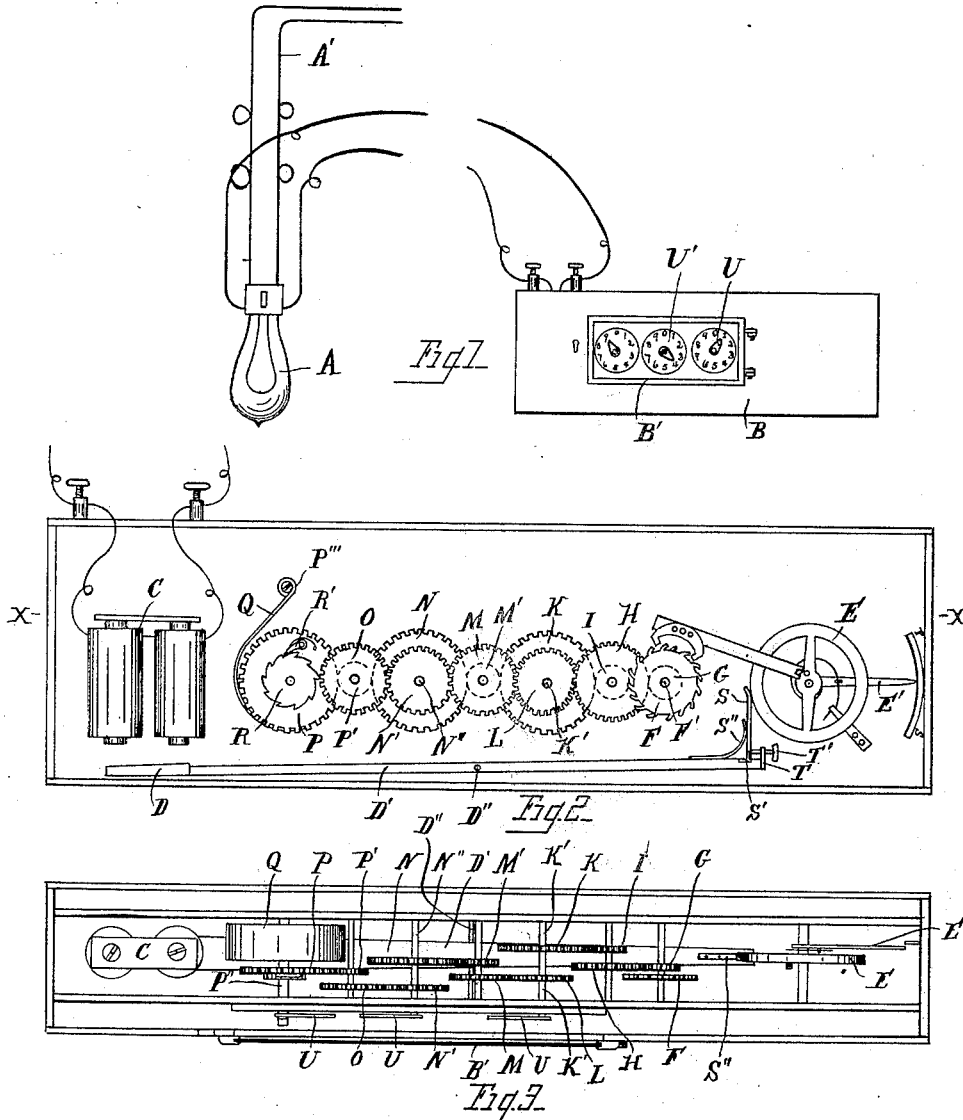


(No Model.)

C. A. PRATT.  
ELECTRIC METER.

No. 418,472.

Patented Dec. 31, 1889.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES A. PRATT, OF TOLEDO, OHIO.

## ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 418,472, dated December 31, 1889.

Application filed October 18, 1889. Serial No. 327,456. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. PRATT, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in a Mechanical Meter for Electric Lights and Power; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to a mechanical meter for electric lights and power, and has for its object to provide a meter that shall correctly indicate the exact time the light or power has been used.

It is the object of my invention to employ a mechanical meter which shall be operated by a very small portion of the whole current employed in lighting or in running a motor.

Another object is to provide an electro-magnet the armature of which shall be the direct means of starting or stopping the meter when the switch is closed or opened.

Another object is to provide a brake that shall, when the circuit to the lamp or motor is closed, start the meter mechanism, and when open stop the mechanism.

In the drawings, Figure 1 is an elevation of the lamp and meter, the circuit and meter wire being shown. Fig. 2 is a longitudinal section of the meter, showing the interior arrangement of mechanism. Fig. 3 is a plan view of the meter on lines *x x*, Fig. 2, the lever of the escapement being omitted to disclose the parts.

A designates the lamp, of the ordinary construction, the circuit-wires A' being connected to the same in the usual manner.

B designates the meter, provided with the door B', by which access is gained to the mechanism in the winding or resetting of the same.

C designates an electro-magnet, the negative and positive wires of the same being connected to the negative and positive wires of the circuit-wires below the switch, it being understood that the switch is of the ordinary con-

struction. The armature of the magnet D is integral with a lever D' at one end, the opposite end of which is the brake mechanism which operates on the balance-wheel E. Lever D', being pivoted at D'', allows the same a pivotal movement by which to operate the brake, as will be more fully described.

F designates the escapement-wheel, which revolves once a minute by reason of the balance-wheel E, the movement of which is regulated by the regulator E'. It will be understood that the lever escapement and regulator are of the ordinary construction employed in clocks, &c. Escapement-wheel F, being secured to journal F', will cause the cogged pinion G to revolve with like rapidity—i. e., once a minute. Pinion G intermeshes with pinion H, and, having one-sixth as many cogs as H, will cause pinion H to revolve one-sixth as fast, or once in six minutes.

