Feb. 9, 1943. A. R. HUTT 2,310,527

TIMING MECHANISM

Filed Sept. 16, 1940 4 Sheets-Sheet 1

Fig. 1

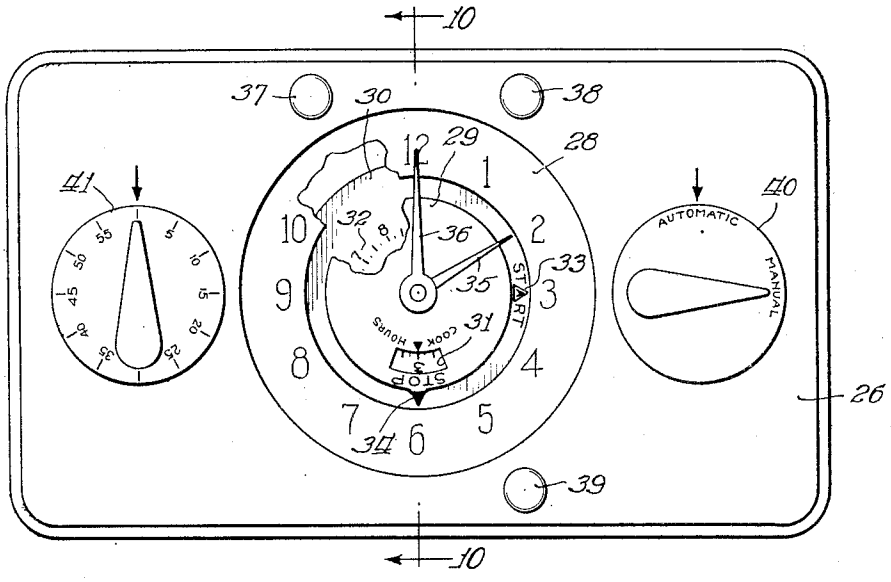
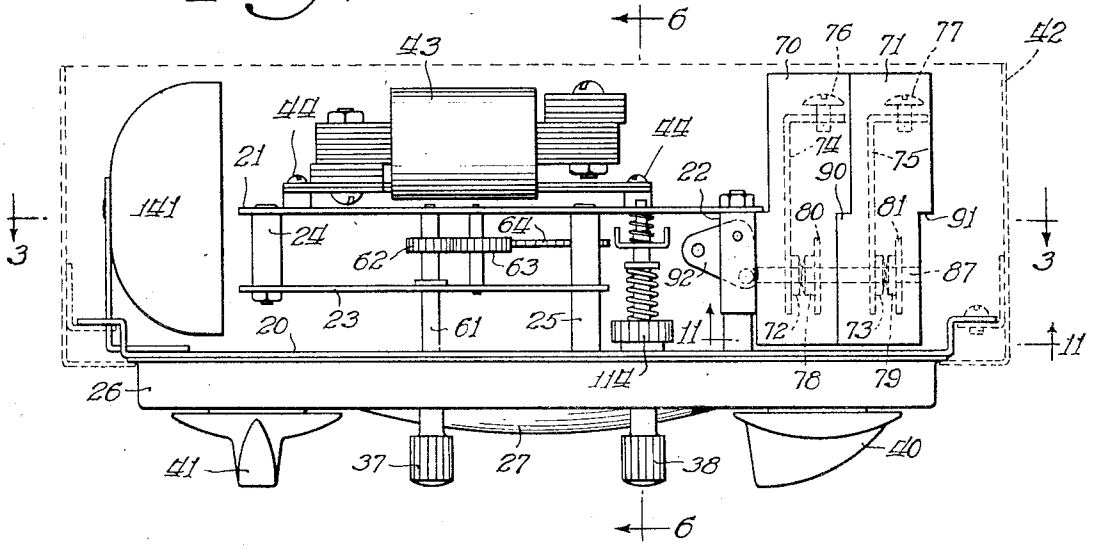


Fig. 2



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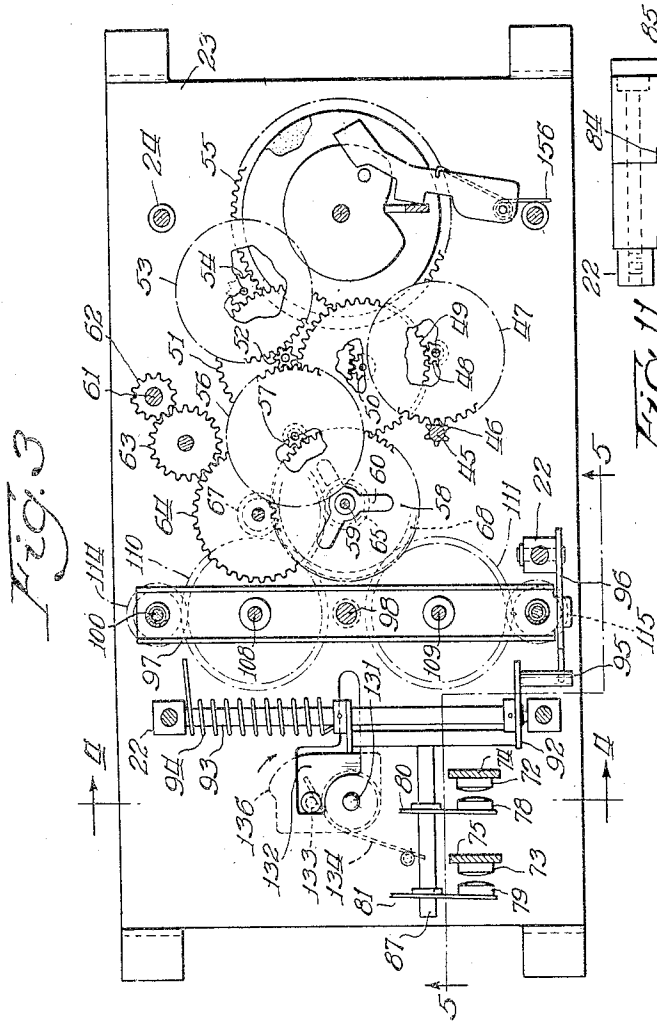


