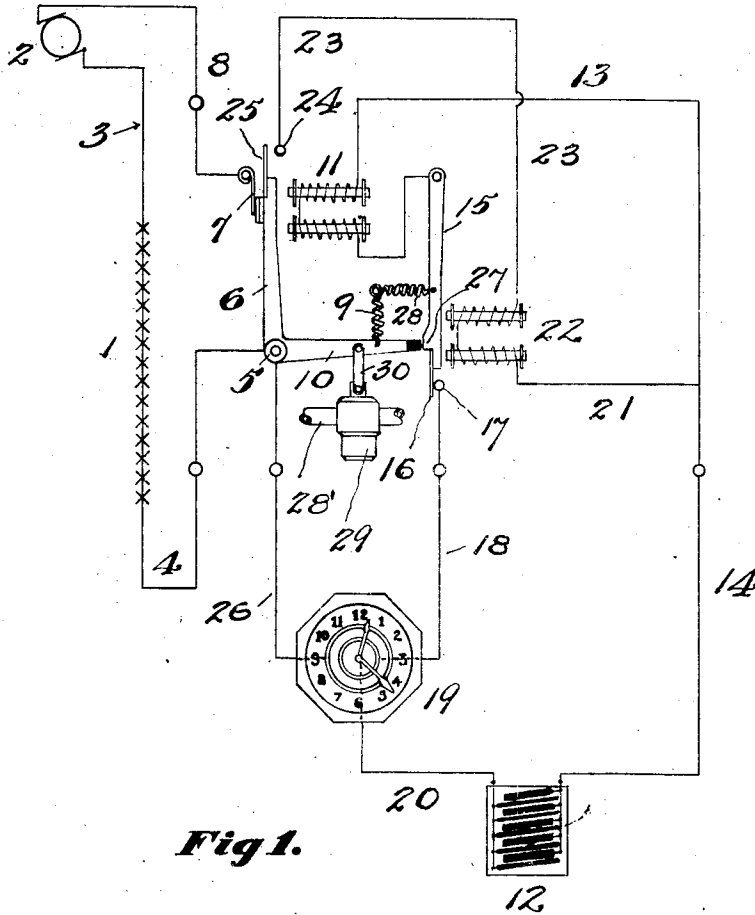


J. C. HEINTZ.
ELECTRICALLY OPERATED CONTROLLING MECHANISM.
APPLICATION FILED JAN. 15, 1912.

1,056,671.

Patented Mar. 18, 1913

3 SHEETS—SHEET 1.



Witnesses:

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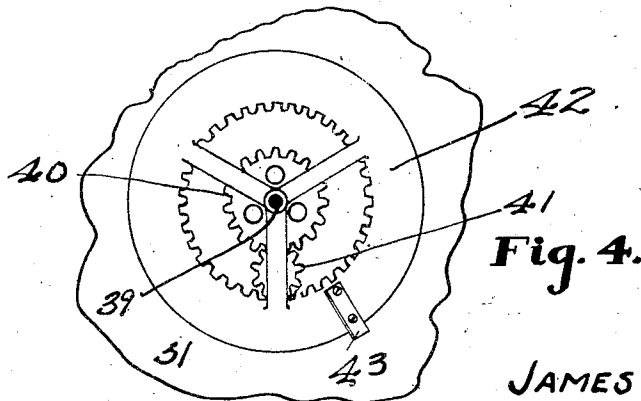
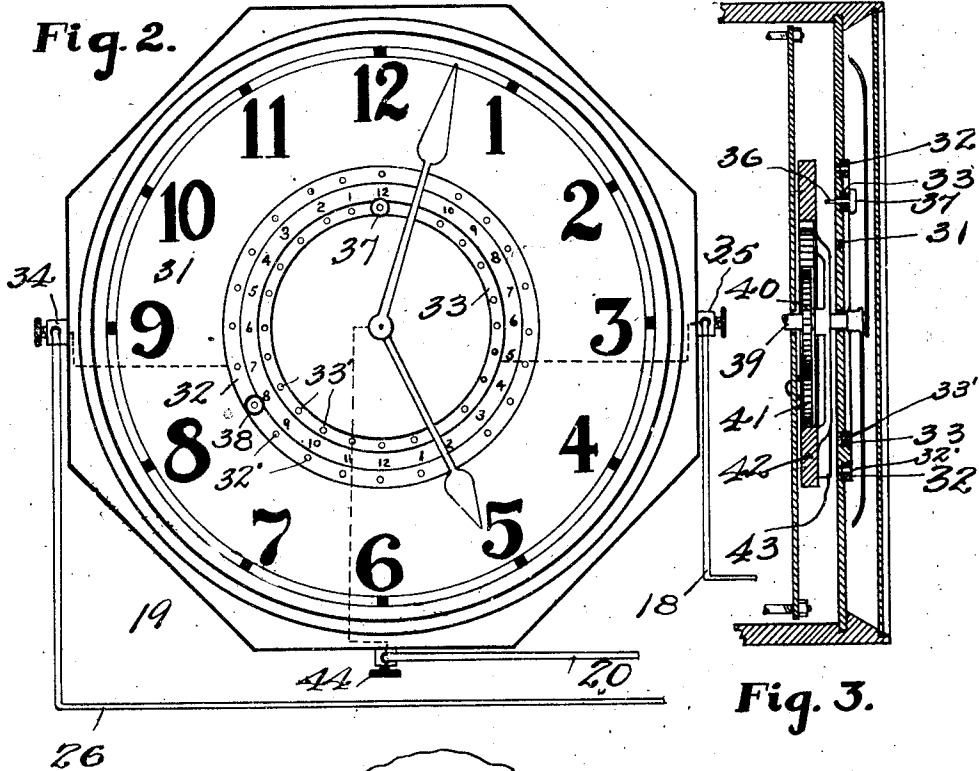
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

