

March 29, 1938.

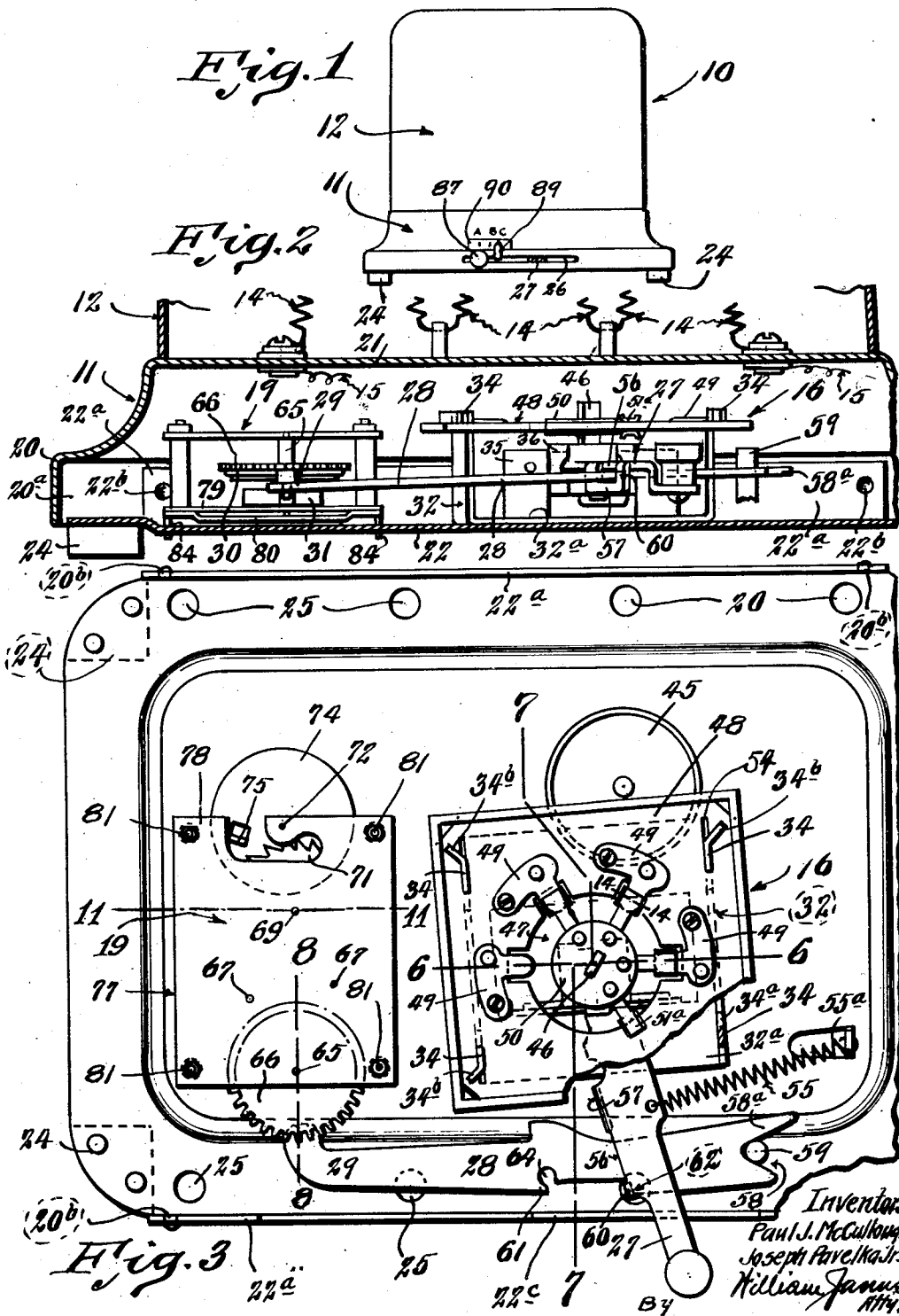
P. J. McCULLOUGH ET AL

2,112,422

SWITCH AND TIMING MECHANISM

Filed July 27, 1935

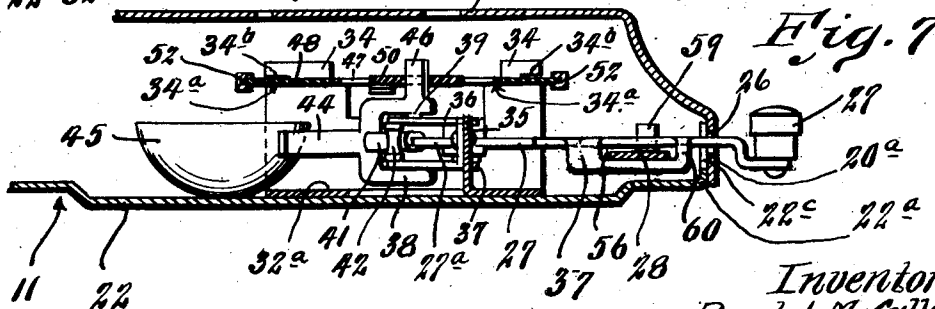
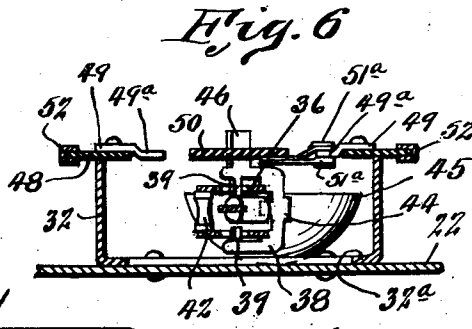
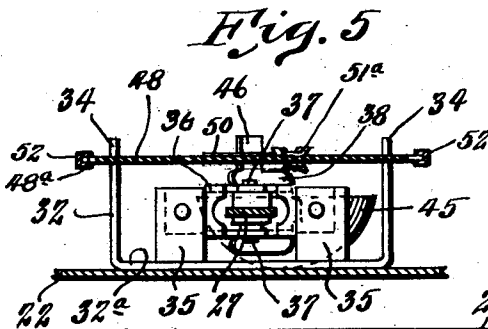
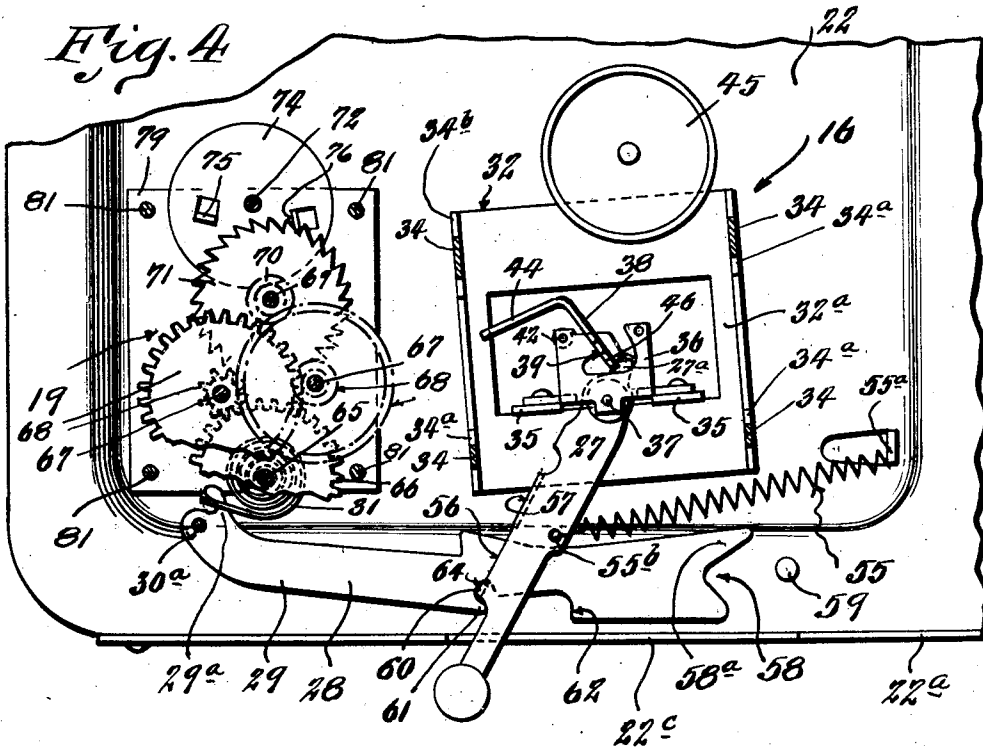
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Inventors
Paul J. McCullough
Joseph Pavelka Jr.
By William J. Janss Atty.