Fig. 3

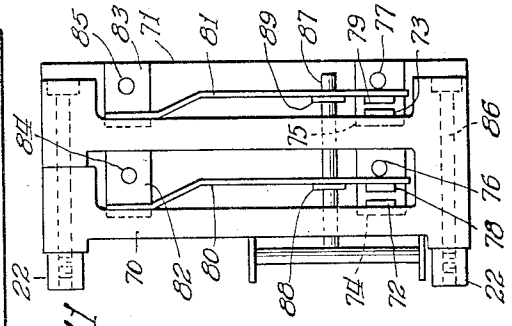


Fig. 11

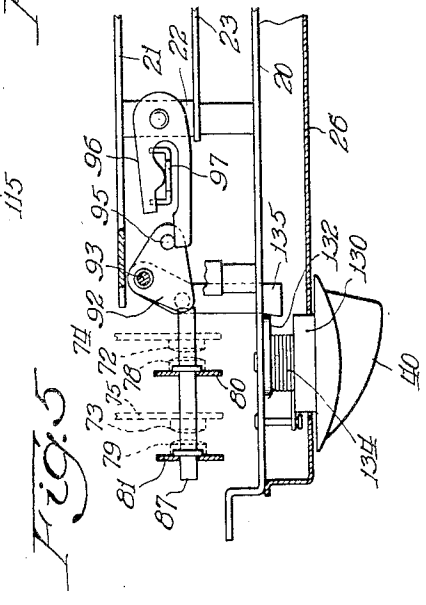


Fig. 5

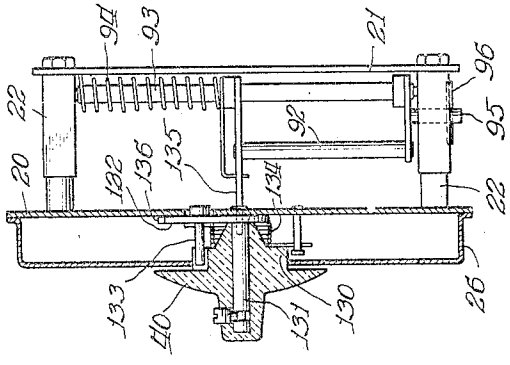


Fig. 7

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Fig. 6

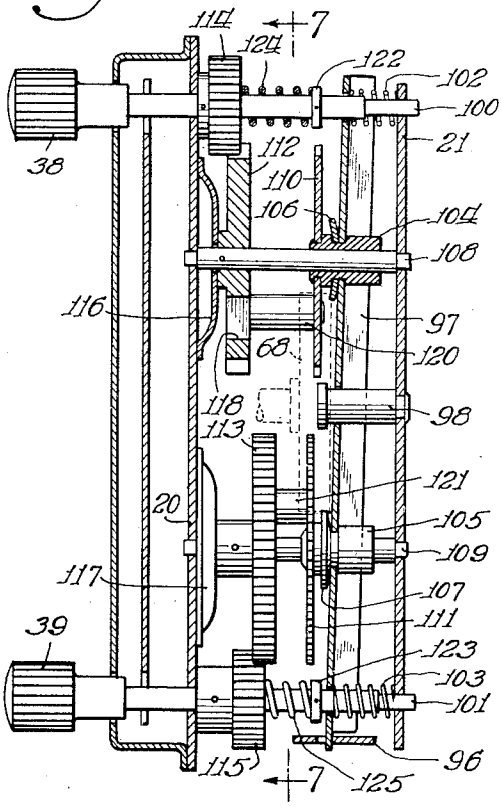


Fig. 7

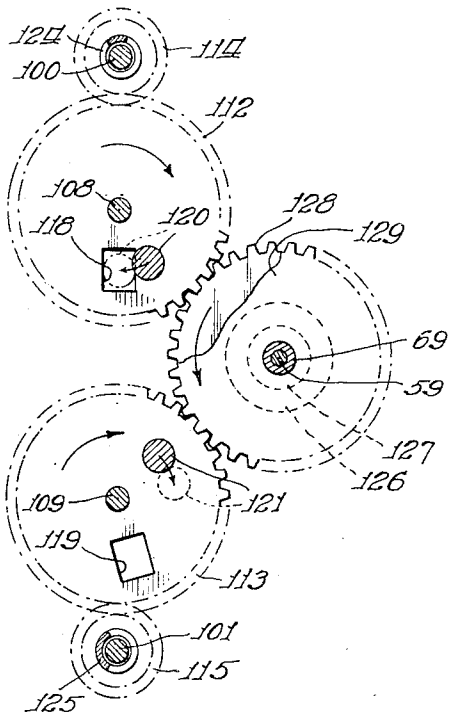


Fig. 8

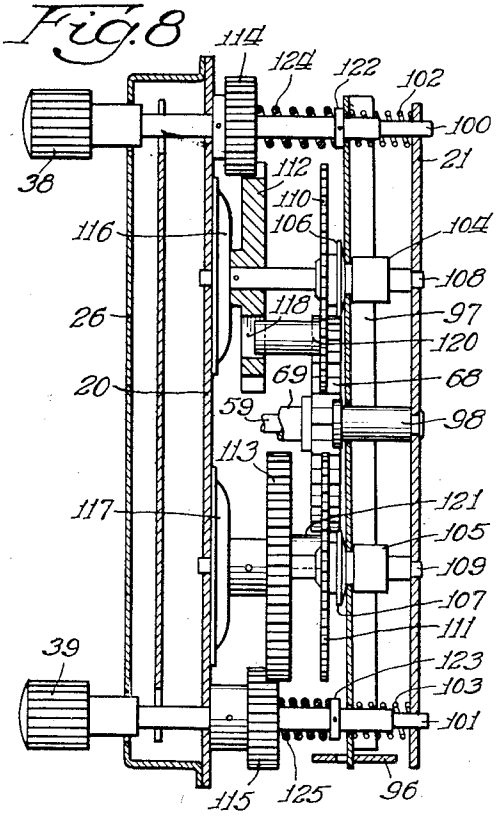
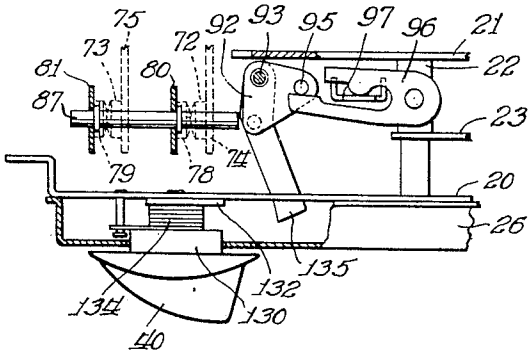


