F. M. TOTTINGHAM.

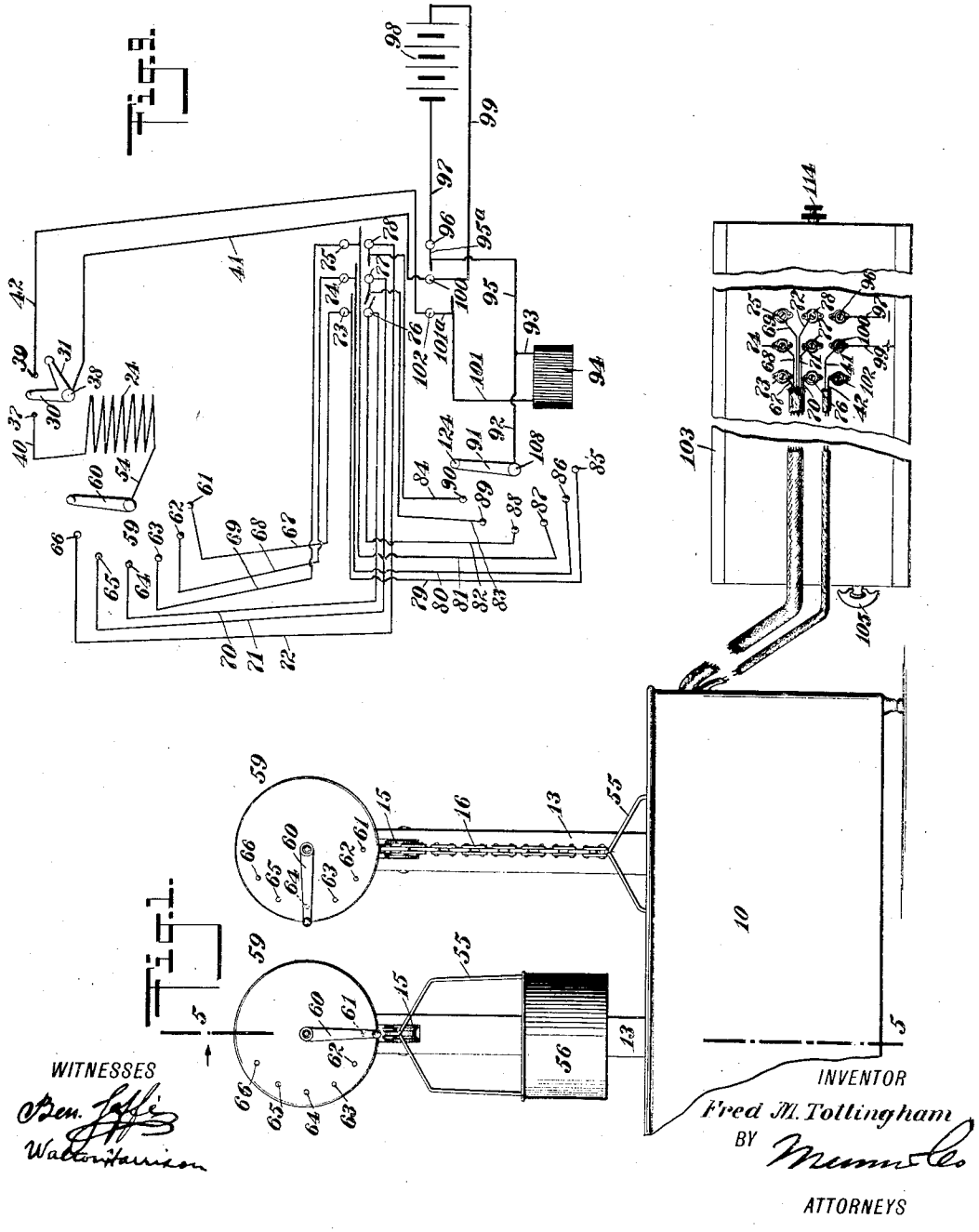
TIME CONTROLLED ELECTRIC SWITCH.

