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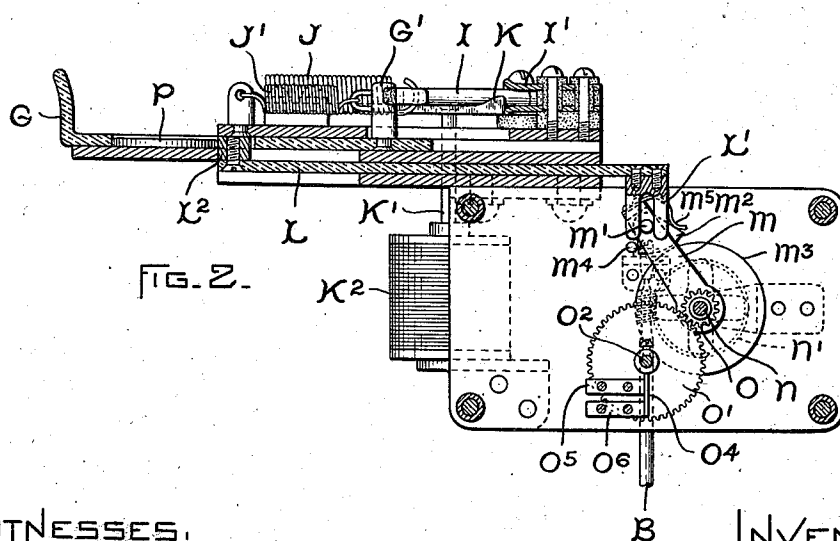
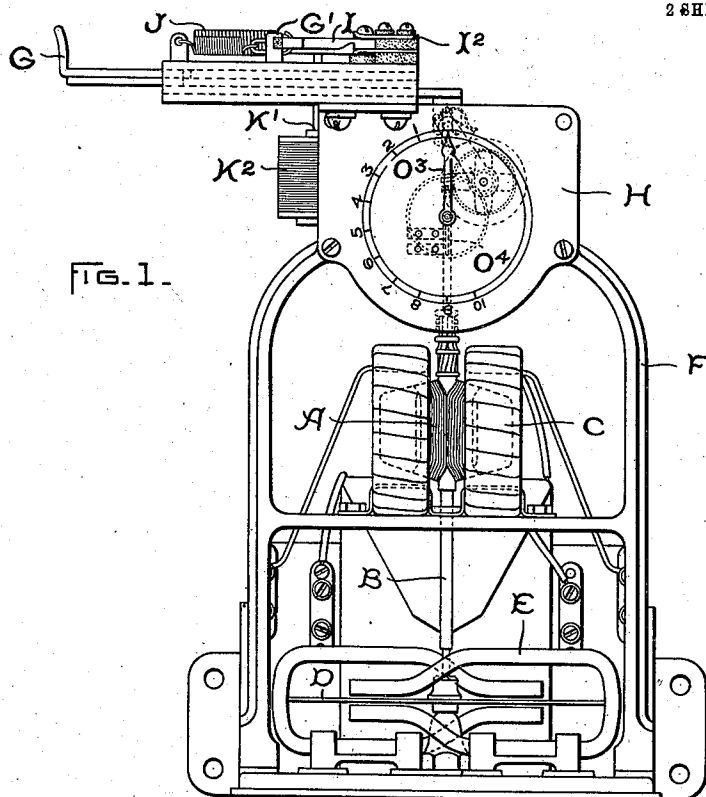
PATENTED OCT. 1, 1907.

F. P. COX.

PREPAYMENT METER.

APPLICATION FILED JULY 14, 1897.

2 SHEETS—SHEET 1.



WITNESSES.