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4 Sheets-Sheet 3

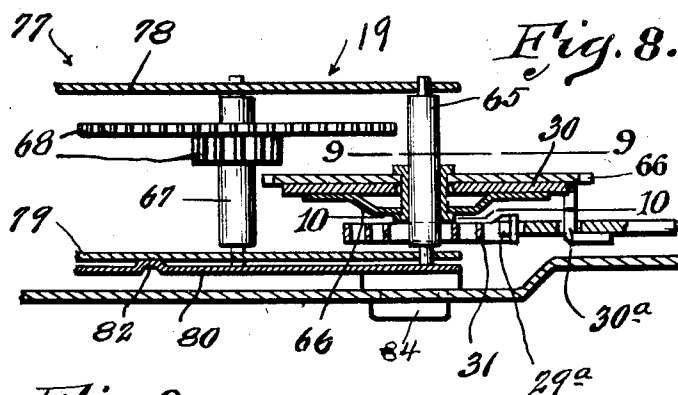


Fig. 14.

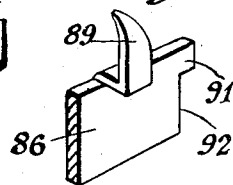


Fig. 9.

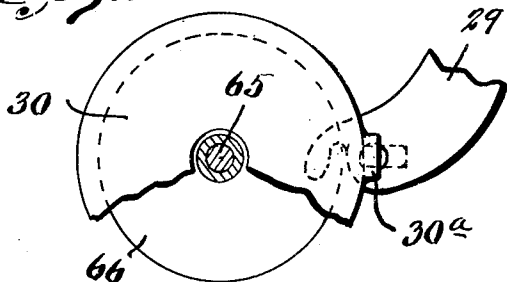


Fig. 10.

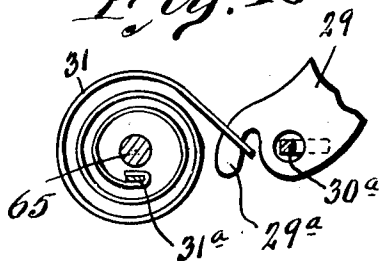


Fig. 11.

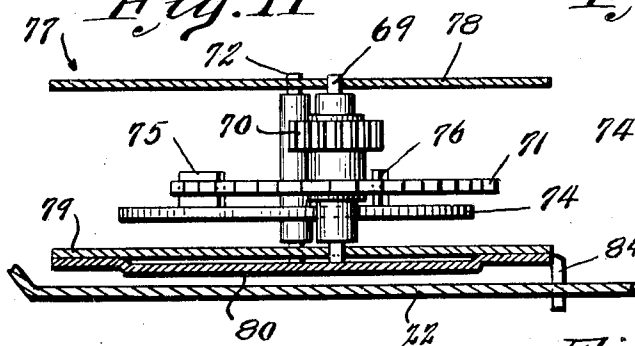


Fig. 12.

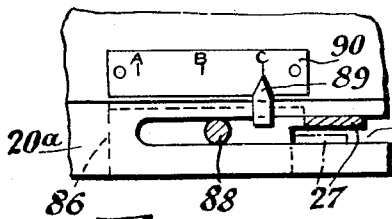
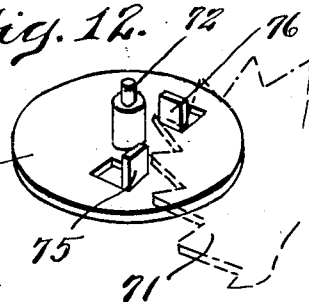
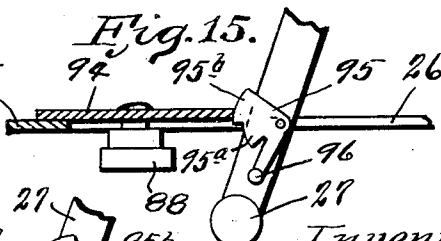


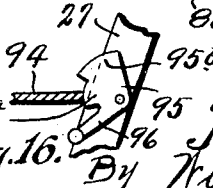
Fig. 13.

Fig. 15.



Inventors
Paul J. McCullough
Joseph Pavelka Jr.
By William Janus Atty.

Fig. 16.