APPLICATION FILED MAY 18, 1909.

961,558.

Patented June 14, 1910.

4 SHEETS—SHEET 1.



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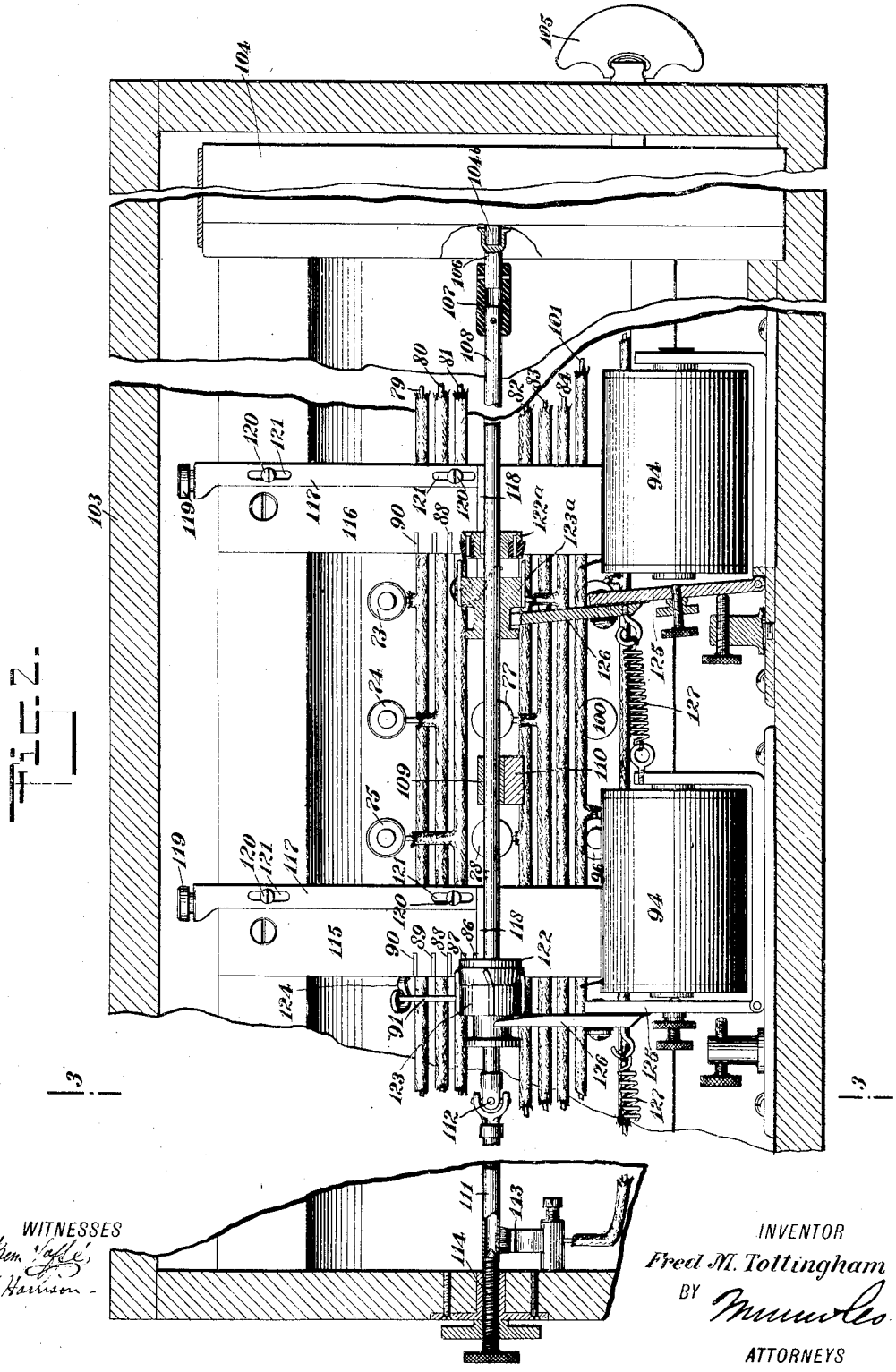

FIG. 2.