Fig. 9

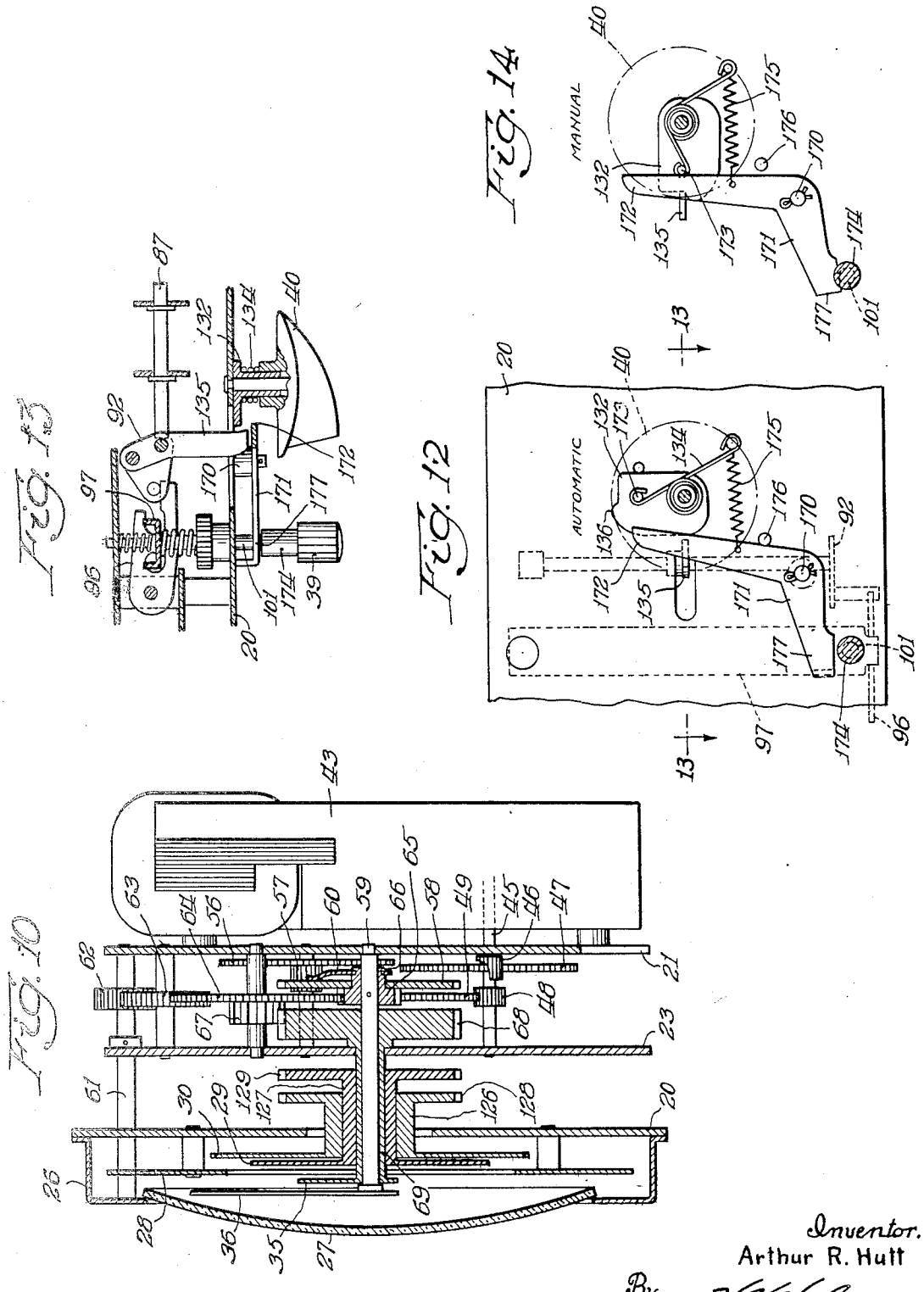


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TIMING MECHANISM

Filed Sept. 16, 1940 4 Sheets-Sheet 4



Patented Feb. 9, 1943

2,310,527

UNITED STATES PATENT OFFICE

2,310,527

TIMING MECHANISM

Arthur R. Hutt, Thomaston, Conn., assignor to General Time Instruments Corporation, New York, N. Y., a corporation of Delaware