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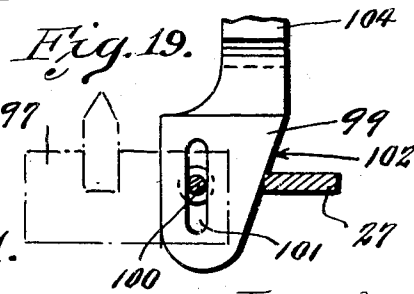
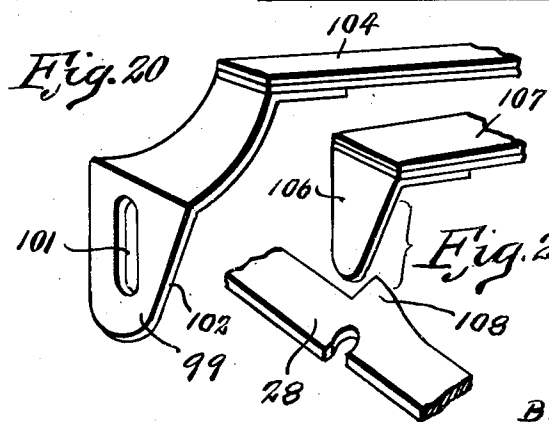
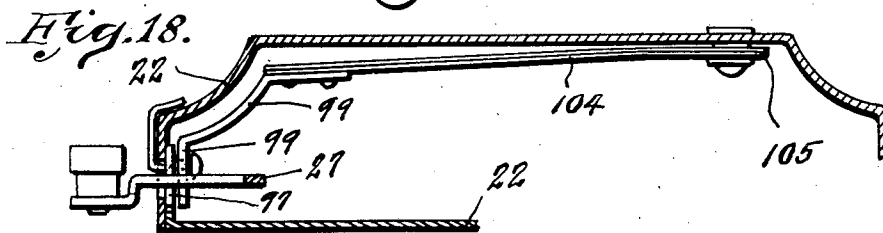
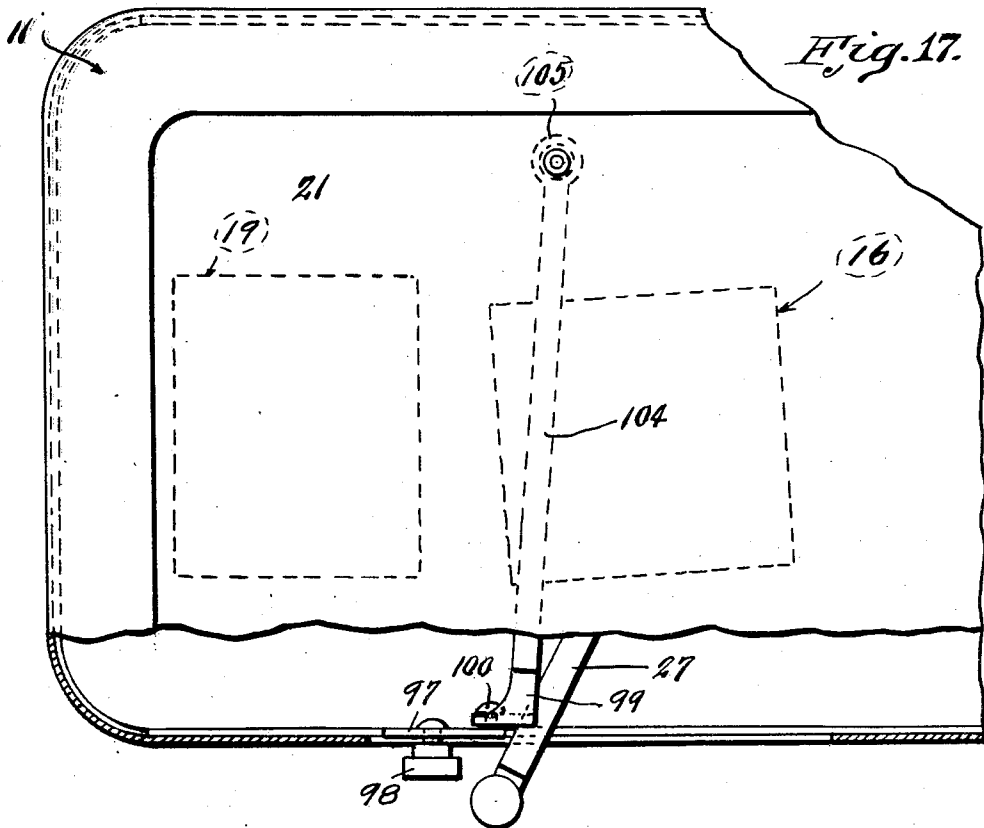
P. J. McCULLOUGH ET AL

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SWITCH AND TIMING MECHANISM

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4 Sheets-Sheet 4



Inventors
Paul J. McCullough
Joseph Pavelka Jr.
By William James Att'y.

UNITED STATES PATENT OFFICE

2,112,422

SWITCH AND TIMING MECHANISM

Paul J. McCullough and Joseph Pavelka, Jr., St.
Louis, Mo., assignors to Joseph Pavelka, St.
Louis, Mo.

Application July 27, 1935, Serial No. 33,548

28 Claims. (Cl. 200—39)

This invention relates to a switch and timing mechanism for electrically operated devices.

One of the objects of the invention is the provision of a switch for controlling the electric circuit of the device, said switch being of simple but rugged construction so as to give a long period of efficient service.

Another object of the invention is to provide a timing mechanism which is reliable and efficient in operation and which can be economically manufactured.

Another object of the invention is to provide a stop for the manually operable member of the switch and timing mechanism whereby said manually operable member can be selectively moved into two different positions for automatically energizing said timing mechanism for two different periods of time so that the automatic opening of the switch can be delayed or advanced.

Other objects of the invention are to provide an electric cooking device having a base provided with a top and a bottom wall and having the switch and timing mechanism secured to said bottom wall and spaced apart from said top wall so as to allow air to circulate between said mechanism and said top wall, thereby preventing said switch and said timing mechanism from being subjected to high temperatures.

With these and other objects in view, our invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view of a toaster equipped with our improved switch and timing mechanism.

Figure 2 is a sectional view of the base of the toaster and showing the mechanism contained therein in elevation.

Figure 3 is a top plan view, partly broken away, of the bottom plate of the toaster with the switch and timing mechanism secured thereon.

Figure 4 is a similar view with parts of the switch and the timing mechanism broken away more clearly to illustrate the invention and showing the switch and parts associated therewith in manually operated position.

Figure 5 is a front elevation of the switch mechanism when occupying the position shown in Figure 3 and with the handle broken away.