WITNESSES

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4 SHEETS—SHEET 3.

Fig. 3.

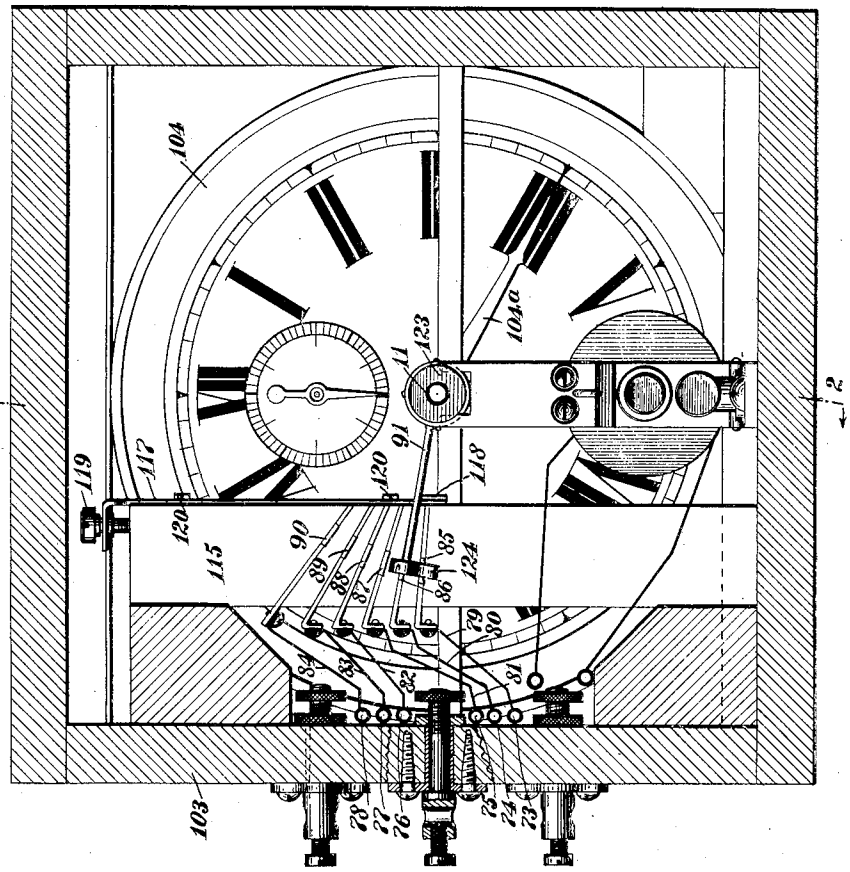
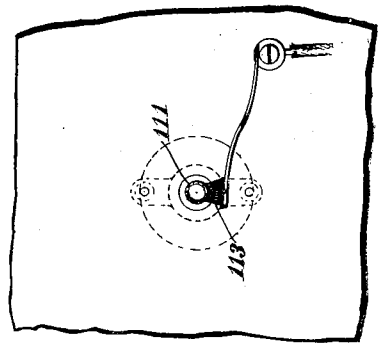


Fig. 4.