Art. H. Abell,
A. H. MacDonald

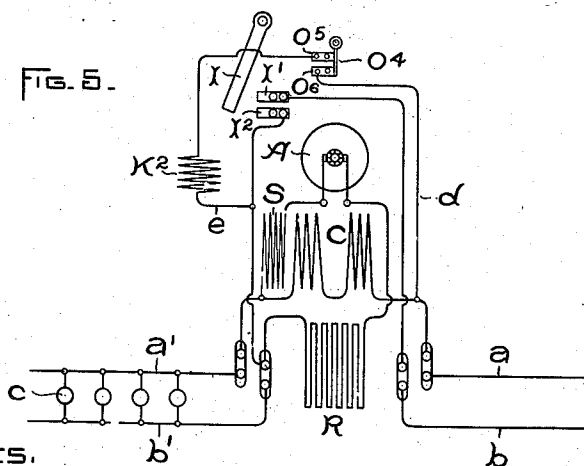
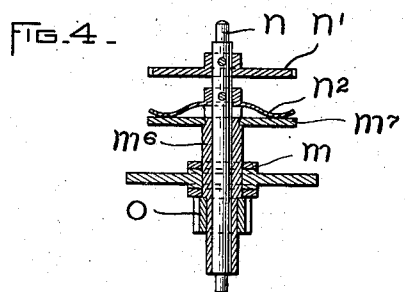
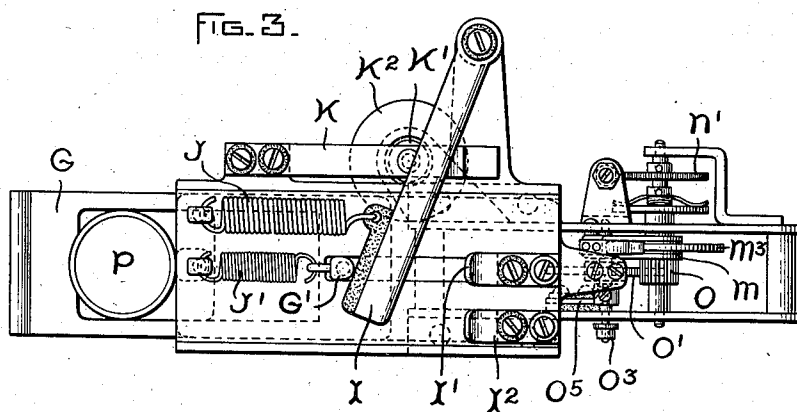
INVENTOR.
Frank P. Cox,
Geo. R. Blodgett,
Attys.

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2 SHEETS—SHEET 2.



WITNESSES.
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A. H. MacDonald.

INVENTOR,
Frank P. Cox, by
Geo. R. Blodgett,
Att'y.

UNITED STATES PATENT OFFICE.

FRANK P. COX, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PREPAYMENT-METER.

No. 867,481.

Specification of Letters Patent.

Patented Oct. 1, 1907.

Application filed July 14, 1897. Serial No. 644,553.

To all whom it may concern:

Be it known that I, FRANK P. COX, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Prepayment-Meters, of which the following is a specification.

The present invention has for its object to provide a meter through which, by the insertion of a coin or token in a proper receptacle, a certain amount of energy may pass, and also to so arrange the meter that the insertion of a number of such coins or tokens either in quick succession or at quick intervals between the first closing and interrupting of the source of supply will set the working parts of the meter in such relation that the consumer will receive an amount of energy corresponding to the total number of coins or tokens thus inserted.

In the accompanying drawings, attached to and made a part of this specification, Figure 1 is a front elevation of my improved meter adapted for use on electric circuits; Fig. 2 is an enlarged detail view, partially in section, of the means employed to set the parts in their proper relation upon the insertion of a coin or token; Fig. 3 is a plan view of the same; Fig. 4 is a detail of construction; and Fig. 5 is a diagram of the meter connections.

I have shown my invention applied to the well-known Thomson recording watt meter, in which A represents the fine wire wound armature mounted on shaft B, and adapted to revolve in the field of the coarse wire coils C.

Mounted on the lower extremity of the armature shaft is a disk D made of good conducting material and revolving within the influence of the damping magnets E, to damp the rotation of the armature.

