

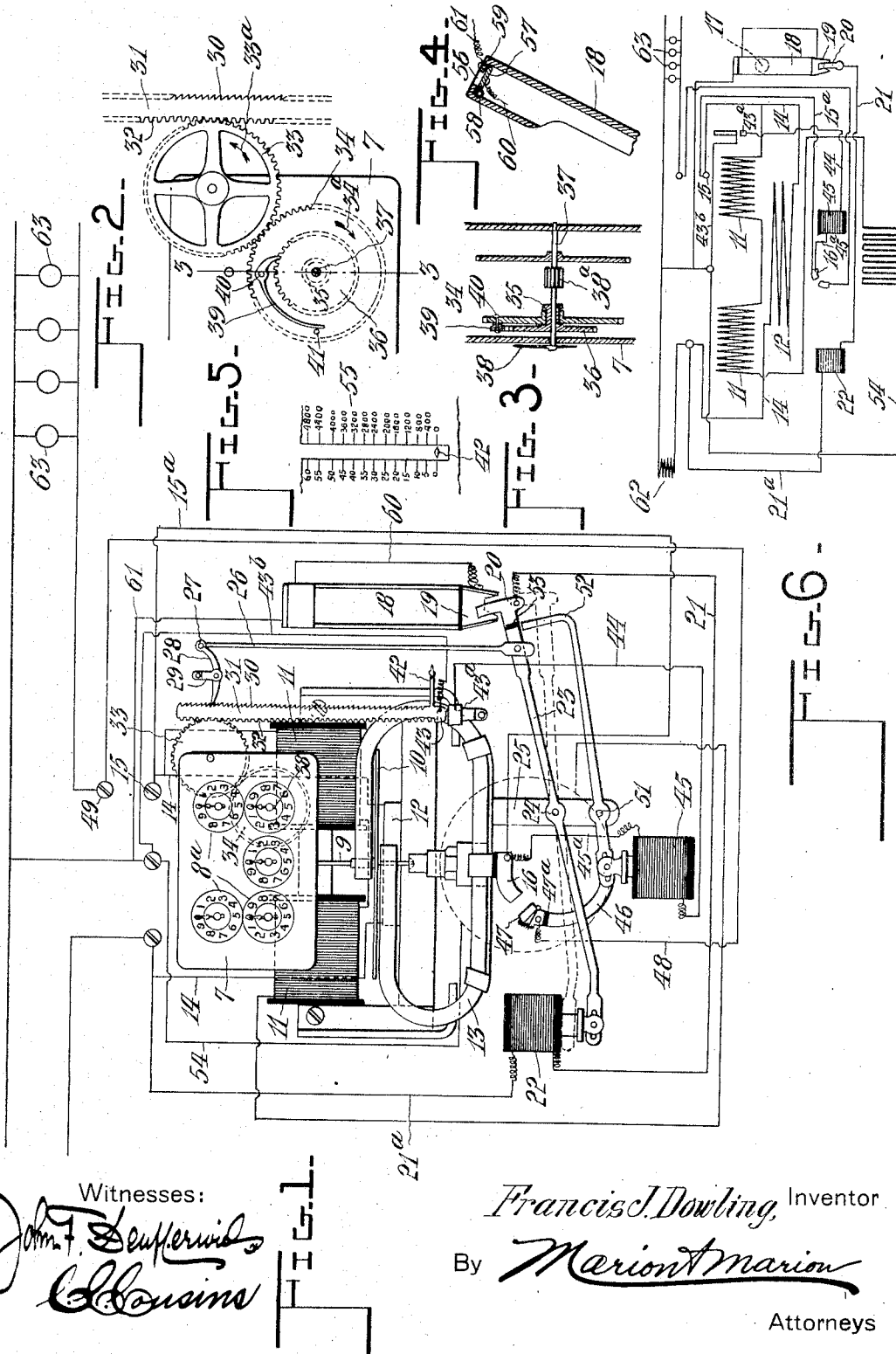
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F. J. DOWLING.

PREPAYMENT ATTACHMENT FOR ELECTRICITY METERS.

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# UNITED STATES PATENT OFFICE.

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## PREPAYMENT ATTACHMENT FOR ELECTRICITY-METERS.

No. 873,356.

Specification of Letters Patent.

Patented Dec. 10, 1907.

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*To all whom it may concern:*

Be it known that I, FRANCIS J. DOWLING, a subject of the King of England, residing at Montreal, Province of Quebec, Canada, have  
5 invented certain new and useful Improvements in Prepayment Attachments for Electricity-Meters; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will  
10 enable others skilled in the art to which it appertains to make and use the same.