WITNESSES

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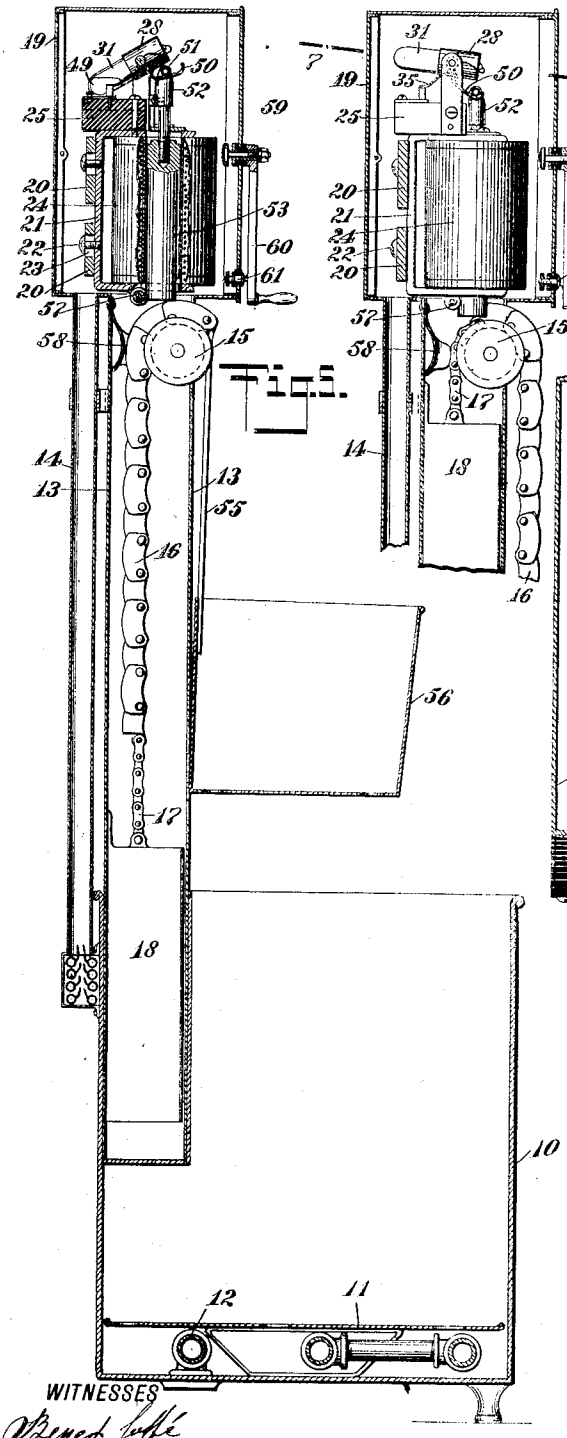

Fig. 5.

Fig. 6.

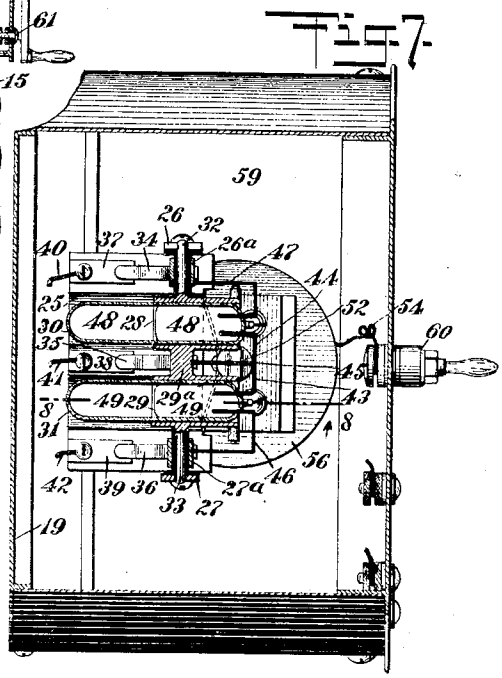

Fig. 7.

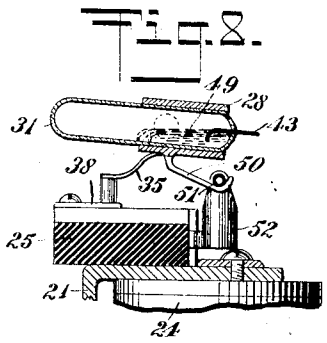

Fig. 8.

WITNESSES

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ATTORNEYS

UNITED STATES PATENT OFFICE.

FRED M. TOTTINGHAM, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO ELIE J. MONEUSE, OF SHEEPSHEAD BAY STATION, BROOKLYN, NEW YORK.

TIME-CONTROLLED ELECTRIC SWITCH.