I designates a pinion keyed on the same journal with pinion H, which intermeshes with pinion K on shaft K'. Pinion I, revolving the same as pinion H, or once in six minutes, and intermeshing with pinion K, which has ten times as many cogs, will cause pinion K to revolve once in sixty minutes, or once an hour.

To cause the revolution of pinion N to be in the same direction of pinion K, I employ the idler M, which, being of the same size as a pinion L upon shaft K, will not increase or diminish the revolution, but will cause pinion N, which intermeshes with pinion M', to revolve in the same direction with pinion K. Pinion N, having ten times as many cogs as M', will revolve once in ten hours. Pinions N' and O, acting as idlers, and pinion P, having ten times as many cogs as pinion P', will cause pinion P to revolve in the same direction as pinions K and N, and once in one hundred hours.

The gearing just described is operated by the mainspring Q, one end being made fast to the shaft P'', the opposite end to a stud P''', which is permanently fixed between the sides of the frame. Ratchet-wheel R, being secured to shaft P'', and pawl R', being pivoted to wheel P, (which is loose on the shaft,) will cause the spring when it is wound up to be held in that position by reason of the pawl

engaging with the ratchet-wheel. This being the ordinary construction needs no further description.

I will now proceed to describe my peculiar  
5 brake and starting mechanism. S is the brake-shoe hinged to lever D at S', and is held against the balance-wheel by spring S''. To regulate the bearing of the shoe on the wheel, I have provided a standard T on the end of  
10 lever D, through which is secured a set-screw T'. In operation the current, being short-circuited by the turning of the switch, will cut off the current through the meter-wires, thereby demagnetizing the core, causing the  
15 armature D to fall, which, being of metal, will act as a weight to raise the opposite end of the lever and apply the brake, stopping the mechanism. When the switch is again turned, the energy of the current will cause incandescence of the carbon filament within the  
20 globe, and will also make a current to the magnet magnetizing the core. It will be seen that the magnet being magnetized will attract the armature and cause the brake to fall below the point of contact with the balance-wheel, thereby allowing the same to revolve through the medium of the spring and intermediate train of gearing. As has been described, the wheels P, (through the medium of  
25 pawl-and-ratchet wheel R,) N, and K, revolving with journals P'', N'', and K', will cause the pointers U on the outer ends thereof to revolve in front of dials U', upon which are numbers 0 to 9, respectively.

35 To ascertain the number of hours a light has been used, the pointer on journal K', making a revolution once an hour, and the pointer on journal N'' once in ten hours, and pointer P'' once in one hundred hours, it is  
40 only necessary to count the number of hours, and charge for the light can then be made by the hour.

It will be seen that the device is accurate, being worked with clock-work regularity, with  
45 a regulator to adjust the escapement if fast or slow, and as it is designed that the time each measure of the meter is taken shall be once a month, or seven hundred and forty-four hours, the one-hundred-hour pointer will  
50 only be required to make seven and forty-four one-hundredths revolutions, thereby only requiring a spring of usual clock form.

By the foregoing it will be seen that the device is inexpensive, thereby allowing for  
55 the use of one for every light, if necessary. It will also be seen that the device is effective in operation, and that when the electro-magnet is energized, thereby attracting the armature, it lowers the brake, which in the act of  
60 lowering moves in the arc of a circle, thereby

causing a partial revolution of the balance-wheel and starting the meter mechanism.

To reset the meter in commencing upon a new month, the hands are turned back, they being frictionally mounted on their journals, 65 and the meter is wound up by applying a key on the squared end of axis P''.

While I have described my invention as particularly applicable to incandescent lights, it is equally well adapted to arc lights or for 70 indicating the time the current is employed in actuating an electric motor, in which instance the negative and positive wires of the electro-magnet are connected with the main circuit between the switch and the motor. 75 The adaptation being so apparent, it is not deemed necessary to further illustrate the same.

Having described my invention, what I claim as new, and desire to secure by Letters 80 Patent, is—

1. In an electric meter, the combination, with an electro-magnet and its armature, of a lever integral at one end with said armature, and a spring-actuated brake-shoe hinged to 85 the opposite end of the lever and adapted to frictionally bear upon the periphery of the balance-wheel of the escapement mechanism, substantially as shown and described.

2. In an electric meter, the combination, 90 with a train of gearing, escapement mechanism, and balance-wheel, of an electro-magnet, a lever pivoted beneath the said magnet, an armature connected to one end of the lever, and an adjustable spring-actuated brake- 95 shoe hinged to the opposite end of the lever adapted to frictionally bear upon the periphery of the balance-wheel, whereby when the current is made the brake-shoe in being released will start the balance-wheel, sub- 100 stantially as shown and described.

3. In an electric meter, the combination, with a train of gearing, escapement mechanism, balance-wheel, and indicators, of an 105 electro-magnet, a lever having an armature connected to one end and a brake-shoe hinged to the other end adapted to bear upon the periphery of the balance-wheel, the spring bearing upon said brake-shoe to press the same against the wheel, the post secured to the end 110 of the lever, and set-screw working therein to adjust the brake-shoe, substantially as shown and described.

In testimony that I claim the foregoing as my own I hereby affix my signature in pres- 115 ence of two witnesses.

CHARLES A. PRATT.

Witnesses:

CHAUNCEY HUMMEL,  
THOMAS CAVANAUGH.