My invention relates to prepayment meters for electricity; the object of my invention is to provide an efficient prepayment attachment easily applicable to common forms of watt meters now on the market; a further object of my invention is to provide means whereby the amount of money deposited may be indicated; a further object  
15 is to provide means whereby the equivalent of the deposit of money may be indicated in watt units, which watt units may be indicated as consumed so that the user may know at all times how many watt units he  
20 has left to be used; a further object is to provide means whereby the circuit through the meter will be broken by anyone tampering with the attachment of my invention; and, my invention consists of the construction, combination and arrangement of parts,  
25 as herein illustrated and described.

In the accompanying drawings, forming a part of this application, I have illustrated one form of embodiment of my invention, in  
35 which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a front elevation of an ordinary Westinghouse watt meter, showing the application of my invention; Fig. 2 is a fragmentary detail in plan, illustrating the actuating mechanism of my invention; Fig. 3 is a fragmentary detail in vertical section, taken on the line 3-3 of Fig. 2, and illustrating part of the actuating mechanism of my invention;  
40 Fig. 4 is a central vertical section through the upper end of the coin chute used in my invention; Fig. 5 is a fragmentary detail in plan, showing an arrangement of a scale adapted to be used on my invention; and,  
50 Fig. 6 is a diagrammatic view, illustrating the circuits in a watt meter with my invention attached thereto.

Referring to the drawings, 7 designates the dial plate of a common form of watt meter,  
55 the indicating members 8<sup>a</sup> thereof being actuated in the usual way by the shaft 9. It

will be understood that the several indicating members on the dial are connected therebelow by any usual form of mechanism, such as gear wheels. The shaft 9 is caused  
60 to rotate by the disk 10 thereon, which disk is actuated by the series coil 12 and the shunt coil 11, a common form of magnet 13 being used to retard the disk. A current is admitted to the meter over the wire 14 connecting with the series coil 12 which causes  
65 rotation of the disk 10 and the current passing through said wire is registered on the dial plate 7. From the series coil 12 the wire 14 is connected to the terminal 15, from  
70 which point it is usually connected to the lights, all of the foregoing mechanism being of the general character now in use.

In my invention, instead of carrying the current from the terminal 15 to the lights, I  
75 carry it over the wire 15<sup>a</sup> to a contact point 16, which forms one side of a switch which stands open (as indicated in full lines Fig. 1) previous to my attachment being put into use. A coin 17 is now inserted in the chute  
80 18, which is supported in any suitable manner adjacent one side of the meter box and said coin is forced against a contact 19 fixed to the lower end of the chute. When the coin reaches this position it strikes against  
85 the contact 20 forming a circuit with the contact 19, which is energized by a circuit hereinafter described. Leading from the contact 20 is a wire 21 leading into one side of electro magnet 22, a wire 21<sup>a</sup> being  
90 connected to the other side of said electro magnet to complete the circuit. When the coin completes the circuit the electro magnet 22 is energized and actuates the lever 23 to the position shown in dotted lines in Fig. 1, the  
95 said lever being pivoted as at 24 to a support 25 secured to the rear casing of the meter.

To the end of the lever 23 opposite the electro magnet 22, is pivotally connected a link 26, pivoted at its upper end 27 to a bent  
100 lever 28, which lever is pivoted to a bracket 29, secured on the meter casing in any convenient way. The free end of the bent lever 28 is in engagement with the teeth 30 of a rack-bar 31, the opposite edge of which is  
105 also provided with teeth 32, and the said rack bar is slidably supported on the meter casing in any suitable way. When the lever 23 is actuated by the means described, the link 26 will be carried downward, actuating  
110 the free end of the lever 28 upward, which free end is in engagement with said rack-bar

31 and which will be actuated upward thereby.

The teeth 32 of the rack bar 31 are in engagement with a gear 33, rotatably supported on the meter casing below the dial plate 7, which gear is in mesh with a gear 34 rotatably mounted on a pushing 35 secured to a gear 36 which is mounted on an arbor 37 which carries the pointer 38 of one of the indicating members on the dial plate 7, which is adapted to be actuated by the pinion 38<sup>a</sup> from the shaft 9, already described. The gear 34 has a detent 39 pivoted thereto as at 40, the opposite end of said detent thrusting against a stud 41 secured to said gear 34. The lower end of the rack bar 31 is provided with a pointer 42 which coincides with a scale, hereinafter described, as the rack bar is actuated upwards by the means already described, said movement upward of the said rack bar causing rotation of the gear 33 to the left as indicated by the arrow 33<sup>a</sup>, which movement is communicated to the gear 34, causing rotation thereof to the right, as indicated by the arrow 34<sup>a</sup>. Movement in this direction is readily permitted by the teeth of the gear 36 slipping over the detent 39 and movement in the opposite direction is prevented by the detent engaging the teeth of the gear 36. As the arbor 37 is rotated by the passage of the current of electricity the gears 34 and 33 will be rotated in a direction opposite to that described and the rack bar 31 will be actuated downward. As the rack bar 31 is actuated downward, by the means described, the pointer 42 will indicate on the right hand side of the scale, hereinafter described, the number of watt units which the consumer still has to use and also indicate the equivalent deposit of money made.