961,558. Specification of Letters Patent. Patented June 14, 1910.

Application filed May 18, 1909. Serial No. 496,753.

To all whom it may concern:

Be it known that I, FRED M. TOTTINGHAM, a citizen of the United States, and a resident of the city of New York, (Sheepshead Bay, borough of Brooklyn,) in the county of Kings and State of New York, have invented a new and Improved Time-Controlled Electric Switch, of which the following is a full, clear, and exact description.

My invention relates to time-controlled electric switches, my more particular purpose being to provide a switch of this general type so constructed and arranged as to perform a mechanical motion, such as the raising of a bucket from a hot water bath after a predetermined lapse of time, this period of time being controllable at will independently of the length of time the clockwork has already been in action.

My invention further relates to mechanism for enabling a single clock or other time piece to control any number of electric switches, the latter being set independently of each other for actuating various mechanisms after predetermined periods of time under control of the operator.

My invention further relates to various improvements in the mechanism employed for time-controlled electric switches as a means of increasing the general efficiency of the same.

For the sake of conciseness I show merely one form of apparatus embodying my invention, to wit: a device for enabling the operator to time the raising of buckets adapted to contain eggs in order to cook the various charges of eggs to different degrees. I do not limit myself to this particular form of apparatus, for the reason that various other forms suited for different purposes may be employed without departing from the spirit of my invention.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary elevation showing a tank for holding hot water and provided with standards carrying at their tops electric switches and provided with egg buckets to be lowered into and raised upwardly from the tank independently of each other; Fig. 2 is a vertical longitudinal section on the line 2—2 Fig. 3 through the casing containing a clock connected with a revoluble shaft and driving the same continuously, and electrically-operated clutch mechanism for temporarily connecting this shaft with means for ultimately controlling the various egg buckets after the same have been lowered by the operator and the electric switches adjusted as hereinafter described; Fig. 3 is a cross section on the line 3—3 of Fig. 2 showing the face of the clock, and also showing one of the contact mechanisms controllable thereby, this contact mechanism being associated with some one of the electric switches and some one of the egg buckets; Fig. 4 is a detail showing a contact brush used in connection with the clock; Fig. 5 is a vertical section on the line 5—5 of Fig. 1 through the hot water tank and egg bucket movable relatively to the same, and electrically-operated mechanism for controlling the release and lifting of the bucket which is here shown in its uppermost or normal position; Fig. 6 is a fragmentary view similar to the top portion of Fig. 5, but showing the parts occupying their abnormal position corresponding to that occupied by a bucket when lowered into the hot water tank; Fig. 7 is a section upon the line 7—7 of Fig. 6, looking in the direction of the arrow and showing one of the mercury switches I employ for opening and closing certain circuits used in my device; Fig. 8 is a fragmentary section upon the line 8—8 of Fig. 7, looking in the direction of the arrow, and showing one of the circuits as closed by the mercury; and Fig. 9 is a diagram of the wiring.

A hot water tank 10 (see Fig. 5) is provided with a perforated floor 11 below which are heating pipes 12 for the purpose of maintaining the temperature of water contained in the hot water tank. A number of columns 13 extend upwardly from the hot water tank. As the several columns 13 together with parts associated with them, are exactly alike, I will describe only one. Mounted upon each column 13 is a conduit 14 for conveniently holding the various wires used in connection with the device. At the top of the column 13 is a wheel 15 engaged by a chain belt 16 and connected with this chain belt is a smaller chain belt 17 from which depends a weight 18.