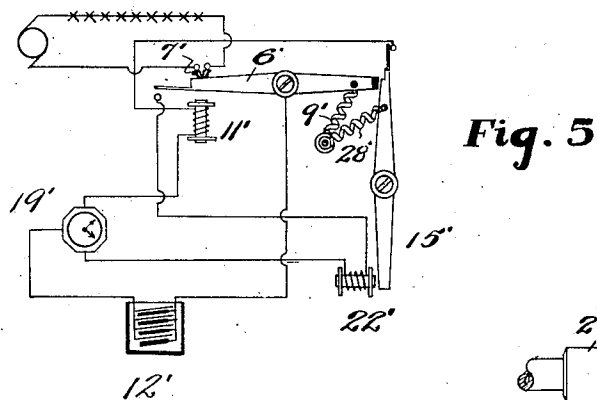


Fig. 5

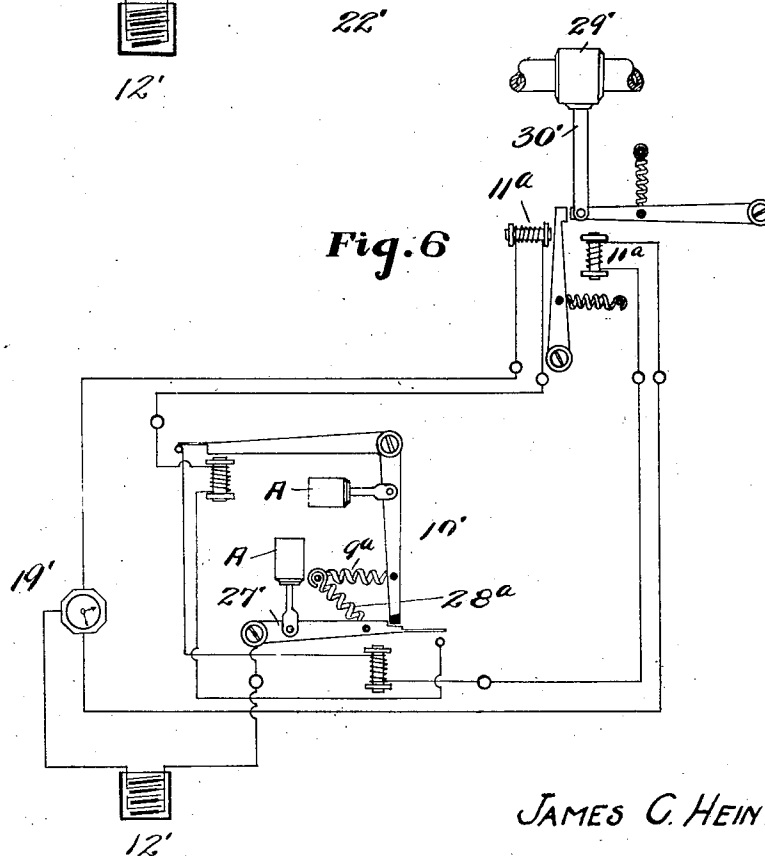


Fig. 6

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JAMES C. HEINTZ, OF CLEVELAND, OHIO.

