No. 642,424. Patented Jan. 30, 1900.

C. R. BROWN.

MAXIMUM INDICATOR.

(Application filed Aug. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

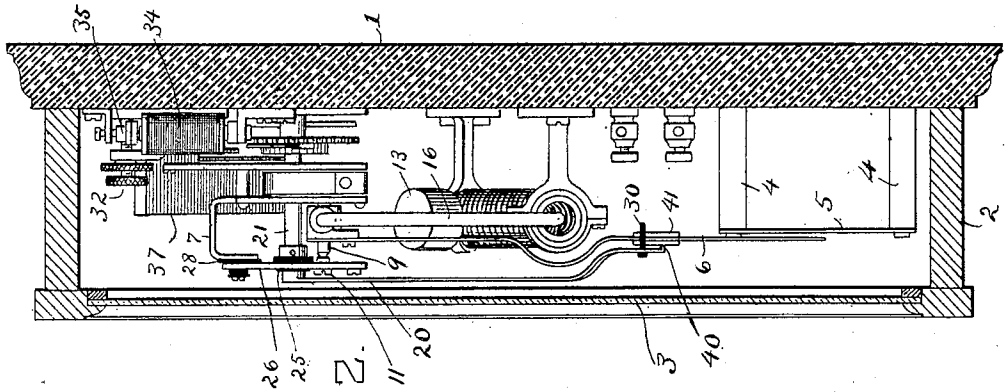


FIG. 2.

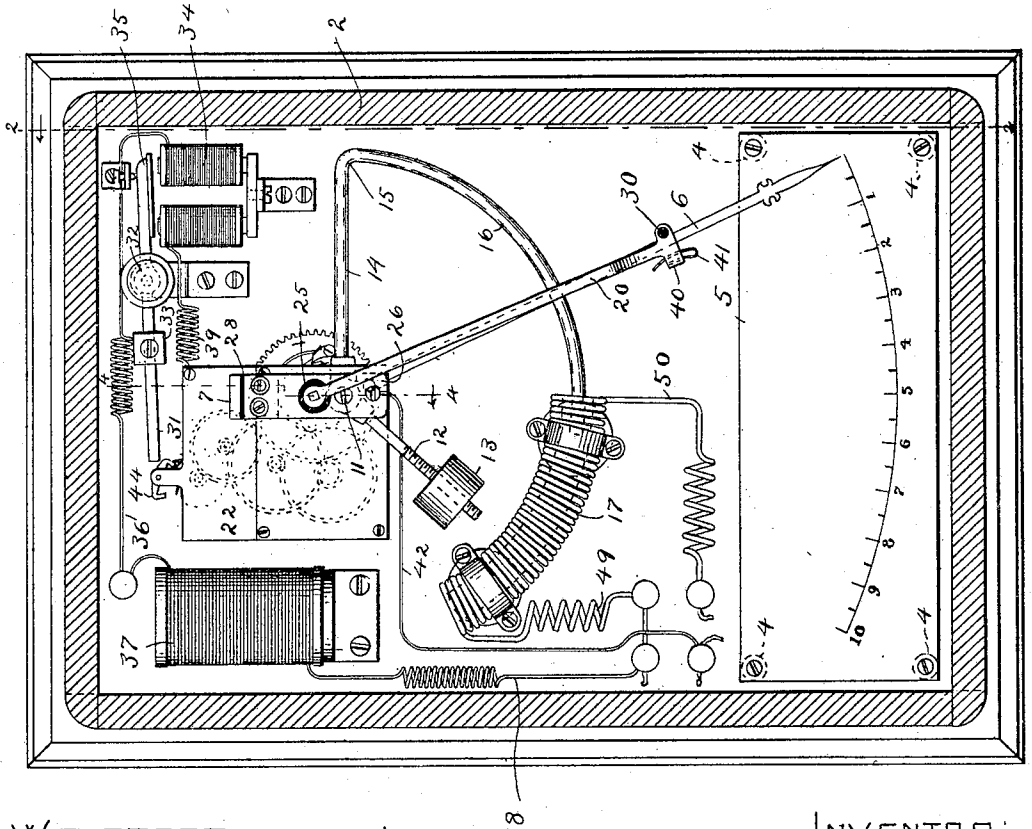


FIG. 1.

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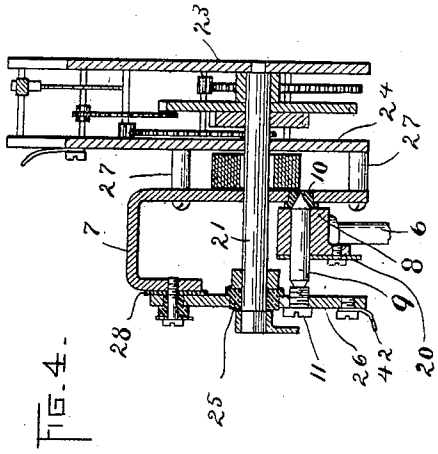


FIG. 4.