Mounted upon each column 13 is a housing 19 containing supporting bars 20, and

engaging the latter is a yoke 21. Guide pins 22 extending through slots 23 in the supporting bars 20 engage the yoke 21. By raising or lowering the yoke and tightening the screws 22, the yoke may be adjusted vertically within proper limits. A solenoid 24 is connected rigidly with the yoke 21, which carries a plate 25 of insulating material, and carried by the latter are bearings 26, 27. Disposed intermediate these bearings are two leaves 28, 29, and mounted in the latter respectively are glass tubes 30, 31, each being sealed. These tubes are supported upon pintles 32, 33 which are integral with the sleeves 28, 29. These sleeves are connected together by a neck 29^a integral therewith. Contact springs 34, 35, 36 are mounted respectively upon metallic plates 37, 38, 39. The contact springs 34, 36 engage sleeves 26^a, 27^a which are mounted upon and insulated from the pintles 32, 33, as will be understood from Fig. 7.

Connected with the plates 37, 38, 39 are wires 40, 41, 42. A wire 43 is sealed into the tube 31 and is joined to a similar wire 44 sealed into the tube 30. Connected with these wires is another wire 45 which leads to the stem 29^a. A wire 46 is sealed into the tube 31 and is connected with the contact sleeve 27^a. Another wire 47 is sealed into the tube 30 and engages the contact sleeve 26^a. At 48, 49 are two volumes of free mercury contained in the tubes 30, 31 for the purpose of making metallic contact between the ends of the wires entering the tubes.

Connected with the sleeves 28, 29 is an arm 50 of the form indicated in Fig. 8. This arm engages a roller 51, and by aid thereof supports a head 52. This head is connected with an iron core 53 which extends loosely through the solenoid 24 and is adapted to be raised thereby when said solenoid is energized. Connected with the chain belt 16 is a bail 55 which supports a bucket 56. A wire 54 is connected with the solenoid 24 and leads to a contact arm 60, as hereinafter described. Rollers 57 are mounted upon the under side of the yoke 21 and are engaged by the core 53. Disposed below the rollers 57 is a spring pad 58 which presses against the chain belts 16, 17 for the purpose of holding the same in proper engagement with the wheel 15.

At 59 is an electric switch provided with an arm 60 and with contact points 61, 62, 63, 64, 65, 66, as indicated particularly in Figs. 1, 6 and 9. Connected with these contact points are wires 67, 68, 69, 70, 71, 72 leading respectively to binding posts 73, 74, 75, 76, 77, 78. In metallic communication with these binding posts are wires 79, 80, 81, 82, 83, 84 leading to contact points 85, 86, 87, 88, 89, 90. These contacts last mentioned are disposed in a row having a general arcuate form, and are disposed adjacent to the path of travel of an arm 91. This arm is connected with a wire 92 which leads to another wire 93, the latter being connected with a clutch magnet 94. Wires 95, 95^a connect this clutch magnet with a binding post 96. A wire 97 connects the latter with a battery 98, and from this battery a wire 99 leads to a binding post 100. Connected with the clutch magnet 94 is a wire 101 which is connected with a wire 101^a leading to a binding post 102. The wire 42 is also connected with this binding post as will be understood from Fig. 9.

Mounted within a casing 103 (see Figs. 1, 2 and 3) is a clock 104 which is wound by aid of a thumb piece 105. The clock 104 is provided with an hour hand 104^a and also with a minute arbor 104^b. Secured upon the latter is a stud 106 as will be understood from Fig. 2. A sleeve 107 of insulating material is connected rigidly with this stud and also with a shaft 108. This shaft extends a considerable distance from the clock and is supported upon one or more bearings 109 carried by cross bars 110, as will be understood from Fig. 2.

A sleeve 111 is connected with the shaft 108 by aid of a universal joint 112. This sleeve 111 practically constitutes a continuation of the shaft and is adjustable by aid of a thumb screw 114. A spring brush 113 engages the spring 111 and forms part of an electric circuit hereinafter described. A number of posts 115, 116 are mounted within the casing 103, these posts being precisely alike and being each provided with a bar 117 having at its lower end a horizontal portion 118 and at its top an adjusting screw 119. Screws 120 extend through slots 121 in the bars 117 and engage the posts. By aid of the screws 119, 120 the height of the bars 117 may be adjusted at will. Mounted rigidly upon the shaft 108 are a number of clutch members 122, 122^a, and mounted loosely upon said shaft 108 are clutch members 123, 123^a. Each of these last mentioned clutch members is provided with an arm 91 projecting radially outward from its center and carrying a spring brush 124. Each clutch magnet 94 is provided with a movable armature 125, the latter carrying a clutch fork 126 which engages the corresponding clutch member 123 or 123^a for the purpose of moving it in the general direction of the axis of the shaft 108. Connected with each armature 125 is a retracting spring 127, the effect of which is to normally maintain the corresponding clutch in its open or so-called "idle" position.