Supported by the upper portion of frame F is a fixed dial H having divisions thereon numbered from one to ten. Secured to the upper part of the dial-plate is the mechanism employed for closing the circuit of the meter and adjusting the recording mechanism.

A flat sliding piece or actuator G (Figs. 1, 2 and 3) is provided, having an upturned end forming a handle; on the inner end of the sliding piece is a pin G¹ engaging with the switch arm I to close both the meter and load circuits. The switch arm I is pivoted on an extension of the frame and engages with fixed contacts I¹ and I².

To hold the switch arm closed against the opening spring J, a spring catch K is employed normally occupying the position shown in the figures but adapted to be pulled down and out of engagement with the switch by the core K¹ when the shunt wound solenoid K² is energized.

Extending parallel with the sliding piece G is an actuator L mounted for reciprocating movement, and having at its outer end a fork L¹ engaging with a pin M¹ which is carried by the arms M. The arms M are loosely mounted upon sleeve M⁶ which surrounds the shaft N, and carry at their outer ends a cam M² mounted for engagement with the periphery of the disk M³, the latter being rigidly secured to the sleeve. A flat spring M⁵ carried by the arms is employed to force the cam into engagement with the disk. When the arms and cam are in the position shown in Fig. 2, the cam is raised from the disk by pin M⁴ so that no extra friction is interposed to affect the operation of the meter.

On the upper end of the armature shaft B is a worm engaging with worm wheel N¹ rigidly secured to shaft N, the latter being supported in suitable bearings in the front and rear plates of the dial. A friction device or slit joint N² consisting of a hub and four spring arms is also rigidly secured to the shaft N and is adapted to engage with the friction disk M⁷, carried by the sleeve M⁶.

On the front end of the sleeve M⁶ is a pinion O meshing with gear O¹; the latter is mounted on the shaft O² which carries the hand O³ situated in front of the meter dial. In addition, the shaft O² carries a contact device O⁴ adapted to close and open the circuit between contacts O⁵ and O⁶. On account of the friction coupling between the armature shaft and the hand O³ it is possible to adjust the position of the hand with respect to the dial, independent of any movement of the meter armature; the object of which will be hereinafter described.

Referring to Fig. 5, the meter connections will be described; a and b represent the supply mains, and a¹, b¹ the work circuit. The load on the work circuit is indicated by lamps c, but it may consist of motors or any other electrical devices. The field coils C are in series with main a, a¹, and the armature A is connected in series with a non-inductive resistance R and starting coils S, across the mains a¹, b¹. The main b, b¹ enters the meter and is provided with stationary contacts I¹, I², and mounted for engagement with these contacts is the switch lever I which closes the circuit through the meter and also that of the consumer. Connected to the main a is a wire d extending to the fixed contact O⁶; extending from main b¹, the opposite side of the circuit, is a wire e, connected to stationary contact O⁵, and included in circuit therewith is the coil of the release magnet K². With the parts arranged as shown, the moving contact O⁴ connects the fixed contacts O⁵, O⁶ and the circuit is completed through the coil of the magnet; this causes the catch K to be withdrawn and the switch lever I to be released, thus

interrupting the circuit to both meter and consumer. By this arrangement the meter is on the consumer's side of the circuit when the supply circuit is interrupted, and the armature circuit of the meter is interrupted, thereby relieving the fine wire coils from all electrical strain.