Figure 6 is a vertical cross section taken on line 6—6 of Figure 3.

Figure 7 is a vertical cross section taken on line 7—7 of Figure 3.

Figure 8 is an enlarged vertical cross section taken on line 8—8 of Figure 3.

Figure 9 is a horizontal cross section taken on line 9—9 of Figure 8.

Figure 10 is a horizontal cross section taken on line 10—10 of Figure 8.

Figure 11 is an enlarged vertical cross section taken on line 11—11 of Figure 3.

Figure 12 is a perspective detail view of the balance wheel.

Figure 13 is a fragmental detail view, partly in cross section, of the adjustable stop for the handle.

Figure 14 is a perspective view, partly broken away, of the stop.

Figure 15 is a detail view of a modified form of adjustable stop for the handle.

Figure 16 is a similar view, but showing the stop in a moved position.

Figure 17 is a top plan view, partly in cross section, of a balance having a modified form of a stop.

Figure 18 is a fragmental vertical cross section of Figure 17.

Figure 19 is a detail view of one end of the stop.

Figure 20 is a perspective view thereof.

Figure 21 is a fragmental perspective view of a handle and another form of stop.

Referring by numerals to the accompanying drawings, 10 indicates an electric cooking device, such as a toaster, having a base 11, a casing 12, and heating elements 14. Electrical connections 15 serve to connect said heating elements to a switch 16 which in turn is adapted to be connected by connections 17 to suitable supply lines.

The switch 16 is operatively associated with a timing or clockwork mechanism 19 which automatically opens the energizing circuit of the device after a predetermined length of time. When the electric cooking device is provided with two heats, such as the toaster in the instant case, wherein high heat is used for the toasting operation and low heat for maintaining the toaster warm, the timing mechanism is used to change the switch of the toaster from high heat or energizing position to low heat or warming position.

The base 11 is hollow, having side walls 20, a top wall 21, and a bottom wall 22. A plurality of feet 24 are secured to said base, preferably to bottom wall 22, so as to space said base from the table. These feet are preferably made of material which will not mar the surface. The switch 16 and timing mechanism 19 are secured to the bottom wall 22 and are spaced from top wall 21 so that air can circulate freely through

said base and between top wall 21 and said switch and timing mechanism. Preferably the bottom wall 22 is provided with a plurality of apertures 25 which allow air to enter said base. As the top wall 21 of base 11 generally forms the bottom of the heating compartment of the toaster, it is subjected to high temperature which is then transmitted to the switch and timing mechanism where these are mounted on said wall. This high temperature causes buckling of parts of the mechanism and impairs the efficiency thereof.

By mounting the switch and the timing mechanism on bottom plate 22 in spaced relation with the top wall 21 and by permitting air to circulate through said base, the switch and the timing mechanism are not in direct contact with said top wall 21 and are protected from injurious high temperature, thereby safeguarding efficiency and insuring accurate operation of the switch and said timing mechanism. Preferably bottom wall 22 is formed separate from the base and is removably attached thereto so as to provide easy access to the mechanism.

As shown, bottom wall 22 is formed at its two sides with upwardly turned flanges 22a which fit snugly against the inner faces of the corresponding sides 20a of said base. The bottom plate 22 is held in place by means of protuberances or indentations 22b formed on flanges 22a and adapted to engage apertures or seats 20b formed in said sides 20a.

One of the side walls or flanges 20 of base 11 is formed with a horizontally disposed slot 26 and the corresponding upturned flange 22a of bottom plate 22 is cut away, as indicated at 22c, in order to permit a handle 27 to project outwardly from said base.

This handle is adapted to be manually operated in one direction to cause the switch 16 to move into circuit closing or high heat position and is operable in the opposite direction by the timing mechanism 19 to cause said switch to move into its normal open or low heat position. The operating connection between switch 16 and timing mechanism 19 is obtained by a link member 28 which is horizontally disposed within the base and is operatively associated near one end with handle 27 while the other end 29 is pivotally connected to a friction disk or clutch member 30 and to one end of a spiral spring 31 of the clockwork mechanism 19 as hereinafter more fully described.

The switch 16 is of the snap action type and it is mounted in a frame 32 which is of U-shape with the horizontal or bottom portion 32a secured to bottom plate 22. The sides of frame 32 have four upwardly projecting members 34. Each of these is provided on one side with a horizontally disposed shoulder 34a and on the other side with a horizontally disposed notch 34b.

A pair of ears 35 is struck up from the horizontal portion 32a and attached thereto is a support 36 in which is pivotally mounted at 37 the inner end of lever or handle 27. A yoke 38 is fulcrumed at 29 in support 36 at a point spaced longitudinally from the fulcrum 37. This yoke member is engaged by one end of a coiled spring, the other end of which is seated in a cup member 41. The opposite or closed end of this member 41 is formed with a transverse seat 41a in which is received the end of extension 27a of handle 27. This extension is disposed diametrically opposite to handle 27 and serves at each operation of the handle to move instantly the yoke 38 to one side of the fulcrum 37. The snap

action is supplied in the usual manner by the compression of said spring.

Preferably one or two rollers 42 are provided in the support 36 to form stops for cup member 41 and also provided anti-friction bearing for said member during the outward or spring compression movement thereof.

The yoke member 38 is provided with a lateral extension 44 which is adapted to strike a bell 45 when the switch is returned to its home or de-energizing position, thereby providing an audible signal to indicate that the energizing circuit of the device has been opened. The bell 45 is attached to bottom plate 22 adjacent to support 32.

An upward extension 46 is formed integral with yoke member 38 and extends upwardly through a circular opening 47 formed in a stationary contact plate 48. This stationary contact plate is formed of insulation material and has fixed thereon a plurality of contacts 49 which are arranged in spaced-apart relation with each other and concentrically with the circular opening 47.

Preferably the contact members 49 have contact blades 49a disposed centrifugally in notches 47a formed in the stationary plate 48.

A rotor or movable plate 50 of insulation material is provided with a central opening 51 which is non-circular and conforms to the cross sectional shape of the extension 46. Thus said plate 50 can be slipped on said extension 46 and form non-rotative engagement therewith. This movable plate 50 has a plurality of contacts 51 which are adapted to engage blades 49a to complete or close with circuit of the device.

Each contact 51 preferably consists of a pair of resilient blades 51a which are adapted to receive therebetween the contact blade 49. Each pair of blades 51a is formed integral with another pair so that said blades establish electrical connection between two spaced-apart stationary contacts 49 when rotor plate 50 is moved in one direction and break said contact when said rotor plate is moved in the opposite direction.