The operation of my device is as follows: I will first suppose that the machine is idle and that each movable part occupies its normal position. The buckets 56 are therefore at their uppermost limits and the

weights 18 (see Fig. 5) at their lowermost limits. The circuits are now all open and consequently the battery is idle. Suppose, now, that the operator desires to start the machine into action. He causes the water in the tank 10 to be heated by aid of the heating coil 12. Suppose, further, that he wishes to cook a number of eggs in one of the buckets 56 and for a period of three minutes. He moves one of the arms 60 by hand (see right hand portion of Fig. 1) until it rests upon the proper contact point, say 64, the various contact points 61, 62, 63, 64, 65, 66 being associated with the interval of time desired for cooking the eggs. Having placed the charge of eggs in the bucket 56, corresponding to the particular switch arm 60 which he has just adjusted, the operator pulls the bucket downward until it enters the hot water. Before pulling the bucket down the movable members occupy the positions indicated in Fig. 5. After the bucket is drawn down, however, these parts appear as indicated in Fig. 6. In drawing the bucket downward the chain belt 16 travels over the pulley 15, turning the latter and lifting the smaller chain belt 17 and the weight 18. The bucket 56 being lowered the core 53, by its own gravity, drops downward and lodges against one end of the chain belt 16, as will be understood from Fig. 6. This is readily accomplished for the reason that the chain belt 16 is considerably larger than the chain belt 17, so that when the core 53 drops down into engagement with the smaller chain belt 17 the chain belt 16 can not retrograde. The uppermost end of the chain belt 16 is securely held in position as indicated in Fig. 6 by the core 53 which thus serves the purpose of a pawl. The lowering of the core 53 as just described causes the head 52 to descend slightly and carry with it the arm 50. This tilts the tubes 30, 31, as indicated in Fig. 6, and causes the two volumes of mercury 48, 49 to flow to the right according to Figs. 5, 6 and 7, thereby making metallic connection between the wires entering the tubes 30, 31, as will be understood from Fig. 7. The setting of the arm 60 (see Fig. 1) upon the contact point 64, as above described, completes a circuit as follows: battery 98, wire 99, binding post 100, wire 41, plate 38, spring 35 (see Fig. 7), neck 29^a, wires 45, 43, to tube 31, mercury 49 in this tube, wire 46, sleeve 27^a, spring 36, plate 39, wire 42, binding post 102, wires 101^a, 101, clutch magnet 94, wires 93, 95, 95^a, binding post 96, and wire 97, back to battery 98. This energizes the particular clutch magnet 94 which is associated with the particular arm 60 (see right of Fig. 1) which has been set by the operator. One of the clutch magnets 94, being thus energized, attracts its armature 125 and causes the corresponding clutch member 123 to grip its mating clutch member 122, as indicated at the left of Fig. 2. The grip of this clutch brings the corresponding arm 91 under control of the clock for the reason that the shaft 108 has a rotation corresponding to that of the minute hand of the clock. The arm 91 therefore begins to travel like a minute hand and in doing this the contact spring 124 successively engages the various contact points 85, 86, 87, 88. The travel of the arm 91 is thus necessarily under the direct control of the clock, and the intervals whereby the contact members last mentioned are spaced apart is associated with distances traveled by the minute hand, and consequently correspond to time periods. The clutch solenoid 94 being thus deënergized, the clutch releases so that the arm 91 drops, by its own gravity, back to its normal position. Suppose, however, that the operator desires to cook eggs for a period of two minutes only. He places the eggs in some one of the buckets 56, draws down the bucket in question and moves the arm 60, associated with the particular bucket 56 he has chosen to the contact point 63, so that the arm 91 rests upon the contact point 87. The automatic operations above described now take place when the clock has caused the proper circuit to be completed, and the completion of this circuit takes place whenever the arm 91 travels sufficiently to enable the spring 124 to engage the contact point 86.