ELECTRICALLY-OPERATED CONTROLLING MECHANISM.

1,056,671.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed January 15, 1912. Serial No. 671,242.

To all whom it may concern:

Be it known that I, JAMES C. HEINTZ, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Electrically-Operated Controlling Mechanism, of which the following is a specification.

This invention relates to electrically operated regulating or controlling mechanism and has for its general object the provision of mechanism of this character wherein successive operations may be performed by electric circuits with a minimum consumption of operating current. In performing such operations, I prefer to employ two electric circuits, one for each of two operations, and close each circuit only momentarily—sufficiently long to enable it to accomplish its particular operation—with the result that there is no waste of the electric energy in the operating circuits.

In carrying out my invention in its preferred form, I employ a movable regulating device, means movably holding the same in a predetermined position, a circuit arranged to move said device to a second position, means for automatically locking the device in such second position, and a second circuit arranged to unlock said device and restore it to its first position.

Mechanism of the foregoing type may be employed for a variety of purposes, such as opening and closing electric lighting circuits at predetermined time intervals, operating the controlling valves of gas burner supply pipes, opening and closing furnace dampers, and generally whenever convenience and reliability of operation and economy of operation are desirable. For convenience of illustration and description the invention is shown, in one of its embodiments, as controlling an electric lighting circuit (see Figure 5; in another embodiment as controlling a gas supply valve (see Fig. 6); and in another embodiment as controlling both an electric lighting circuit and a gas supply valve (see Fig. 1).

Generally speaking the invention may be defined as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein:—

Fig. 1 is a diagrammatic view illustrating a conventionalized installation of my improved controlling mechanism. Fig. 2 is

a face view of a clock or time piece for controlling the controlling mechanism of Fig. 1. Fig. 3 is a vertical sectional view of Fig. 2, and Fig. 4 is a detail view of the contact carrying member of the time piece. Figs. 5 and 6 are modified forms of the invention.

In Fig. 1, the preferred embodiment of my invention is shown as arranged to control an electric and a gas lighting system, the former system comprising a group of lamps as 1 which receive current from the generator 2 through conductor 3, and the lighting circuit is completed through conductor 4, post 5, one arm 6 of a bell crank lever, contact piece 7, and conductor 8 which returns to the generator. As shown in the diagram, the circuit is complete and the lights are burning. The arm 6 of the bell crank lever, which forms a switch, is held in contact with the contact piece 7 by means of the spring 9, attached to the arm 10 of the lever and tends to hold the arm 6 in contact with contact piece 7.

The light extinguishing circuit includes a magnet 11 of which the lever arm 6 is the armature, and the magnet is connected to the battery 12 by conductors 13 and 14 at one side and through a latch lever 15, contact piece 16, post 17, conductor 18, time piece 19, conductor 20, at the other side of the battery.

The lamp lighting circuit comprises, starting with the battery 12, the conductor 14, wire 21, magnet 22 of which the latch lever 15 is an armature, conductor 23, post 24, contact piece 25 on lever arm 6, post 5, conductor 26 which is connected as will be described, to the time piece 19, and thence through the conductor 20 back to the battery 12.

It will be noted that the latch lever 15 which forms the armature of the magnets 22, is formed with a shoulder 27, and that the spring 28 tends to hold the armature 15 out of contact with the magnets 22 when the magnets are deenergized. As shown in Fig. 1, with the lamps lighted, the spring 9 holds the bell crank lever in its illustrated position. When the extinguishing circuit is completed, the magnet 11 is energized which draws its armature 6 to contact with the post 24 through the piece 25. The extreme end of the arm 10 of the bell crank lever is pushed downwardly and the spring 28 pulls the lever 15 over to the left, the shoulder 27

rides over the end of the arm 10 and holds the bell crank lever against the power of spring 9. When the lighting circuit is energized, the magnets 22 draw the armature 15 from engagement with the lever arm 19, and the spring 9 serves to pull the bell crank lever to the position illustrated in Fig. 1, wherein the lamps are lighted.

I have illustrated a gas pipe 28', valve 29, and link 30, the latter connected to the arm 10, as means for regulating and controlling a group of gas lamps, and as the operation will be obvious I do not consider it necessary at this time to give herein a detailed description.