Application September 16, 1940, Serial No. 356,891

15 Claims. (Cl. 200—39)

This invention relates to timing mechanisms and more particularly to a mechanism which includes both an automatically operated electric switch and an alarm or audible signal indicating a predetermined time interval.

Such devices may be used in range timers or in other controlling means for electrical cooking appliances wherein the circuit to the cooking element is closed at a predetermined time and opened at a later time. For other uses, the parts may be so arranged as to cause the circuit to be first opened and then closed. When used as a range timer, it is often desirable to have incorporated therein means for timing other kitchen operations, such as cooking on other circuits than the controlled oven circuit, or for indicating a time in which the oven circuit should be changed to increase or decrease the oven heat.

Range timers in order to be practically useful must be provided with an easily understandable control means, otherwise the average housewife will find it easier to do without the range timer than to understand its operation. It is desirable to provide a range timer with controls which may be set in any order, and which will clearly indicate both the duration of the cooking period as well as the time at which the cooking is to start and to cease. It is also desirable to provide controls which when once set, may not be changed by inadvertent manipulation or accidental displacement of other controls. It is also desirable to provide a starting and stopping control which is self-clearing; that is after the device has been set and the circuit has been opened and closed in accordance with such setting, the controls will not remain in their set condition for another cycle of operations, but must again be reset. This prevents inadvertent operation of the device during the succeeding twelve hours unless the controls are again manually set.

It is an object of my invention to provide an improved time switch of an inexpensive construction which is positive and accurate in its operation, and which is provided with legible and easily operating control means.

It is another object of my invention to provide improved time responsive means to actuate electrical contacts at a predetermined time and to restore the same to their original position at a later time.

A still further object of my invention is to provide improved time responsive actuating means for electrical contact means which may be set for operation independently of, and without disturbing the condition or position of the contact members.

Another object is to provide improved contact means for a time switch of such construction that each separate contact unit is substantially identical to another and whereby the said units may be built up or arranged in a group of any reasonable number so that all may be actuated simultaneously by the same actuating means.

A further object is to provide an improved time switch wherein the controls are self-clearing.

Another object is to provide for a range timer improved means for measuring short intervals of time.

Still another object is to provide circuit control means, which may be operated automatically or manually, and interlocking means whereby inadvertent manipulation of the controls when set to one type of operation will not cause a change in that setting.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings wherein like reference numerals denote like parts:

Fig. 1 is a front elevation of a preferred embodiment of my invention, certain parts being broken away;

Fig. 2 is a plan view showing the general organization of the device shown in Fig. 1, certain parts being omitted for purpose of clarity;

Fig. 3 is a rear sectional elevation taken along line 3—3 of Fig. 2;

Fig. 4 is a section taken along line 4—4 of Fig. 3;

Fig. 5 is a section taken along line 5—5 of Fig. 3;

Fig. 6 is an elevation taken along the line 6—6 of Fig. 2;

Fig. 7 is a section of certain parts taken along line 7—7 of Fig. 6;

Fig. 8 is a section similar to Fig. 6 but showing the parts in a changed position;

Fig. 9 is a section similar to Fig. 5 but showing the parts in a different position;

Fig. 10 is a section taken along line 10—10 of Fig. 1;

Fig. 11 is an elevation of the contact units taken along the section line 11—11 of Fig. 2;

Fig. 12 is a detailed elevation of a modified control means;

Fig. 13 is a section taken along line 13—13 of Fig. 12; and,

Fig. 14 is an elevation of certain parts shown in Fig. 12, but in a changed position.

With reference now to Figs. 1 and 2, reference numeral 20 indicates the front plate of the range timer which is associated with the rear plate 21 by means of spacing members 22. An intermediate plate 23 is spaced from the rear plate 21 by means of spacing members 24, and from the front plate by means of spacing members 25. A shell 26 is secured to the front plate 20, and serves to enclose certain of the parts mounted on the front plate. A glass crystal 27 is mounted in the shell and exposes an annular clock dial 28 which is provided with the usual indicia thereon. A rotatable stop dial 29 is mounted centrally of the clock dial, and a start dial 30 is rotatably mounted rearwardly of the clock dial and the start dial. The stop dial is apertured as indicated at 31 to expose indicia 32 formed on the start dial. The start dial is provided with a pointer 33, and the stop dial is provided with a pointer 34. An hour hand 35 and a minute hand 36 are provided for cooperation with the clock dial 28. The hands and dial are shown in section in Fig. 10.

A setting knob 37 for the hands 35 and 36 extends from the shell 26, and setting knobs 38 and 39 for the start and stop dials, respectively, also extend through the shell. A switch control knob 40 is located at the right hand portion of the device as indicated in Fig. 1, and an alarm control knob 41 is located at the left hand portion.