Since the shaft 108 may be of considerable length, as above stated, and may be provided with any number of clutches, and since aside from the general parts of the apparatus the various groups of mechanism corresponding to the different buckets 56 may be duplicated to any desired extent, the same clock can be used in any number of buckets. It will also be noted that no matter how long the clock has been running, and no matter what may be the time of day indicated by the clock or otherwise, the operator can almost instantly place the apparatus in such condition that upon the expiration of any predetermined time limit consistent with the proportions of the machine, one or any other number of the buckets will be raised automatically. It will be further noted that the buckets need not be set all at the same time, and that their action is entirely independent of each other. Also that the restoration of any bucket to its normal position and the restoration of any parts associated with a bucket to their respective normal conditions, has no effect on any other bucket or buckets.

It is obvious that the lifting of a bucket from a hot water tank is only one of the myriads of purposes to which my invention may be applied. I therefore describe the invention in detail with respect to its distinguishing structural and functional charac-

teristics in connection with what I believe to be a preferred construction as illustrated in the drawings, and the applicability of the specific distinctive features to other purposes or to other constructions I keep in view as far as possible.

In my claims I endeavor to point out the particular features distinguishing my invention from previously existing structures, in the best manner in which these features may be defined in the present state of the art.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A time-controlled electric switch, comprising a time piece provided with a revoluble member, an arm associated with said revoluble member and normally loose relatively to the same, means controllable at will for securing said arm rigidly in relation to said revoluble member for the purpose of enabling said revoluble member to turn said arm, contact mechanism controllable by movements of said arm means including an electric circuit connected with said contact mechanism and controllable thereby for performing a predetermined mechanical motion, and electric mechanism connected with said contact mechanism and adjustable at will for the purpose of energizing said circuit after a predetermined length of time.

2. A time-controlled electric switch, comprising a time piece provided with a revoluble member, an arm associated with said revoluble member and normally loose relatively to the same, means controllable at will for securing said arm rigidly in relation to said revoluble member for the purpose of enabling said revoluble member to turn said arm, contact mechanism controllable by movements of said arm, an electrically-operated switch included in said circuit and actuated by the same for the purpose of breaking said circuit, mechanism coacting with said electrically operated switch for executing a predetermined mechanical motion.

3. The combination of a normally open circuit, a time-controlled switch for closing said circuit after a predetermined interval of time, an electrically-operated switch connected with said circuit and adapted to be actuated thereby, said electrically-operated switch having contact mechanism, said contact mechanism being included in said electric circuit for the purpose of opening said electric circuit when said electrically-operated switch is operated, and mechanism for executing a predetermined mechanical motion, said last-mentioned mechanism being provided with means for preventing said electrically-operated switch from closing when said circuit is opened by said contact mechanism.

4. The combination of a normally open electric circuit, a time-controlled switch for closing said electric circuit after a predetermined interval of time, an electrically-operated switch connected with said circuit and adapted to be actuated thereby, said electrically-operated switch including a solenoid, and a movable core and also having contact mechanism included in said circuit for the purpose of opening the latter when said electrically-operated switch is actuated, a sprocket chain movable relatively to said core and disposed adjacent thereto for the purpose of supporting said core and thereby maintaining said contact mechanism open, a weight connected with said sprocket chain for the purpose of actuating the latter, and a receptacle connected with said sprocket chain for the purpose of holding eggs or the like, and means for applying heat to said receptacle and its contents when said receptacle occupies a predetermined position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRED M. TOTTINGHAM.

Witnesses:

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PHILIP D. ROLLHAUS.