When a consumer desires to receive energy, a coin or token P is placed in position on the sliding piece G and the handle manually moved to the right; this causes the token P to strike against the piece L² on the actuator L and move it to the right. The fork L¹ on the outer end of the actuator advances the arms M and, by means of cam M² engaging with the outer periphery of disk M³, the disk is advanced a certain number of degrees. The disk and pinion O being rigidly connected, motion is imparted to shaft O² by means of gear O¹ which meshes with pinion O. As the shaft is advanced contact O⁴ is moved away from the stationary contacts O⁵, O⁶, and the magnet circuit is interrupted; by the same movement hand O³ on the front of the dial is moved away from zero. Simultaneously with the adjusting of the hand with respect to the dial, the circuit is closed by switch lever I, which is actuated by the pin G¹ carried by the sliding piece G. As soon as the pressure is relieved on the sliding piece G, it assumes its normal position under the action of spring J¹. As soon as the switch is closed the catch K retains it in position until the prepaid amount of energy has been consumed and the contact O⁴ returned to the point where it bridges the stationary contacts O⁵, O⁶, and a circuit is established through the magnet coil, which attracts the core K¹ and pulls down the catch, releasing the switch and allowing it to open under the action of the spring J. The switch in opening also interrupts the continuity of the circuit of the magnet K². The worm on the upper end of the armature shaft meshing with worm wheel N¹ prevents the wheel from turning when the actuator is moved, and to provide for this movement of the hand independent of the armature the friction coupling N² is employed. After a coin is inserted in the meter and the sliding piece G actuated, the meter operates as an ordinary watt meter, and by inspection of the dial the consumer can at any time tell the amount of energy remaining to his credit.

Assuming that the consumer desires to pay for an amount of energy greater than that obtained by a single coin or token, a number of such coins or tokens can successively be placed in position and the sliding piece G actuated as before. Each time the piece G is actuated it will cause the hand O³ to advance one division of the dial, but as the switch was closed at the first operation it will have no further effect thereon. As the energy is consumed by the burning of lights the armature A revolves within the field coils and the worm on the upper end of the armature shaft transmit motion to the worm wheel N¹ and the shaft N. The friction between arms N² and disk M³ is sufficient to cause a rotation of the sleeve M⁶ and by means of gears O and O¹ the hand, and the contact O⁴. The hand, which was originally set at division 1-2, etc., now moves toward zero, and when the prepaid amount of energy has been consumed, the contact O⁴ will close the magnet circuit and the switch I will be released interrupting the meter and consumer's circuit.

What I claim as new and desire to secure by Letters Patent of the United States is,

1. In a coin-controlled electric meter mechanism, the combination of a motor mechanism driven by the current in the consumption circuit, and comprising coarse and fine wire windings, a switch for closing the circuit of the coarse and fine windings and also the consumption circuit, coin-controlled means regulating the operation of the switch, and a magnet controlled by the meter mechanism for causing the interruption of all of the said circuits including its own after a prepaid amount of energy has been consumed.

2. In a prepayment electric meter, the combination of an armature and field-magnet coil each in a separate circuit and acting together to register the consumption of energy in the circuit, a manually-actuated switch for closing the circuit of the consumer and also that of the armature and field-magnet coil, a magnet controlled by the meter mechanism for automatically opening all of said circuits including its own, and leaving the meter on the consumption side of the circuit, and a coin-controlled device which regulates the closing of the switch.

3. In a prepayment electric meter system, the combination of a meter mechanism responsive to the energy consumed in the circuit of the consumer, a manually-actuated device controlled by the insertion of a coin in the meter for closing the circuit of the meter and also of the consumer, and automatic means controlled by the meter mechanism, for interrupting the circuit of both meter and consumer, the said means remaining inoperative after so doing until the circuit is again closed after depositing a coin.

4. In a prepayment meter, the combination of a sliding piece adapted to be operated by an exterior handle upon the insertion of a coin or token, means operated by the sliding piece to permit the supply to the meter, a sleeve adapted to be rotated in one direction when the sliding piece is operated, and in the opposite direction by a movement of the meter mechanism, and means operated by the sleeve to close an electrical circuit when the sleeve returns to its normal position; and thereby cut off the supply until a coin or token is again inserted in the meter.

5. In a prepayment electric meter, the combination with the meter mechanism, of a main circuit and a derived local circuit, a coin-controlled device adapted on the insertion of a coin to separate two contacts in a local circuit a certain distance and simultaneously close the supply circuit through the meter, means operated by the meter mechanism for moving one of the contacts to establish electrical connection between them, and means operated by the local circuit to cut off further supply to the meter.