These blades 51a are so disposed that they ride one on each side of the stationary plate 48. This eliminates arcing and also serves to maintain the rotor plate 50 in proper alignment with the respective blades 49a and the stationary plate 48.

It will be noted that said rotor plate 50 is free to move relatively to the axis of rotation, being slidably mounted on extension 46. Consequently, said plate 51 and blades 51a are self-adjustable with respect to the stationary plate 48 and blades 49a and tend at all times to maintain proper contact with said stationary blades 49a.

Where, as in the instant case, the cooking device is provided with two heats, namely, high or operating heat and low or warming heat, two sets of stationary contacts 49 and of movable blades 51a are required.

The plate 48 has formed therein along its two sides elongated openings 54, each of which is of sufficient size to allow the upper or undercut ends of the corresponding extension 34 to pass freely therethrough. The plate 48 is then supported on shoulders 34a and is held against removal by the undercut ends which are bent as indicated at 34b.

In order to maintain the plate 48 taut and prevent buckling thereof when subjected to heat, the sides of the frame 34 on which said plate is mounted are placed under tension. Normally these sides occupy positions inclined upwardly and outwardly from vertical. Thus in order to place the plate 48 in position, said sides have to

be pressed inwardly to allow the ends 34 of each side to be inserted through the respective openings 54. When the plate 48 expands, due to the heat, the resiliency of the sides automatically takes care of this expansion and prevents buckling of the plate.

To remove the stationary plate 48 the depressed portions 34b are bent back to their normal positions, whereupon both stationary plate 48 and the rotor plate 50 can be lifted from the support. In this manner, both plates can be easily removed and replaced without requiring adjustment or reassembly of the whole switch.

Certain of the stationary contacts 49 are connected by connections 15 to the heating elements 14 and certain other of said contacts 49 are connected by connections 17 to the supply lines, and the movable contacts 51 are adapted to bridge said contacts 49 and complete the circuit.

A coiled spring 55 is anchored at one end, as indicated at 55a, and is connected at the other end to said handle 27 as indicated at 55b. This spring is under tension and tends to hold said handle in normal position, as shown in Figure 3.

Link connection

The link 28 which extends horizontally between handle 27 and the timing mechanism 19 passes through a horizontally disposed slot 53 formed in a downwardly extended portion 57 formed integral with the forward edge of said handle. The rear end of said link is formed with a V-shaped notch 58 which is adapted to engage a vertically disposed pin 59 fixed to plate 22. The link is supported at its forward end 29 by a finger 30a of friction or clutch member 30 and near its rear end by the slotted portion 57 of handle 27.

This edge portion 57 has a downwardly extending shoulder or lug 60 which is adapted to engage a pair of spaced-apart shoulders 61 and 62 formed on said link 28. Shoulder 61 is engaged by a lug 60 when the handle 27 occupies home position (see Fig. 3) and shoulder 62 is engaged when the handle is manually operated from its normal position (see Fig. 4).

A notch 64 is formed in link 27 adjacent to shoulder 62 and when said link 28 is actuated by the handle 27, said link swings on its forward end 29 so that said notch 64 engages lug 60, thereby interlocking said handle with said link. The finger 30a of the friction member 30 extends downwardly from said member through an aperture formed in end 29 and is then bent horizontally so as to support said end. The link swings outwardly with said finger 30a as the axis, due to the action of the spiral spring 31 which is connected to said end 29 at 29a. This outward movement of the link 28 depresses the V-shaped end 58 thereof with respect to the stop pin 59 and as said link is returned to its normal position during the automatic operation of the timing mechanism the upper half 58a of said end rides upon said pin and slowly raises said link until the notch 64 is clear of lug 60, whereupon handle 27 is released and moves quickly rearwardly against shoulder 59, simultaneously actuating the switch mechanism from closed or high heat position to open or low heat position. This takes place before the completion of return movement of the link 28, that is, before the V-shaped end 58 comes to rest against the stop pin 59. The impact produced by the striking of lug 60 against shoulder 61 is transmitted by the link 28 to the friction member 30 which gives

slightly, thereby absorbing the shock. This arrangement reduces the noise and also protects the mechanism.

Timing mechanism

The timing mechanism 19 includes a main or drive shaft 65 having fixed thereon a gear 66, a plurality of intermediate shafts 67 having gears and pinions 68, a ratchet wheel shaft 69 having a pinion 70 and a ratchet wheel 71, and a shaft 72 having fixed thereon an escapement and balance wheel 74.

The train of gears is arranged in the usual manner so that the power applied to the main shaft 65 is transmitted by the intermeshing gears and pinions to said ratchet wheel 69 which is driven in the direction indicated by arrow in Figure 4. The inner end of spiral spring 31 is fixed to a stationary projection, as indicated at 31a. The power is supplied to shaft 65 by said coiled spring 55 and to a certain extent by said spiral spring 31.

Thus when the handle 27 is manually operated or moved into the position shown in Figure 4, spring 55 is placed under increased tension by the movement of said handle and the spiral spring 31 is also placed under increased tension by the movement of the link 28 forwardly. The pull of spring 55 against the handle 27 is transmitted through the lug 60 and notch 64 to link 28 which in turn acts on the friction member 30 so that the main or drive shaft 65 is caused to revolve in the direction indicated by arrow in Figure 4.

The spiral spring 31 has two functions to perform, namely, to force the link 28 outwardly to cause it to interlock with the handle 27 and also to assist in imparting revoluble motion to said shaft 65. While either one of said springs is strong enough to operate the timing mechanism, spring 55 is required to operate the switch into open or low heat position and to return the handle to normal position or against the shoulder 61 when said handle is released from notch 64. The spiral spring 31 assists in the completion of the return movement of the link 28 after the handle 27 has been released from said notch.

The friction or clutch member 30 is loosely mounted on shaft 65 and is frictionally engaged on one side by gear 68 and on the other side by a friction disk 66 fixed on said shaft. The friction thus produced is sufficient under normal driving conditions to maintain a driving connection between the member 30 and said shaft 65. However, when the handle 27 is manually operated, said friction member 30 is caused to slip and to be partially rotated from its normal position shown in Figure 3 to the position shown in Figure 4, without affecting the timing mechanism. Also when the handle 57 is released during its return movement and flies back until lug 60 thereof strikes against shoulder 61 of link 28, the blow thus produced is sufficient to cause said friction member 30 to slip and take up the shock.