Referring to Figs. 2, 3, and 4, the construction of the time piece or controlling clock will now be described. The clock 19 is completely illustrated only so far as is necessary to a complete understanding of the present invention. Upon the face 31 of the clock are attached a pair of rings 32 and 33, which are composed of conducting material but are insulated from each other and from the clock. These rings are connected, the former to conductor 26' through post 34, and the latter to conductor 14 through post 35, a connection between the posts and rings being indicated by dotted lines in Fig. 2. Each ring 32 and 33 is perforated, as shown at 32' and 33' and it will be noted that these perforations coincide with the half hour markings on the dial of the clock, that is, there is a perforation for each half hour on the face of the clock. These perforations are adapted to receive the shank, as 36, of a button 37 in ring 33, and a similar button 38 is provided for use with the ring 32. It will be observed that the shank or stem 36 extends through a complementary opening in the face 31 of the clock, and projects some distance therefrom. Located directly behind the face of the clock, and supported to rotate with the driving post 39 thereof, is a driving pinion 40, which engages an intermediate pinion 41 to drive the interiorly toothed pinion 42, which likewise is supported, but loosely, on the post or pintle 39. The pinion or gear wheel 42 carries a contact piece 43 which is secured thereto and is of sufficient length to span the distance between the conducting rings 32 and 33. This contact piece 43 rotates with the wheel 42, which if desired may be geared to complete a single revolution in each twenty-four hours. The shanks or stems of the buttons 37 and 38 are located in the path of movement of the contact piece 43 which rotates with the wheel 42. When piece 43 encounters a shank, the current passes from the conductor 20, post 44 to the pintle 39 and thence to the contact piece 43, through the gear wheels or pinions.

As a convenient means of illustration, we will assume that the group of incandescent

lamps 1 is located in a store window, and that the lamps have been lighted at eight o'clock, by the contact button 38 and contact piece 43. The button 37 is located in the ring 33 to correspond with the hour of twelve, which is the time determined upon for extinguishing the lamps. When the piece 43 reaches the twelve o'clock mark said piece contacts with the stem 36 of button 37 and the circuit is complete through the button, ring 33, the dotted connection to post 35, conductor 18, post 17, plate 16, lever 15, magnets 11, conductor 13, 14, battery 12, conductor 20, post 44, dotted connection (Fig. 2) to pintle 19, gears 40, 41, 42, plate 43. This circuit energizes the magnet 11 which draws the armature 6 and breaks the lighting circuit. The movement of the bell crank lever permits the locking lever 15 to respond to the draw of the spring 28 and the lever 15 through its shoulder 27 holds the bell crank lever disengaged from contact with plate 7.

It will be noted that the circuits for lighting and extinguishing the lamps are completed only during the contact of the plate 43 with one of the button shanks or stems. In this manner the current is used during the shortest possible time, but still long enough to be effective for its purpose, and in this manner a great saving in the battery is produced.

It will be understood of course that changes may be made within the scope of my claims without departing from the spirit of the invention. The size and number of gears in the clock may be varied in order to make a greater or lesser number of contacts during twenty four hours, or the period itself may be lengthened or shortened; the clock may be arranged to control various numbers of circuits of lamps, by the addition of conductor rings on the clock face, etc., and numerous other changes are contemplated in the physical embodiment or installation of the invention.

In the modified form of the invention shown in Fig. 5, the light circuit is completed through the contact piece or bridge 7' carried by the lever 6', and this lever is operated to break the circuit and extinguish the lamps, through the coil 11' and clock 19' in connection with the battery 12', against the tension of spring 9'. The latch lever 15' is actuated by the coil 22' against tension of spring 28'.

Fig. 6 illustrates a modification of the same inventive idea, but in addition, two retarders A, A, are employed to retard the quick motion of the levers 10' and 27' when under pull of the respective lever springs 9^a and 28^a. These retarding devices, by their action, lengthen the time required to break the current which operates the coils that are energized from the clock 19' and battery 12'. 130

This lengthened time insures a complete movement of the link 30' to operate the valve 29'.

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

1. In mechanism of the character set forth, the combination of an electric circuit, a lever one arm of which constitutes a switch for said circuit, means connected with said lever tending to hold said arm in circuit-closing position, a second circuit including an electro-magnet in operative relation to one of the lever arms and adapted, when energized, to move the lever in a direction to break the first circuit, a locking device in the second circuit having a projection adapted to engage the second arm of the lever when the latter is operated by said magnet and constituting a switch for said second circuit, means tending to move the locking device so as to bring its projection into locking engagement with such arm and thereby break the second circuit, a third electric circuit including an electro-magnet adapted, when energized, to operate the locking device to release the lever arm from engagement therewith and restore said device to circuit-closing position, and additional means for closing the last two circuits.