6. In a prepayment electric meter, the combination with a meter mechanism having a main circuit and a local circuit derived therefrom, of a contact device in the main circuit, a contact device in the local circuit, manually operated devices controlled by the insertion of a coin or token to simultaneously close the main circuit and break the local circuit, means operated by the working of the meter mechanism to close the local circuit, and means operated by the local circuit when closed to break the main circuit.

7. In a prepayment electric meter, the combination of a meter mechanism having a main circuit and a local circuit derived therefrom, with a switch in the main circuit normally open, a detent normally held in position to engage with the switch and hold it in its closed position, a contact device adapted to close the local circuit, manually actuated devices adapted on the insertion of a coin or token to simultaneously close the main circuit and break the local circuit, means operated by the working of the meter mechanism for closing the local circuit, and a magnet in the local circuit adapted upon the closing of the circuit to disengage the detent from the main circuit switch.

8. In a prepayment meter mechanism, the combination of a circuit, means responsive to the current flowing in the circuit for indicating the consumption of energy, a switch arranged to be manually closed, a coin controlled slide which engages with the switch and closes it, means for insuring a quick opening of the switch, and a magnet con-

trolled by the meter mechanism for releasing the switch, the circuit of the magnet being interrupted at the time the switch opens.

9. In a prepayment meter mechanism, the combination of a reciprocating coin slide, an armature, a registry train, a worm between the armature and the train, an indicating pointer having a slip joint with the armature and moved by the slide, and a magnet controlled by the pointer for opening the circuit.

10. In a prepayment meter, the combination of a vertical shaft, a worm thereon, a register train geared to the shaft through a slip joint, a coin controlled slide for advancing one portion of the train while the remainder is stationary, and a contact driven by the vertical shaft for closing an electric circuit.

11. In a prepayment mechanism, the combination of a reciprocating coin slide, an actuator extending parallel therewith, a forked arm carried by the actuator, and a pointer which is adjusted by the arm.

12. In combination, an electric circuit, translating devices located therein, means for connecting said circuit to a source of energy, said means comprising a switch, a meter for measuring the electric consumption in said circuit, a latch for holding said switch closed, electro-magnetic means for rendering said latch inoperative, comprising a circuit energized from said source and a switch controlling said circuit, coin-controlled means for closing the first switch, and means operated by the meter upon a predetermined consumption for closing the second switch.

13. In combination, an electric circuit, translating devices located therein, means for connecting said circuit to a source of energy, said means comprising a switch, a motor meter for measuring the electric consumption in said circuit, a latch for holding said switch closed, electro-magnetic means for rendering said latch inoperative, comprising a circuit energized from said source and a switch

controlling said circuit, an operating handle by which upon the insertion of a coin the first switch can be closed and the second opened, and means operated by the meter upon a predetermined consumption for closing the second switch.

14. In combination, a source of current supply, a consumption circuit, a meter for measuring the consumption in said consumption circuit, a switch for connecting said consumption circuit to said source, a local circuit derived from the said consumption circuit for controlling the opening of said switch, and coin controlled means for simultaneously closing said switch and opening said local circuit.

15. In combination, a source of current supply, a consumption circuit, a meter for measuring the consumption in such consumption circuit, a switch for connecting said consumption circuit in said source, a magnet for controlling the opening of said switch, a local circuit including said magnet and said switch so that when the consumption circuit is opened the local circuit is also opened, and a coin controlled means for closing said switch.

16. In a prepayment electric meter, the combination with a meter mechanism of a switch in the main circuit of the meter, manually-operated means controlled by the insertion of a coin or token to close said switch, an electro-magnet controlling the opening of said switch, and contacts controlling said magnet and controlled jointly by said manually-operated means and by the meter mechanism.

In witness whereof I have hereunto set my hand this 12th day of July, 1897.

FRANK P. COX.

Witnesses:

JOHN W. GIBBONEY,
HENRY O. WESTENDARP.