The lower end of the rack-bar 31 is provided with a contact 43, to which is connected a wire 43<sup>b</sup> making a circuit with the shunt current wire. Disposed adjacent the lowest point of travel of the contact 43 is a fixed contact 43<sup>a</sup>, so arranged that when the rack bar has been actuated to its lowest point by the means described a circuit between the contacts 43 and 43<sup>a</sup> will be made. From the contact 43<sup>a</sup> a wire 44 is connected to an electro magnet 45, adapted to actuate downward the end 46 of a lever bearing on its end a pivoted spring controlled contact 47, so that it will strike against the contact 16, hereinbefore described, suitable insulation 47<sup>a</sup> being used to separate the contact 47 and the lever 46. The contact 47 is connected to wire 48 leading to the terminal 49 and from thence to the lights. The lever 46, just described, is pivoted at 51 to the support 25, hereinbefore described, and its free end is provided with a bent portion 52 adapted to bear against the lever 23, suitable insulation 53 being used to separate the said

levers and to separate the contact 20 and the lever 23. The circuit having been made by the coin 17, as hereinbefore described, the current passing over the wire 21 to the electro magnet 22 will be energized and will actuate the lever 23 upward forcing its right hand end, downwards which strikes against the bent portion 52 of the lever 46, the end 46 moving upward and causing the parts 47 and 16 to contact and close the circuit and the current will flow through the wire 48 on to the lights as described. As the current passes through the meter it will cause rotation of the gears 33 and 34 as described and the consequent descent of the rack bar 31. When the rack bar 31 reaches its lowest position (as shown in full lines Fig. 1) the circuit will be closed by the contacts 43, 43<sup>a</sup> and the current carried over the wire 44 will energize the electro magnet 45, which will actuate the lever 46 downward and thereby breaking the contact of the parts 47 and 16, and at the same time forcing the bent portion 52 of the lever 46 against the right hand end of the lever 23, so that the contact 20 is carried to a position adjacent the contact 19 on the lower end of the chute 18 (as shown in full lines Fig. 1). The circuit through the electro magnet 45 is completed by the wire 45<sup>a</sup> which is carried over and connected to the binding post on the contact 16. The shunt circuit is brought into the meter through the wire 54 in the usual way and after passing through the meter is carried out at a point adjacent the terminal 15, already described.

The graduations 55 (Fig. 5) are disposed at any convenient point over or under the pointer 42. The chute 18 is of a size to receive a coin of the size of a quarter, and when that coin is deposited and the mechanism actuated as described the pointer will be at a point opposite the "25" on the left hand of the graduation, the equivalent thereof in watt units being 2,000. As the pointer is actuated downwards, the consumer will always know exactly how many more watt units he has to consume before depositing any more money.

The upper end of the chute 18 is provided with a slot 56, which is closed by a door 57 having a spring hinge 58 adapted to keep it normally closed. The edge 59 of the slot 56 is made a contact point connected by a wire 60 to the contact 19. A wire 61 connects the door with the shunt circuit, so that the circuit is normally closed. In the event of someone tampering with the door 57 by the insertion of an improper coin or token the circuit will be broken, and if the coin is smaller than the required denomination it will drop to the bottom of the meter casing without making the proper contact. Or if it does make the proper contact the mechanism on the dial plate 7 registers the number of watt units which pass through the meter

and a wrong amount of money in the meter will be discovered. But this may be mainly avoided by having the slot 56, the chute 18 and the contact 19 of the proper dimensions.

5 Any coin inserted through the slot 56 will be prevented from returning by the spring pressed door 57.

In Fig. 6, 62 is an ordinary transformer, and in this figure and in Fig. 1, the lights  
10 are designated by the number 63.

In the operation of the invention, as described, it will be understood that after the contact is made by the deposit of the coin the electro magnet 22 will actuate the lever  
15 upward, which will cause the contact of the parts 16 and 47, the coin will drop into the lower part of the meter casing. After the coin drops the electro magnet 22 will be deenergized by the breaking of the circuit,  
20 which was made by the coin, and the lever 23 will be free to drop by gravity to the position shown in full lines in Fig. 1. However the lever 46 will be retained in its position until the contact of its end 47 with the part  
25 16 is broken by the circuit herein described, when its bent end 52 will again force the right hand end of the lever 23 to the position shown in dotted lines in Fig. 1.