A housing 42 which is indicated in Fig. 2 in dotted lines may be provided for the device. A synchronous electric motor 43 is mounted on rear plate 21 and is positioned within the housing, and serves to drive the clock hands, the switch actuating means, and the alarm for a short time interval measuring means, the motor being secured to the plate by means of screws 44.

The motor shaft 45 extends through the rear plate and is provided at its forward end with a pinion 46, which pinion as shown in Fig. 3 drives the mechanism through a series of speed reduction gears which are indicated as speed wheels 47, 49, 51 and 53 and associated pinions 48, 50, 52 and 54. Pinion 54 meshes with and drives a wheel 55 which as will be hereinafter described, drives the alarm mechanism. A wheel 56 is driven by the pinion 52, and a pinion 57 secured to the wheel 56 drives a wheel 58 which is frictionally associated with the minute shaft 59 by means of the usual spider 60 and adapted to drive the same.

A hand setting shaft 61 is journalled in the rear and intermediate plates 21 and 23 and carries a pinion 62 which meshes with pinion 63 which in turn drives the wheel 64. A pinion 65 is staked to the minute shaft 59 as shown in Fig. 10 and is provided with a hub 66 to which the spider 60 is secured, the wheel 58 being journalled on the hub and located between the spider and the pinion 65.

The pinion 65 meshes with the wheel 64 so that the minute shaft may be set by rotation of the hand setting knob 37. A pinion 67, which is secured to the wheel 64, meshes with the hour wheel 68 so that the latter may be driven from the minute shaft. The hour wheel 68 is mounted on a sleeve 69 which extends forwardly around the minute shaft 59, and carries at its outer end the hour hand 35. The minute hand 36 is mounted on the minute shaft 59.

The frictional association of the wheel 58 with the minute shaft 59 permits the hands and the hour wheel to be set by manually rotating the setting knob 37. Certain parts of the contact actuating means hereinafter described are driven from the hour wheel so that their position corresponds with that of the hands.

As shown in Figs. 2 and 11, the contacting means are mounted in the recessed portions of two insulating blocks 70 and 71, and comprise a stationary contact 72, 73, connected by a strip 74, 75 to a terminal screw 76, 77, respectively.

A movable contact 78, 79 is provided for each of the insulating blocks 70 and 71, respectively, each movable contact being carried on a spring member 80, 81, which is connected by a conducting strip 82, 83 to a terminal screw 84, 85. It will be seen that each insulating block carries a complete contact means and the two contact means may be employed to open both wires of a circuit to the heating element.

A pin 87 extends through apertures in the two blocks and through apertures in the spring members 80 and 81, the pin being provided with collars 88 and 89 which contact the spring members 80 and 81, respectively, so that the circuit may be broken when the pin 87 is displaced to the right against the bias of the spring members as shown in Fig. 11. Each insulating block is provided with an interlocking lug or projection 90 which cooperates with a corresponding recess portion 91 on the adjacent lug so that the two blocks may be fitted or nested together. Inasmuch as each of the contact means is identical to the other it will be seen that any number of said blocks may be aligned side by side so that any number of circuits may be controlled by the actuating means, the only difference being that a longer pin 87 provided with additional collars must be employed with additional contacting means. Studs 86 extend through the series of insulating blocks and are threaded into the spacers 22 in order to hold the blocks in the correct position.

The pin 87 at one end abuts a pivoted contact actuating member 92 which includes a rock shaft 93 on which a spring 94 is located to bias the pin 87 and the contacts 78 and 79 to open circuit positions as shown in Fig. 5. When the pivoted actuating member is rotated in the counterclockwise direction against the bias of spring 94, the resiliency of the spring members 80 and 81 permits the circuit to be closed. A projection 95 mounted on the actuating member 92 is engaged by one arm of an U-shaped member 96 which is pivotally mounted on a spacing member. A floating bar 97 is mounted on a headed stud 98 which extends forwardly of the rear plate, and the lower end of the floating bar is engaged by the U-shaped member 96 in such a manner as to cause retraction of the actuating member 92, thereby closing the circuits through the contacts, when the lower end of the floating bar is caused to move rearwardly. The position of the upper end of the bar is controlled by the actuating means hereinafter described to first close the circuit through the contacts, and then to open the same.

With the reference now to Fig. 6, a start shaft 100 is journalled in the front and rear plates and frictionally associated with the start knob 38, and a stop shaft 101 is journalled in the front and rear plates and frictionally associated with the stop knob 39, the floating bar 97 being apertured to permit these shafts to extend therethrough. A spring 102, 103 is provided for each of the shafts 100, 101, the spring being confined between the

rear plate and the floating bar to urge either end of the bar forwardly. A hub 104 is rotatably and slidably mounted on the guide shaft 108, the sleeve being provided with an annular groove by means of which it may engage the upper portion of the floating bar 97. A crowned washer 106 fits in the groove and serves as a bearing member between the floating bar and the hub. A similar hub 105 together with a crowned washer 107 is rotatably mounted on guide shaft 109 and engages the lower portion of the floating bar 97. The guide shafts 108, 109 may be rotatably mounted in the front and rear plates 20, 21.

Wheels 110, 111 are secured to hubs 104, 105, respectively, and mesh with the hour wheel 68, a fragmentary portion of which is shown in Fig. 6 in dotted lines in order that the wheels 110, 111 may be driven at the rate of one revolution every twelve hours. Wheels 112, 113 are mounted on the guide shafts 108, 109, respectively, each wheel meshing with a pinion 114, 115 on the start setting shaft and stop setting shaft 100, 101, respectively, so that they may be manually rotated independently with respect to the clock driven wheels 110, 111. An aperture 118, 119 is provided in each of the wheels 112, 113 which is adapted at certain times to receive a pin 120, 121 which extends rearwardly from the wheels 110, 111, respectively, so that either of the latter wheels are caused to be driven by the former.