2. In mechanism of the character set forth, the combination of an electric circuit, a lever constituting a switch for said circuit, means tending to hold said lever in circuit-closing position, a second circuit including an electro-magnet in operative relation to the lever and adapted, when energized, to move the lever in a direction to break the first circuit, a locking device in the second circuit and constituting a switch therefor and adapted to hold the lever in circuit-opening position with reference to the first circuit, means for moving the locking device into operative relation to said lever and thereby breaking the second circuit, a third electric circuit including an electro-magnet adapted, when energized, to operate the locking device to release the lever, and additional means for closing the last two circuits.

3. In mechanism of the character set forth, the combination of an electric circuit, an angle lever one arm of which constitutes a switch for said circuit, a spring connected with one of the arms of said lever and tending to hold the first mentioned arm in position to close the said circuit, a circuit including an electro-magnet in operative relation to one of said lever arms and adapted, when energized, to move the lever in opposition to said spring, a lever in the second circuit and having means adapted to engage the second arm of the first mentioned lever when the latter is operated by said magnet, a spring tending to move the second lever arm into locking engagement with the second arm of

the first mentioned lever and thereby break the second circuit, and a third circuit including an electro-magnet adapted, when energized, to operate the second lever against the action of its spring to release the first lever and close the second circuit, and additional means for closing the last two circuits.

4. In mechanism of the character set forth, the combination of an electric circuit, a lever constituting a switch for said circuit, a spring connected with said lever and tending to hold it in circuit-closing position, a circuit including an electro-magnet in operative relation to said lever and adapted, when energized, to move the lever in opposition to said spring, a lever in the second circuit having means adapted to engage the first mentioned lever when the latter is operated by said magnet, a spring tending to move the second lever arm into locking engagement with the second arm of the first mentioned lever to thereby break the second circuit, a third electric circuit including an electro-magnet therein adapted, when energized, to operate the second lever against the action of its spring and thereby close the second circuit, and means for closing the last two circuits.

5. In mechanism of the character set forth, the combination of an electric circuit, an angle lever one arm of which constitutes a switch for said circuit, a spring tending to hold said lever arm in circuit-closing position, a second circuit including a lever forming a switch for the said second circuit and having means adapted to engage the second arm of the first mentioned lever and thereby to retain the first-mentioned arm of said lever in circuit breaking position, an electro-magnet in the second circuit adapted to operate the first mentioned lever to open the first circuit, means tending to move the second lever into locking relation with the first mentioned lever to thereby break the second circuit, additional means for closing the second circuit, and means for restoring the levers to their initial positions.

6. In mechanism of the character set forth, the combination of an electric circuit, a circuit for opening and a circuit for closing the first circuit, an angle lever one arm of which constitutes alternately a switch for closing the first and third circuits, a spring connected with one of the lever arms and tending to hold the first mentioned arm in a position to close the first circuit, an electro-magnet in the second circuit and in operative relation to one of said lever arms and adapted, when energized, to operate said lever to break the first circuit and close the third circuit, a lever in the second circuit forming a switch for said circuit and having means adapted to engage the second arm of the first mentioned lever when the latter is operated by said magnet and simultane-

- ously open the second circuit, a spring tending to move the second lever into locking relation with the second arm of the first lever, an electro-magnet in the third circuit adapted, when energized, to move the second lever out of locking relation with the first lever and into circuit closing position, and additional means for closing the second and third circuits.
- 10 7. In mechanism of the character set forth, the combination of an electric circuit, an angle lever one arm of which constitutes alternately a switch for closing said circuit and a switch for a restoring circuit, a spring connected with one of the lever arms and tending to hold the first mentioned arm in a position to close the first circuit, a circuit including an electro-magnet in operative relation to one of said lever arms and adapted, when energized, to operate the first mentioned arm to a position to break the first circuit and to close the restoring circuit, a lever in the circuit including the electro-magnet and forming a switch for said circuit and having means adapted to engage the second arm of the first mentioned lever when the latter is operated by said magnet, a spring tending to move the second lever into locking relation with the second arm of the first lever to thereby open the circuit including said second lever, an electro-magnet in the restoring circuit adapted, when energized, to move the second lever out of locking relation with the first lever and into circuit closing position in its circuit, and additional means for closing the last two circuits.
- 25 30 35
- In testimony whereof I affix my signature in presence of two witnesses.
- JAMES C. HEINTZ.
- Witnesses:
R. M. GATES,
H. A. BROWN.