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

1. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a switch in the connection leading from the meter, a chute disposed adjacent to the meter, a contact on the chute, electrical connections to the contact, and a lever provided with a contact adjacent to the chute and adapted to close the switch when the space between the chute and the lever is bridged, and electrically actuated means for opening the switch.

2. In combination with an electricity  
45 meter having electrical actuating means and rotatable indicating means, a prepayment attachment comprising a switch in the connection leading from the meter, a chute disposed adjacent to the meter, a spring-pressed  
50 slotted closure for the chute, a contact on the chute, a lever pivoted adjacent to the chute and adapted to close the switch, and electrically actuated means for opening the switch.

3. In combination with an electricity  
55 meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a switch in the connection leading from the meter, a chute disposed adjacent to the meter, a hinged slotted closure disposed on the chute, an electrical connection from the source of electricity to said closure, a connection from the closure to the switch, whereby the switch  
60 may be rendered inoperative by opening the

closure, and electrically actuated means for opening the switch.

4. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a switch in the connection leading from the meter, a chute disposed adjacent to the meter and in electrical connection therewith, a lever pivoted adjacent to the end of the chute and  
75 adapted to close the switch, and an electro magnet and connections adapted to actuate the lever to open the switch.

5. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a switch in the connection leading from the meter, a bent lever supporting the switch, a chute disposed adjacent to the meter and in electrical connection therewith, a lever pivoted above the bent lever and terminating adjacent to the end of the chute and adapted to close the switch, and an electro magnet and connections adapted to actuate the bent  
90 lever to open the switch.

6. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotally supported switch on the connection leading from the meter, electrical means for closing the switch by the deposit of a coin, a gear driven by the indicating means, a rack bar in mesh with the gear, a contact on the rack  
100 bar, a second contact adjacent thereto, an electro magnet connected to the pivotal support of the switch, and a connection between said second contact and the electro magnet.

7. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotally supported switch on the connection leading from the meter, a rack bar adapted to be actuated in one direction by the indicating means, means for actuating the rack bar in an opposite direction when the switch is closed, and means connecting with the rack bar for opening the switch.  
115

8. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotally supported switch on the connection leading from the meter, a rack bar adapted to be actuated downward by the indicating means, means for actuating the rack bar in an opposite direction when the switch is closed, and means connecting with the rack bar for opening the switch, a pointer on the rack bar, a scale disposed adjacent to the path of movement of the pointer and provided with characters indicating the deposit of a coin and its equivalent of electrical current.  
120 125 130

9. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotal support, a switch on the support, means for actuating the support in one direction, means for actuating the support in an opposite direction, a rack bar adapted to be actuated in one direction by the indicating means, and means for actuating the rack bar in an opposite direction.

10. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotal support, a switch on the support, means for actuating the support in one direction, means for actuating the support in an opposite direction, a rack bar adapted to be actuated in one direction by the indicating means, and means connecting with said support for actuating the rack bar in an opposite direction.

11. In combination with an electricity meter having electrical actuating connections and rotatable indicating means, a prepayment attachment comprising a pivotal support a switch on the support, means for actuating the support in one direction, means for actuating the support in an opposite direction, a rack bar adapted to be actuated in one direction by the indicating means, and means for actuating the rack bar in an opposite direction comprising a link connected to said pivotal support and a pawl connected with the link and in mesh with the rack bar.

12. In a device of the class described, the combination of a switch, coin actuated means for closing said switch and registering the de-

posit of a coin, switch opening means actuated by the coin registering means, and a signal circuit closed by the coin registering means prior to the opening of the switch.

13. In a prepayment attachment for electric meters, a switch, means for opening and closing said switch, a coin registering bar, a pawl for lifting said bar, coin controlled electric means for actuating said pawl, and means carried by said bar for closing the circuit of the switch opening means.

14. In a prepayment attachment for electric meters, the combination of a switch, means for opening and closing said switch, a toothed rack cooperating with the gear train of the meter, a pawl adapted to raise said rack, coin controlled electric means for actuating said pawl, and means carried by said rack for actuating the switch opening means.

15. In a prepayment attachment for electric meters, the combination of a switch, means for opening and closing said switch, a coin registering bar, a click bearing gear wheel meshing with said bar, a pawl for raising said bar, a coin controlled electric means for actuating said pawl, means for actuating said gear wheel to lower said bar, means carried by said bar for closing the circuit of the switch opening means, and means carried by said bar for closing the signal circuit prior to the opening of the switch.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRANCIS J. DOWLING.

Witnesses:

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