. 3, and this movement will gradually increase the inclination of said trip arm in respect to a vertical. When the lever 41 about reaches the limit of its upward movement in the slot 42, the inclination of the dog-engaging edge of the lug 48 of said trip arm 45 will be so increased that its upward pressure on the dog 49, under the action of the spring 46, will be sufficient to raise the said dog and permit said trip arm to be quickly thrown rearward by said spring 46. This rearward movement of trip lever 45 imparted thereto by the spring 46 is limited by the re-engagement of the lug 47 with the rear end of the lever 41. When the trip arm 45 is moved rearward as just described, that is from the left toward the right in respect to Fig. 3 and from the right toward the left in respect to Fig. 4, the angle of the spring 71 in respect to a line drawn from the axis of the stud 72 to the axis of the shaft 39, will be reversed from that shown in Fig. 4 (see dotted lines in Fig. 5) and then the tension of said spring 71, acting on the lever 24, will raise the rear ends of contact levers 24 and 29, thereby separating the contacts 26 and 30, respectively, from contacts 18^a and 19^a, and the downward movement of the front end of the lever 24 will move contact 25 into engagement with contact 17^a and this entirely changes the relative arrangement of the electric circuits. It breaks the circuit through light bulb 57 and it then connects the two heating elements 11^a and 12^a in series through the following leads, to wit: from binding post 59^a and lead 64 through heating element 11^a, thence through lead 65 to the flange of contact socket 19, thence by lead 67 through heating element 12^a, and from thence through lead 66, bracket 23 and shaft 21 to switch lever 24 and from thence through contacts 25 and 17^a, bar 27 and lead 62 to binding post 60^a. It has thus been seen that the signal lamp 57 goes out simultaneously with the cutting down of the current supply by the connection of the heating elements in series.

When the grids have been supplied with waffle dough, the baking action proper will be started by the depression of the control lever 41, and the time during which the baking operation will be continued at high temperature produced by connecting the elements 11^a and 12^a in multiple as already described, will depend on the extent to which the control lever 41 is depressed, and of course it will be understood that with the adjustment of the stop device the flattened end of the stop rod 54 is set in the slot 42. When the long end of the lever 41 is depressed as just stated, the upper end of the arm 43 by engagement with the stud 44 on the gear segment 38 will move the latter forward a distance proportionate to the movement of said lever. Also the rear end of the lever 41, by engagement with the lug 47 on the trip arm 45, will move the latter

forward and cause the lug 48 thereof to lift and pass under the latch dog 49 into the position shown in Figs. 3 and 4 and in which position the upper end of said latch lever will be temporarily locked ready to be tripped as heretofore described when, under the action of the clockwork or time-controlled motor, the gear segment 38 has been moved far enough to lift the lever 41 to its tripping position. By reference to Fig. 3 it will be noted that the wires that lead to the heating elements 11^a and 12^a are extended through the elbow extension 9^a of the casing 9 and from thence through a hollow hinge lug of the lifting lever 13.

The signal device is preferably in the form of a light bulb but may be such as to give either visible or audible signal.

What I claim is:

1. In a timing mechanism for use with electric heating elements and a two position switch mechanism normally connecting the elements in series and in its second position connecting the elements in multiple, a timed power mechanism with a pinion, a gear subject to said pinion, a common control lever having an arm operative to move said gear into a set position and to set the timed mechanism into action, a trip arm eccentrically pivoted to said control lever and a spring connected thereto for tripping movement when released, a latch engageable with said trip arm to hold the same in a set position during the timed operation, said lever operating to move said trip arm into engagement with said latch, and a connection between said trip arm and a pivoted member designed to assume two selected positions.

2. The structure defined in claim 1 in which the connection between said trip arm and said pivoted member is a coiled spring movable from one side to the other of a line drawn from the pivot of said pivoted member to the axis of the pivot of said control lever.

3. The structure defined in claim 1 in which the connection between said trip arm and said pivoted member is a coiled spring movable from one side to the other of a line drawn from the pivot of said pivoted member to the axis of the pivot of said control lever, and in which said trip arm is connected to said control lever by a pivot located immediately over the pivot of the latter.

4. In a timing mechanism for use with electric heating elements and a two position switch mechanism normally connecting the elements in series and in its second position connecting the elements in multiple, a timed power mechanism, a member driven from the timed power mechanism, a common control lever having an arm operative to move said driven member into a set position and to set the timed mechanism into action, a trip arm pivoted to said control lever, and a connection between said trip arm and a pivoted member designed to assume two selected positions.

In testimony whereof I affix my signature.

LLOYD C. STRITE.