When both the start and the stop shafts have been set so that the apertures 118 and 119 are angularly spaced by a predetermined distance from their respective pins 120 and 121, the wheels 110 and 111 will be rotated so that the pins will slide on the surface of the wheels 112, 113 until their respective pins drop into their corresponding apertures. The wheels 112, 113 will remain stationary due to the friction disks 116, 117, which are secured to the wheels 112, 113 and bear against the front plate 20. The contacting area between the friction disks and the front plate is of greater radius than the contacting area between the pins and the wheels 112, 113 so that sliding always takes place between the pins and the wheels. When the pins drop into their respective positions the friction between the friction disks and the plate is entirely relieved so that the load is released from the clock motor.

As shown in Figs. 6 and 7, the start wheel 112 is set for 3, and the stop wheel is set for 6 o'clock. The position of each of the wheels 110, 111, together with their respective pins 120, 121, is 2 o'clock. The position of the pins 120, 121 at 3 o'clock is shown in Fig. 7 in dotted lines in which the pin 121 has moved into registry with the aperture 118 and permits the spring 102 to displace the upper portion of the floating bar to the left so that the pin drops into the aperture, this position of the parts being shown in Fig. 8. During this motion of the bar 97, the bar is pivoted on the hub 105, and the lower end of the bar moves to the right causing the pivoted actuating member 92 to be rotated against the bias of spring 94 and the contacts to be closed. This position of the contacts is shown in Fig. 9.

At 6 o'clock the pin 121 will move into registry with the aperture 119, and permits the lower end of the bar 97 to be moved to the left by the spring 103, and thereby permitting the contacts to be again opened. It will be evident that as each pin drops into its respective aperture the wheels 112 and 113 will be driven by the clockwork and the apparatus will not repeat its automatic operation until the operator has again set the controls.

A collar 122, 123 is located on each of the shafts 100, 101, respectively, to limit the displacement of the floating bar as either end thereof snaps forwardly. A shock absorber spring 124, 125 is located on the shaft 100, 101, between the collar 122, 123 and the pinion 114, 115. When the apparatus is set, the knobs 38 and 39 are pushed inwardly, one at a time against the bias of the springs 102 and 103, so that the pins 120 and 121 may be withdrawn from their respective apertures, and the knobs are then rotated so that the apertures are displaced from their respective pins into the desired set position. When the apparatus has been thus set the wheels 110, 111, are held away from the wheels 112, 113, and the floating bar 97 is caused to assume its set position as shown in Fig. 6.

A sleeve 127, as shown in Fig. 10, surrounds and is rotatably mounted on the hour sleeve 69, and at its forward end carries the stop dial 29. At its rear end is mounted a wheel 129 which meshes with the wheel 113. A sleeve 126 is rotatably mounted on the sleeve 127, and carries at its forward end the start dial 30, and at its rear end a wheel 128 which is driven by the wheel 112. It will be seen that the pointers 33 and 34 on the start and stop dials 30 and 29, respectively, serve to indicate to the operator the positions of the apertures 118 and 119. As the shaft 100 is rotated in the counter-clockwise direction as shown in Fig. 7, the wheel 128 and the start dial 30 will be rotated in the counter-clockwise direction until the desired setting is reached.

Referring now to Figs. 3, 4 and 5, the switch control knob 40 is provided with a hub portion 130 which is mounted on a stud 131, extending forwardly from the front plate 20. A cam plate 132 is non-rotatably associated with the knob 40 by means of a pin 133. A spring 134 biases the knob 40 and the cam plate into the automatic position. An arm 135 extends forwardly from the pivotal contact actuating member 92 through the apertured front plate 20 so that its forward end may be engaged by the cam plate 132. When the knob 40 is in the automatic position, as shown in Figs. 3, 4 and 5, the arm 135 is permitted to assume its normal position in which the spring 94 causes the contacts to be held open. When the knob is rotated against the bias of the spring 134 into the manual position, the arm 135 is displaced so as to manually retract the actuating member 92 and permit the contacts to assume their closed circuit position. A hump or latch portion 136 is provided on the surface of the cam plate 132 so as to permit the knob to remain in its manual position until it is manually released by the operator. When the knob is set in the manual position, the circuit through the range timer is closed and the range may be operated manually by means of the usual control on the range itself. However, when the knob 40 is set in the automatic position, the circuit through the usual range control must be closed in order that the range timer may perform its function.

The interval timer or minute minder for measuring short intervals of time is enclosed in the left hand end of the range timer as viewed in Fig. 1 and is shown somewhat diagrammatically in Fig. 3. Since this interval timer forms no part of the invention covered hereby, it will not be described in detail. Suffice it to state that the interval to be measured is set by knob 41 having a scale graduated in minutes. The mechanism

is then driven by the motor through wheel 55 and the bell 141 is struck by a hammer at the end of the set interval.

In Figs. 12, 13, and 14, are shown a modification of the switch control means. A stud 170 is mounted on the front plate 20, and carries a lever 171. A pin 173 on the cam plate 132 is adapted to engage one arm 172 of the lever 171 when the knob 40 is rotated from automatic to manual position. As shown in Fig. 14 this causes displacement of the lever 171 so that its lower arm 177 will be urged into engagement with the stop shaft 101. A collar 174 is provided on the stop setting shaft which, when the lever 171 is in its displaced position, will prevent the stop setting shaft from being manually pushed inwardly. A spring 175 biases the lever 171 to a position wherein the lower arm 177 clears the collar 174. A stop 176 serves to limit the position of the lever 171.