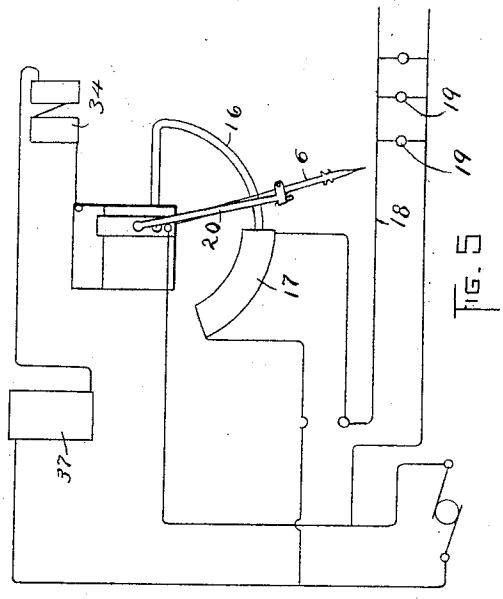


FIG. 5.

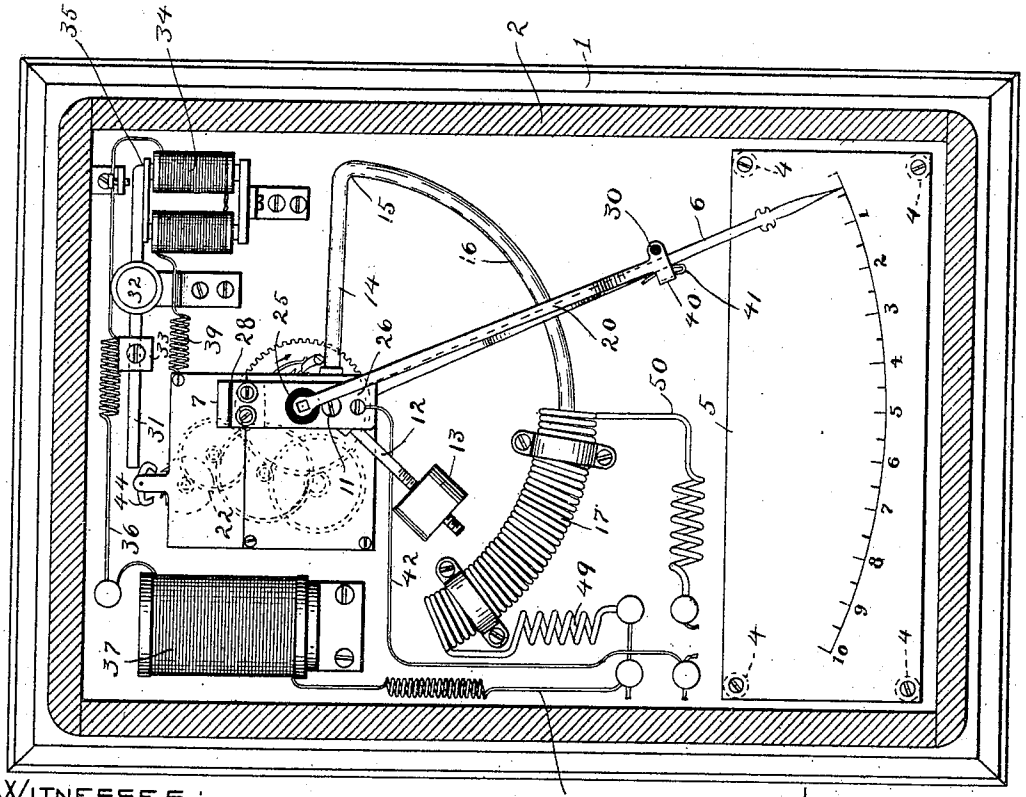


FIG. 3.

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UNITED STATES PATENT OFFICE.

CRAWFORD R. BROWN, OF DEDHAM, MASSACHUSETTS.

MAXIMUM-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 642,424, dated January 30, 1900.

Application filed August 7, 1899. Serial No. 726,378. (No model.)

To all whom it may concern:

Be it known that I, CRAWFORD R. BROWN, a citizen of the United States, residing at Dedham, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Maximum-Indicators, of which the following is a specification.

This invention has relation to indicators for showing the maximum amount of electrical current used by a consumer during any predetermined period; and it has for its object to provide a device of the class named which is simple in construction and at the same time accurate and efficient.

In that embodiment of the invention which I have illustrated in the drawings and described in the following specification the index is actuated by an electromagnet in the form of a solenoid in the working circuit, and as the amount of the current is increased the index is moved over a graduated scale.