The lower ends of said shafts are revolubly mounted in said bottom plate 79 and extend therethrough for a suitable distance and have their ends resting on said thrust bearing plate 80. This plate is spaced from the bottom plate 79 a slight distance in any suitable manner and preferably by upwardly presented ribs 82 pressed in said plate 80 and projecting upwardly against bottom plate 79.

Each side of the thrust bearing plate 80 has formed integral therewith one or more ears or

projections 84 which are bent downwardly and engage the bottom plate 22 of base 11 and serve to secure said timing mechanism in position.

Heretofore, the lower end of each shaft of the timing or clockwork mechanism was formed with an annular shoulder which engaged the lower plate to form a bearing. This arrangement resulted in considerable friction and otherwise impaired the efficiency of the mechanism.

By providing the thrust bearing plate 80 and having the lower ends of the shafts resting thereon, the friction is reduced to minimum and all danger of binding and sticking of the shafts is eliminated. Thus the efficiency of the mechanism is greatly increased while the assembling thereof is rendered more simple.

Selective stop for the handle

As stated before, the handle 27 extends from the device through a slot 26 formed in the flange 20 of base 11, the corresponding flange 22a of the bottom plate 22 being cut away as at 22a to provide clearance for said handle.

In order to control the extent of manual operation of said handle and thus regulate the period of operation of said timing mechanism, an adjustable stop 85 is arranged slidably on said flange 20.

This stop includes a plate 86 arranged on the inner side of said flange 20 and a knob 87 arranged exteriorly of said flange and engaging screw 88 fixed to said plate 86 and extending outwardly through said slot 26. This knob 87 forms convenient means for moving the plate 86 longitudinally of said slot and by tightening said knob said stop plate 86 can be secured in selected position.

A pointer 89 is formed integral with said plate and extends outwardly through said slot 26 and points to graduations or indicia arranged on a plate 90 fixed on said flange 20 preferably above said slot 26.

When the cooking device is initially used, it requires a longer period of time to raise the temperature thereof to the cooking or toasting degree due to the cold temperature of the device. After the device has been heated properly, a shorter or normal period of time is only required for each cooking or toasting operation.

In order to take care of this initial or pre-heating of the device, the forward end of said stop plate 86 is cut away to provide two shoulders 91 and 92 spaced from each other longitudinally of said slot 26 to allow two distinct movements of the handle 27. The upper shoulder 91 is disposed in the normal operating horizontal plane of said handle and is used as a stop for normal operations after the device has been pre-heated.

The lower shoulder 92 is spaced below the normal operating plane of said handle and is used only during the initial operation of the device when it is cold and requires a longer period of time to obtain the desired result. For the initial operation it is necessary to depress the handle 27 from its normal position so that it occupies position below its normal horizontal plane and below the plane of said shoulder 91.

By bringing the handle 27 against the lower shoulder 92 a longer stroke of the handle is required, thereby increasing accordingly the period of energization of the timing mechanism and consequently the period during which the switch remains in closed or high heat position. The handle when released assumes its normal operating plane. Thus the handle is normally oper-

able only against the upper stop 91 and to increase the heating period of the toaster it is necessary to press the handle downwardly and bring it against the lower stop 92.

The relative positions of the shoulders 91 and 92 do not change so that the proper time relationship is preserved at all times. However, the plate 86 can be adjusted in the slot 26 as desired, the stationary plate 90 and pointer 89 of plate 86 being used as a guide to obtain the proper cooking or toasting period.

In the modified form shown in Figures 15 and 16, an adjustable stop plate 94 is mounted on flange 20a and a selective stop 95 is pivotally mounted on handle 27. This stop 95 has a pair of shoulders 95a and 95b adapted to engage the edge of plate 94 when the handle is manually operated. A handle 96 is provided on stop 95 to permit either shoulder 95a or 95b to be moved into position to engage plate 94. When the toaster is cold, the stop 95 is adjusted to bring the shoulder 95a in position, thereby permitting longer stroke of the handle and the corresponding longer period of heating. After the toaster is heated, stop 95 is adjusted to bring shoulders 95b in position, thereby shortening the manual stroke of said handle and the subsequent heating period.

In order to provide automatic regulation of the stroke of the handle 27, a thermostatically controlled stop can be used as shown in Figures 17 to 20. In this form, a plate 97 which is preferably manually adjustable by means of a handle 98, is mounted in the usual manner in flange 20a of the base. A stop 99 is arranged in the path of handle 27 and is operatively associated with plate 97 by means of a pin or projection 100 extending inwardly from said plate and engaging a slot 101 vertically disposed in stop 99. That side of the stop 99 which is presented toward the handle 27 is inclined from vertical, as indicated at 102, whereby as stop 99 is moved vertically it lengthens or shortens the stroke of the handle 27 and accordingly regulates the interval during which the switch remains closed.

The stop 99 is carried by one end of a thermostatic element 104, the other end 105 of which is secured to the underside of wall 21 of base 11. The stop 99 and element 104 are so arranged that when the toaster is cold said element 104 occupies raised position with the narrow portion of the stop 99 arranged in the path of the handle 27. Consequently the handle will be permitted its maximum stroke which in turn will cause the timing mechanism to run and hold the switch in a closed position for a maximum period of time to compensate for the cold condition of the device.

After the toaster has been warmed the thermostatic bar or temperature responsive element 104 will be deflected downwardly, depressing stop 99 so that the obliquely disposed portion thereof will move downwardly to shorten the path of movement of said handle 27. Thus the shortened movement of the handle will result in a correspondingly reduced period of operation of the timing mechanism and the closure of the switch. The movement of stop 99 is automatic and is in accordance with the temperature of the toaster or other cooking device.

Where the automatic stop 99 is used in conjunction with the manually adjustable plate 97, the fixed end 105 is pivotally mounted to permit said thermostatic element 104 to move in an arc while the stop 99 moves with said plate 97.

In the modified form shown in Figure 21, a

stop 106 is mounted on a thermostatic element 107 so as to engage a shoulder 108 on the connecting link 28 in order to regulate the extent of movement of handle 27 and the energization of the device.

The provision of a thermostatic element to control the stroke of the handle renders the selection of the timing period automatic, so that the user is not called upon to bring the handle against the lower or upper stop, but operates the handle in the usual manner as heretofore mentioned.

While we have shown and described the preferred forms of our timing and switching mechanism and of the stop for controlling the period of energization thereof, it is obvious that various changes in the construction and arrangement of parts of our invention can be made and substituted for those herein disclosed without departing from the spirit of our invention.