It will be seen that when the knob 40 is in manual position the arrangement of the parts is such that when the stop setting knob 39 is pushed inwardly, the pivoted contact actuating member 92 will be displaced so that arm 135 will clear the latch portion 136 on the cam 132, thereby permitting the spring 134 to rotate the cam plate to the automatic position. This is undesirable inasmuch as such change from manual to automatic operation may not be intended. Provision of the locking lever 171 prevents this from happening inasmuch as it prevents the stop setting knob 39 from being pushed inwardly when the switch control knob is set at "manual." On the other hand when the switch control knob is set at "automatic," and the controls on the range are closed, it is obvious that an inadvertent setting of the knob 40 to the manual position will cause the oven to be turned on. The interlocking means shown in this modification prevents this from happening inasmuch as when the range timer is in its set position, the knob 39 is displaced inwardly in such a manner that the collar 174 obstructs the lever 171, and consequently the knob 40 can not be latched in manual position inasmuch as the upper arm 172 will engage the pin 173 and prevent rotation of the knob into latched position.

In operation, the dial is normally cleared, the start and stop pointers, 33 and 34, coinciding with the hour hand. In this position, there is no friction drag between the friction members 116, 117, and the front plate. Rotation of the hand setting knob 37 causes the hands of the clock as well as the position of the pins 120 and 121 to be set. The switch control knob 40 is first set to "automatic" to permit the contacts to be opened by the contact actuating member 92. The usual range control is then adjusted to closed circuit position at the proper degree of heat.

The start and stop dials may be set in any order by depressing and rotating the respective start and stop knobs. This causes either end of the floating bar 97 to be displaced rearwardly and to be maintained in such position until the apertures 118 and 119 are rotated away from their corresponding pins. Let it be assumed that at two o'clock the operator desires to set the range timer so that the oven will go on at three and be turned off at six o'clock. By rotating the start knob 38 so that the pointer 33 on the start dial 30 points to three o'clock, the aperture 118 is displaced from the pin 120 by an angular distance which is the equivalent of one hour. Similarly the stop setting knob 39 is pushed in and rotated until the pointer 34 on the stop dial 29 is opposite six o'clock. This causes the aperture 119 to be displaced from the pin 121 by an angular distance which is the equivalent of four hours. It will be noted that the cooking time, or the interval between the start and stop settings, is indicated by the indicia on the stop dial 30, which indicia are exposed through the aperture in the start dial 29. Due to the construction hereinbefore described, setting can take place in either direction; that is the knobs can be rotated either way.

At three o'clock the pin 120 drops into the aperture 118 and causes the floating bar 97 to be pivotally rotated about the hub 105. The backward movement of the remote end of the floating bar causes retraction of the contact actuating member 92, which in turn permits the contacts to close.

At six o'clock, the pin 121 drops into the aperture 119 which causes the pivoted actuating member to again engage the contacts and to open them.

The switch control knob 40 may at any time be set to the manual position wherein it maintains the contact actuating member in the disengaged position without in any way affecting the timing mechanism. If it is desired to set the mechanism when the switch control knob is in manual position, it will be observed that depression of the stop setting knob 39 will cause the contact actuating member to be retracted sufficiently so that the arm 135 thereof will clear the hump or latch portion 136 on the cam plate 132. This permits the knob to return to its automatic position.

In the modification shown in Figures 12, 13, and 14 however, the interlocking lever 171 prevents this from taking place, inasmuch as the stop setting knob 39 is locked in its forward position when the switch control knob 40 is in its manual position. This prevents inadvertent opening of the circuit when cooking manually.

If it is desired to measure a shorter interval, the alarm control knob 41 can be rotated manually so that the indicia thereon will indicate the length of the interval to be measured. The alarm mechanism is then rotated by the motor through wheel 55 and will sound the alarm bell 141 at the end of the selected interval.

It is obvious that numerous changes and modifications may be made in the preferred embodiments which have been herein described, without departing from the spirit of my invention. It is understood however that this invention is not to be limited by the above description, but only by the following claims.

I claim:

1. Timing mechanism comprising two separate time driven releasing means adapted to be displaced seriatim in the same direction and disposed in side by side relationship, a rigid member associated with both of said releasing means, resilient means urging said rigid member against each releasing means, and circuit controlling means engaged by one end of said rigid member for actuation thereby.

2. Timing mechanism comprising contact actuating means biased to open circuit position, two time actuated releasing means disposed in side by side relationship, and a floating bar associated with said releasing means and having a portion engaging said contact actuating means in such a manner that operation of one of said releasing means will cause said contact actuating means to be displaced to closed circuit position, and operation of said second releasing means will cause

said contact actuating means to be restored to its normal position.

3. A time switch comprising a contact member biased to closed position, a contact actuating member biased to maintain said contact member in open position, and automatic means to cause operation of said contact actuating member, said means including two independent time driven releasing means disposed in side by side relationship, and a floating bar engaged by said releasing means and having a portion engaging said contact actuating member for causing disengagement between said contact actuating member and said contact member at a predetermined time to close a circuit, through said contact member, and for causing engagement at a later predetermined time to open the circuit, and manually operated means for maintaining said contact actuating member in disengaged position whereby the circuit may be closed at will.