In order to prevent the index from jumping under a sudden impulse beyond the position it should properly occupy, I employ a retarder controlled by the movement of the index, which not only governs the speed of the latter, but also prevents its reverse movement. The retarder, as illustrated, is actuated and governed in speed by a clock-movement which is normally at rest, but which when the index is in movement is permitted to be operated.

It is evident that any form of trip mechanism may be employed for holding the clock-movement at rest, although for all general purposes an electromagnetic device, the circuit through which is governed by the index, as I have shown it, is desirable. By this construction it is evident that the movement of the index governs the retarder, which in turn controls the speed of movement of the index.

Referring to the drawings, Figure 1 shows in front elevation a maximum-current indicator embodying my invention. Fig. 2 represents a vertical transverse section through the same. Fig. 3 represents a view similar to that in Fig. 1, except that the index and retarder are shown in motion. Fig. 4 represents an enlarged section on the line 4 4 of Fig. 1. Fig. 5 represents a diagram of the electric circuit.

On the drawings, 1 represents a base of any suitable non-conducting material, as wood, which forms a part of a casing comprising the walls 2 and the glazed front 3. On posts or standards 4, projecting forward from the base 1, is a plate 5, provided with a scale, the divisions or graduations of which are suitably numbered. An index 6 is hung in a U-shaped bracket 7, so as to move along the scale, being provided with a hub 8, through which the shaft 9 projects, said shaft being provided with conical pins journaled in bearings 10 11. The bearing 10 is formed of suitable insulating material, as gutta-percha, while the bearing 11 consists of a screw which may be adjusted. Projecting from one side of the hub 8 is an arm 12, on which a weight 13 is adjustably placed, and projecting from the other side of the hub is an arm 14, which is bent laterally at 15 into an arc of a circle whose center is the axis of the shaft 9. The bent portion 15 of the said arm forms a portion of an electromagnetic device, being, in fact, the core or plunger of a solenoid 17. The weight 13 is sufficient to overbalance the armature to hold it in the zero position, as shown in Fig. 1; but when the electric current is passed through the solenoid or magnet the core is drawn into the aperture therein to move the index along the scale, as shown in Fig. 3. The solenoid is connected in series by wires 49 50 with the working or lamp circuit 18, as shown in Fig. 5, the lamps being indicated at 19.

In order to prevent the index from jumping when a quantity of current is used, I employ what I term a "retarder," which consists of an arm 20, rigidly secured on a suitable motor, as the spring-arbor 21 of the clock-movement, (indicated conventionally at 22 in Figs. 1 and 3.) Any form of clock-movement may be employed, and hence I will not describe the one which I have shown more than to state that it is provided with an escapement 44, which regulates the speed of the arbor 21. The arbor is journaled at one end in the rear plate 23 of the clock-movement and passes through the front plate 24, through the bracket 7, and is journaled in a non-conducting bushing 25 in the plate 26 of the said bracket 7. The bracket itself is secured to the plate 24 by suitable me-

chanical connections 27, and the plate 26 is insulated from the rest of the bracket by insulating material 28, placed between them, in addition to the bushing 25 and the bearing 10. When the clock-movement is set in motion, the arm or retarder 20 moves slowly forward and controls the speed of movement of the index.

In order to prevent the index from returning to its original position after it has been moved forward, the said arbor is provided with a pin 30, of insulating material, which projects rearwardly beyond the edge of the index, as shown.

The clock-movement is normally held against movement, but is released when the index is moved toward the left under the impulse of the solenoid. The controller for the clock-movement may consist of any suitable mechanism; but for general purposes I employ that which I have shown, which comprises a trip-lever 31, fulcrumed upon a stud 32 and held normally in engagement with the escapement 44 by an adjustable weight 33. Said trip-bar is moved out of engagement with said escapement by an electromagnet 34, whose armature 35 is secured on or forms a part of the shorter end of the said trip-lever. This electromagnet is connected by a wire 36 with a non-inductively-wound spool or resistance-coil 37, which is in turn connected by a wire 38 with one branch of the working circuit, said resistance-coil being placed in the circuit for the purpose of taking up any electromotive force unnecessary for the operation of the electromagnet. Another wire 39 connects the electromagnet 34 with the plate 24 of the clock-movement and therethrough to the arbor 21 and the retarding-arm 20, said arm being formed of metal of high conductivity. The end of the retarder is extended laterally, as at 40, and is then bent rearwardly to receive a platinum spring 41, against which the edge of the index may be engaged when said index moves away from the insulating-pin 30. The index 6 is likewise formed of conductive metal, so that a current may traverse through it and the shaft 9 to the plate 26, said plate being connected by a wire 42 with the other leg of the lamp-circuit 18, said resistance-coil 37, said magnet 34, and said plate 26 being all in multiple with the main circuit 18.