We claim:

1. In an electric cooking device, a switch, a manually operable member for closing said switch, a timing mechanism for opening said switch, said mechanism being set in operation by the manual operation of said member, and a stop for limiting the extent of movement of said manually operable member, said stop having two abutment portions spaced from each other and selectively engageable by said manually operable member to energize said timing mechanism for two different periods of time.

2. In a device of the class described, the combination with a snap action switch and a timing mechanism, of a handle for actuating said switch, a clutch member associated with said timing mechanism and operable in one direction free of said mechanism and in the opposite direction in driving engagement therewith, a link connected to said clutch member and said handle for operating said clutch member in the free direction when said switch is closed, a spiral spring operatively associated with said timing mechanism and said link, and a coiled spring connected to said handle for exerting energy to return said handle to normal position and open said switch.

3. In a device of the class described, the combination with a snap action switch and a timing mechanism including a main gear shift, of a spiral spring anchored at one end, a handle for actuating said switch, a clutch member associated with said main gear shaft and operable in one direction free thereof and in the opposite direction in driving engagement therewith, a link pivotally connected at one end to said clutch member and to the free end of said spiral spring, means for interengaging said link with said handle whereby said link is actuated by said handle to operate said clutch in the free direction and increase the force of said spiral spring, and a coiled spring connected to said handle for exerting energy to return said handle to normal position and opening said switch, said timing mechanism being operable by said springs.

4. In a device of the class described, the combination with a switch and a timing mechanism for opening the same, of a handle for actuating said switch and said timing mechanism, and a stop for limiting the movement of said handle, said stop having a pair of shoulders spaced from each other in the path of movement of said handle whereby the latter can be moved into two different positions and energize said timing mechanism for two different periods of time.

5. In an electric cooking device, the combination with a switch and a timing mechanism therefor, of a handle for actuating said switch and said timing mechanism, and a stop for limiting the movement of said handle, said stop being provided with a notch into which said handle can be moved by distortion from its normal position to increase the energy of said timing mechanism and prolong accordingly the heating period of the device.

6. In a device of the class described, the combination with a snap-action switch and a timing mechanism, of a handle for actuating said switch, a clutch member operatively associated with said timing mechanism and operable freely in one direction and in the opposite direction in driving engagement with said timing mechanism, a link connected at one end to said clutch member and extending toward said handle, a pair of spaced-apart shoulders formed on said link, a projection on said handle engageable with the first of said shoulders when manually actuated and with the second shoulder when returned to normal position, means for interlocking said handle with said link when in engagement with said first shoulder, and a spring connected to said handle for yieldably holding it in its home position.

7. In a device of the class described, the combination with a snap-action switch and a timing mechanism, of a handle for actuating said switch, a clutch member operatively associated with said timing mechanism and operable freely in one direction and in the opposite direction in driving engagement with said timing mechanism, a link connected at one end to said clutch member and extending toward said handle, a pair of spaced-apart shoulders formed on said link, a projection on said handle engageable with the first one of said shoulders when manually actuated and with the second shoulder when returned to normal position, means for interlocking said handle with said link when in engagement with said first shoulder, a spring connected to said handle for yieldably holding it in its home position, and means for releasing said link and said handle from their interlocked relation before the completion of movement of said timing mechanism.

8. In an electric toaster, the combination with a switch and timing mechanism for automatically opening the same, of a handle for closing said switch and energizing said timing mechanism, a tension spring associated with said handle, and a stop for limiting the movement of said handle, said stop being provided with two abutment portions, one of which lies in the normal path of movement of said handle and is used after the toaster has been pre-heated, the second of said abutment portions being spaced from the first and displaced with respect to said handle whereby said handle has to be displaced to move past the first abutment portion into engagement with the second one upon the initial operation of the toaster when it is desired to pre-heat the same.

9. In an electric toaster, the combination with a switch and timing mechanism for automatically opening the same, of a handle for closing said switch and energizing said timing mechanism, a tension spring associated with said handle, a stop for limiting the movement of said handle, said stop being provided with two abutment portions, one of which lies in the normal path of movement of said handle and is used after the toaster has been pre-heated, the second of said abutment portions being spaced from the first and displaced with respect to said handle whereby said handle has to be displaced to move past the first abut-

ment portion into engagement with the second one upon the initial operation of the toaster when it is desired to pre-heat the same, and means for adjusting said stop to regulate both periods of heating of said toaster.

10. In a toaster, the combination of a hollow base having a bottom wall and a top wall, an upright casing fixed to said top wall, and a switch attached to said bottom wall and spaced from said top wall whereby air is allowed to circulate between said switch and the top wall of said base.

11. In a toaster, the combination of a hollow base having a bottom wall and a top wall, an upright casing fixed at its lower end to said top wall, a switch and a timing mechanism fixed to said bottom wall and spaced from said top wall to allow air to circulate therebetween and prevent heating of said switch and said timing mechanism.

12. In an electric device, a switch comprising a support, a snap action mechanism mounted therein, and including an upwardly projecting rotatable portion, a stationary plate of insulation material mounted on said support and provided with a central opening, a rotatable member of insulation material non-rotatably supported on said upwardly projecting portion and disposed within the central opening of said insulation plate, a plurality of stationary contacts fixed to said stationary plate in spaced-apart concentric relation, and a plurality of contacts fixed to and extending radially from said rotatable member and movable thereby into and out of engagement with said stationary contacts.

13. In an electric device, a switch comprising a support, a snap action mechanism mounted therein, a plate of insulation material mounted on said support and provided with a central opening, a circular member of insulation material arranged in said opening and operatively associated with said snap action mechanism, a plurality of terminal contacts fixed on said stationary plate in spaced-apart relation, and a plurality of contacts fixed to said circular member and movable therewith into and out of engagement with said stationary contacts, said circular member having floating non-rotative engagement with said snap action mechanism so as to maintain said movable contacts in proper alignment with said stationary contacts.

14. In a switch, a U-shaped support, a plate of insulation material mounted on the upper ends of said support and having a central opening, a snap action mechanism mounted in said support below said plate and including a switch rotor extending upwardly through said opening, a circular plate of insulation material mounted non-rotatably on said rotor and operable thereby, a plurality of stationary terminal contacts fixed on said stationary plate, and a plurality of contacts fixed on said movable plate and operable therewith into and out of engagement with said stationary contacts, said movable plate being movable axially relatively to said rotor to allow adjustment of said movable contacts relatively to said stationary contacts.