4. Timing mechanism comprising a time driven rotatable member, a manually rotatable member in coaxial relationship therewith, interlocking means to cause said manually rotatable member to be driven by said time driven member when said latter member has been rotated into a predetermined position with respect to said manually rotatable member, and means associated with said interlocking means to cause actuation of an electric switch.

5. Timing mechanism comprising a contact member biased to closed position, a contact actuating member biased to open position, time responsive means for causing displacement of said actuating member into closed position, manually rotatable cam means for latching said actuating member in closed position, and manually actuated setting means for said time responsive means which is associated with said contact actuating member in such a manner as to cause displacement thereof away from said cam means to unlatch the same.

6. Timing mechanism comprising a contact member biased to closed position, a contact actuating member biased to open position, time responsive means for causing disengagement of said actuating member from said contact member, manual means for latching of said actuating member into disengaged position, manually actuated setting means for said time responsive means, and an interlocking lever adapted to be displaced by said latching means into engagement with said setting means in order to prevent manual operation of the same when said actuating member is latched in disengaged position.

7. A time switch comprising time responsive driving means, two rotatable wheels driven thereby and arranged in side by side relationship with each other, two apertured setting wheels coaxially mounted with respect to each of said driven wheels, a projection on each of said driven wheels extending into contact with each of said setting wheels and adapted to hold each pair of driven and setting wheels in axially spaced relationship, a bar contacting each of said driven wheels and being resiliently confined thereby when said wheels are maintained in spaced relationship to their corresponding setting wheels, friction means to maintain each of said setting wheels in a predetermined set position when the projections of the respective driven wheels contact the side surfaces of said setting wheels, and adapted to be released when the said projection drops into the said aperture so that said setting wheels may be driven by said driven wheels, and contact means actuated by the position of one end of said bar to first close and then open a circuit at predetermined times.

8. Timing mechanism comprising two axially movable rotatable members, time responsive driving means for rotating each of said members, a pivotally mounted member having its pivoted support movable axially with one of said members and having a remote portion movable axially with the other of said members, yielding means biasing each of said rotatable members against a corresponding adjustable stop plate for each, each plate being ineffective as a stop in one position of adjustment and effective in all other positions, and a circuit controlling device connected to said pivoted member, whereby axial movement of one of said rotatable members at a predetermined time will rock said pivoted member in one direction and axial movement of the other of said rotatable members at a predetermined time will rock said pivoted member in the opposite direction to operate said circuit controlling member.

9. Timing mechanism comprising two axially movable rotatable members, time responsive driving means for rotating each of said members, a pivotally mounted member having its pivoted support movable axially with one of said members and having a remote portion movable axially with the other of said members, yielding means biasing each of said rotatable members against a corresponding adjustable stop plate for each, each plate being ineffective as a stop in one position of adjustment and effective in all other positions, and a circuit controlling device connected to said pivoted member whereby axial movement of said rotatable members one after the other at predetermined times will rock said pivoted member first in one direction and then in the opposite direction to open and close a circuit, and separate means to adjust the position of each of said stop plates which includes means to displace each of said rotatable members against said yielding means.

10. Releasing mechanism for a time switch comprising an axially displaceable rotatable member, time responsive driving means therefor, yielding means biasing said rotatable member against a manually rotatable stop plate, said plate being ineffective as a stop in one position of adjustment and effective in all other positions, friction means for maintaining said stop stationary when effective as a stop, means for releasing said friction means at the time at which it becomes ineffective as a stop, whereby said stop plate may be subsequently rotated by said time driven rotatable member, indicating means associated with said rotatable member to indicate the relative position of same, and manual setting means for said releasing means which includes means for disengaging said time driven rotatable member from said stop plate together with means for rotating said stop plate with respect to said time driven rotatable member.

11. A timer unit comprising two sets of rotatable members, each set consisting of a time driven member and a manually operable member in coaxial relationship therewith, interlocking means for each set for causing the manually rotatable member thereof to be driven by the time driven member when the latter is rotated to a predetermined position with respect to the former, an electric switch, means associated with the interlocking means of one of said sets of members to close said switch, and means asso-

ciated with the interlocking means of the other set of members to open said switch.

12. In a timing unit, an electric switch, a synchronous motor, operating means for said switch comprising a rotatable member driven by said motor and a rotatable member coaxial therewith and settable manually to predetermine the time of operation of said switch, friction means for holding said second member stationary when same has been manually set, interlocking means to cause said second member to be driven by said first member when the latter has been rotated to the position denoting the predetermined time of switch operation, and means controlled by said interlocking means for causing operation of said switch and for releasing said friction means to reduce the load on said motor.

13. In a timing unit, a timing mechanism, a switch, actuating means for said switch including a member driven by said timing mechanism and a member manually adjustable to predetermine the time of operation of said switch, friction means for holding said manually operable member in set position, and means for releasing said friction means upon operation of said switch.

14. In a timing unit, a timing mechanism, a switch, actuating means for said switch controlled by said timing mechanism, manually operable setting means for predetermining the time of operation of said switch including a visual indicator to indicate the set time, and means for driving said indicator from said timing mechanism following operation of said switch.

15. In a timing unit, an electric switch, a synchronous motor, operating means for said switch including a member driven by said motor, manually operable setting mechanism for adjusting the time of operation of said switch including a second member cooperating with said first member and an indicator to indicate the position of said second member, and means for driving said second member and said indicator by said motor following operation of said switch.

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