Now it will be seen that when a current of electricity has traversed the solenoid 17 and the index 6 has been moved to make contact with the platinum spring 41 the circuit will be closed through the electromagnet 34, and consequently the trip-lever 31 will be drawn out of engagement with the escapement 44. The clock-movement will immediately commence to run and carry the retarder forward slowly, so long as the index 6 remains in contact with the platinum spring 41. As soon, however, as the index 6 has been moved by the armature 16 of the solenoid the proper extent to indicate the amount of current used on the line the index will stop and the retarder will be moved a short distance farther until the contact between the index and platinum spring is broken, immediately upon which the circuit through the magnet 34 will be likewise broken and the trip-lever will engage the escapement 34 and stop the motor or clock-movement.

From this construction it will be seen that the retarder can be moved in only one direction and at a predetermined rate of speed, whereby the maximum amount of current passed through the lamp-circuit through any predetermined time is indicated.

My invention may be used in connection with any meter by means of which the amount of current is indicated by a pointer or index and a graduated scale, and it may be varied in construction to suit any particular requirements.

Wherever I have employed the term "electric meter" I desire to be understood as not limiting my invention to a device for measuring electricity, since the invention may be used with any other form of measuring instrument having a movable member or an index, and consequently in construing the claims said term "electric meter" is a general term.

The term "retarder" I have used generally to mean any mechanism which retards the movement of the movable member or index and regulates its speed of movement. In this connection I desire to state that the insulating-pin 30 is not essential to the invention.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, I declare that what I claim is—

1. A maximum-indicator, comprising an electric meter having a movable member, a retarder for said member, and a motor for said retarder controlled by said member.

2. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a motor for moving said retarder at a relatively slow speed, and a controller for said motor governed by said member.

3. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a mechanical motor for running said retarder, and a trip for said motor governed by said member.

4. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a clock-movement for moving said retarder, a trip adapted to engage and release said clock-movement, and means for controlling or governing said trip.

5. A maximum-indicator comprising an electric meter, having a movable member, a

retarder for said member, and electromagnetic devices for governing said member.

6. A maximum-indicator comprising an electric meter, having a movable member, a retarder for said member, a motor for moving said retarder, a trip for said motor, and electromagnetic devices for governing said trip.

7. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a motor for moving said retarder, a trip for said motor and electromagnetic devices controlled by said member for governing said trip.

8. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a mechanical motor for actuating said retarder, a trip-lever for arresting said motor, and an electromagnet adapted to actuate said trip.

9. A maximum-indicator comprising an electric meter having a movable member, a retarder for said member, a mechanical motor for actuating said retarder, a trip-lever for arresting said motor, an electromagnet adapted to actuate said trip, an electric circuit including said electromagnet, and contacts carried by said retarder and said member.

10. A maximum-indicator comprising an electric meter having a movable member, a retarder movable in substantially the path of movement of the member, contact devices carried by the member and retarder, a motor for the retarder, an electromagnetic trip mechanism for said motor, and an electric circuit including the said trip mechanism and the said contacts.

11. A maximum-indicator comprising an electric meter, and a motor, one of said parts having an index, in combination with means whereby said index is advanced progressively as current is increased, and is stopped when the current reaches or falls below its maximum.

12. A maximum-indicator comprising a meter having a movable member, a motor having an arm in the path of said member, and means whereby the arm advances progressively, so long as the member is moved forward by reason of current passing through said meter, and stops when the current falls below the maximum already reached.

13. A maximum-indicator comprising a meter having a movable member, a clock having a movable member, and means actuated by the meter for starting the clock whereby one of said members is advanced progressively so long as the current increases through the meter and is stopped when the current reaches or falls below its maximum.

14. The combination of an electric meter, a clock, a member moved by said clock, a circuit completed by a contact operated both by the clock and the meter, a magnet in the circuit, and a detent controlled by the magnet, whereby when the circuit is completed, the clock starts, and when the circuit is broken the clock stops.

15. The combination of an electric meter, a clock having an escapement and a circuit completed by the clock-hand and the meter member, said circuit including a magnet and a detent controlled by the magnet and acting upon the escapement.

16. A maximum-indicator comprising an electric meter having a movable member, and an automatically-controlled motor for retarding the movement of said member.

17. A maximum-indicator comprising an electric meter, a motor, and means whereby said motor is started when the meter member is advanced, and is stopped when said member stops or moves in a reverse direction.

18. A maximum-indicator comprising a movable member, a motor for moving said member, an electric meter, and means controlled by said meter for governing the action of said motor.

19. A maximum-indicator comprising a meter having an index, a scale, and a motor having provisions for retarding the movement of said index along said scale.

In testimony whereof I have affixed my signature in presence of two witnesses.

CRAWFORD R. BROWN.

Witnesses:
M. B. MAY,
E. BATCHELDER.