15. In an electric switch, a support having a pair of upstanding side walls normally inclined outwardly from the vertical, a plate of insulation material engaging the upper ends of said side walls, whereby the latter are moved inwardly and placed under tension thereby holding said plate taut and preventing the buckling thereof when subjected to heat, said plate being provided with a central opening, a plurality of stationary terminal contacts fixed on said plate,

a movable member disposed in said central opening, a plurality of contacts fixed to said movable member and movable therewith into and out of engagement with said fixed contacts, and a switch mechanism for actuating said movable member.

16. In an electric device, the combination with a switch, of a timing mechanism including a drive member therefor, a friction means associated with said drive member, a handle for operating said switch, a coiled spring for restoring said handle to normal position, a link operatively connected at one end to said friction means, a lost motion connection between said handle and said link, means for interlocking said link with said handle upon the forward movement of the latter, and means for releasing said link from said handle before the completion of restoring movement of said link, whereby the force of the impact produced by the released handle is absorbed by the slippage of said friction means.

17. In a device of the character described, the combination with a switch and a timing mechanism, of a handle for actuating said switch, a coiled spring connected to said handle for yieldably holding it in a normal position, a friction means associated with said timing mechanism, said friction means establishing under normal conditions a driving connection for said timing mechanism and being adapted to slip when subjected to abnormal force, a link connected at one end to said friction means and having a lost motion operative connection with said handle whereby said link is operated by said handle in time sequence therewith, means for interlocking said link with said handle upon the forward movement of the latter, and means for releasing said handle from said link before the completion of restoring movement of said link, the impact produced by the released handle upon said link being absorbed by the slippage of friction means.

18. In an electric cooking device, the combination with a switch, of a lever movable to actuate said switch, and a thermostatically operable stop arranged in the path of movement of said lever for controlling the extent of movement thereof in accordance with the temperature of said device.

19. In an electric cooking device, the combination with an electric switch therefor and a timing mechanism, of a handle for actuating said switch and operatively associated with said timing mechanism, an adjustable stop for regulating the extent of energization movement of said handle, and a thermostatic element for actuating said stop whereby the extent of movement of said handle is in direct ratio with the temperature prevailing in said device.

20. In an electric cooking device, the combination with a switch and a timing mechanism, of a member operatively associated with said timing mechanism and said switch and movable to close and open said switch, a stop arranged in the path of movement of said member, said stop having its lever engaging portion disposed obliquely to said member, and a temperature responsive element for moving said stop to control the extent of movement of said member in accordance with the temperature of said device.

21. In an electric cooking device, the combination with a switch and a timing mechanism, of a lever manually operable in one direction to close said switch and operable by said timing mechanism in the opposite direction to open said switch,

and a thermostatically operated stop disposed in the path of movement of said lever and adjustable relatively to said lever to limit the extent of movement thereof in accordance with the temperature of said device.

22. In an electric cooking device, the combination with a switch, of a timing mechanism, a manually operable lever to actuate said switch and said timing mechanism, and a thermostatically operable stop controlling the extent of movement of said lever in accordance with the temperature of said device.

23. In an electric cooking device, the combination of a switch, a timing mechanism, a manually operable lever for actuating said switch, means operatively connecting said lever with said timing mechanism, a temperature responsive element, and a stop carried by said element and engaging said means, said stop being positionable by said element to increase or decrease the energizing stroke of said lever in accordance with the temperature prevailing in said device.

24. In an electric cooking device, the combination with a switch, a timing mechanism and manually operable means for actuating said switch and said mechanism, of a stop movable in a plane to limit the energizing movement of said means, and a thermostatic element engaging said stop and moving it relatively to said means to shorten or lengthen the energizing stroke thereof in accordance with the temperature of said device.

25. In an electric cooking device, the combination with a switch therefor, of a handle for closing said switch, a coiled spring for restoring said handle, means for engaging said handle and holding it in switch closing position, a timing mechanism associated with said means for releasing said handle after a predetermined time interval, a stop adjustable to regulate the energizing stroke of said handle, and a thermostatic element for adjusting said stop to lengthen or shorten said time interval in accordance with the temperature prevailing in said device.

26. In an electric switch, a support, a stationary plate of insulation material carried thereby and having a central opening, a plurality of contacts fixed on said stationary plate in spaced relation with each other and adjacent to said opening, a switch operating mechanism mounted in said support and including a rotatable member extending into said opening, a movable plate of insulation material mounted on said rotatable

member and disposed within said opening, and a plurality of contacts arranged on said rotatable member in spaced-apart relation with each other and extending radially therefrom for engaging said stationary contacts when said rotatable member is operated into one position to engage said stationary contacts and for riding on the surface of said stationary insulation plate member when operated into another position.

27. In an electric switch, a support, a stationary plate of insulation material carried thereby and having a central opening, a plurality of blades fixed on said stationary plate in spaced-apart relation with each other and adjacent to said opening, a switch operating mechanism mounted in said support and including a rotatable member extending axially into said opening, a movable plate of insulation material mounted non-rotatively on said rotatable member, and a plurality of contacts arranged in pairs on said movable plate and extending radially therefrom within said opening and adapted to engage said stationary blades, the members of each pair of movable contacts being adapted to ride on the opposite sides of said stationary insulation plate when moved out of engagement with said blades.

28. In an electric switch, a support, a stationary plate of insulation material mounted on said support and having a circular opening, a plurality of terminal contacts fixed on said plate in spaced relation with each other and with said opening, a switch operating mechanism mounted in said support and including a rotatable member disposed axially of said opening, a plate of insulation material removably mounted on said rotatable member in non-rotative engagement therewith and free to move axially relatively thereto, said plate being disposed within said opening substantially in the same horizontal plane with said stationary plate, and a plurality of contacts fixed on said movable plate in spaced-apart relation with each other and adapted to engage said stationary contacts being arranged in pairs and, one set of contacts extending from its respective plate to engage the other set of contacts and being adapted to ride upon the opposite faces of the other plate when out of engagement with said last-mentioned set of contacts.

PAUL J. McCULLOUGH.
JOSEPH PAVELKA, Jr.

DISCLAIMER

2,112,422.—*Paul J. McCullough and Joseph Pavelka, Jr.*, St. Louis, Mo. SWITCH AND TIMING MECHANISM. Patent dated March 29, 1938. Disclaimer filed May 31, 1941, by the assignee, *Joseph Pavelka*.

Hereby enters this disclaimer to claims 18, 19, 22, 23, and 24 of said Letters Patent.

[*Official Gazette July 1, 1941.*]