No. 657,983. Patented Sept. 18, 1900.

J. HARRIS.

ELECTRIC METER.

(Application filed July 5, 1899.)

(No Model.) 2 Sheets—Sheet 1.

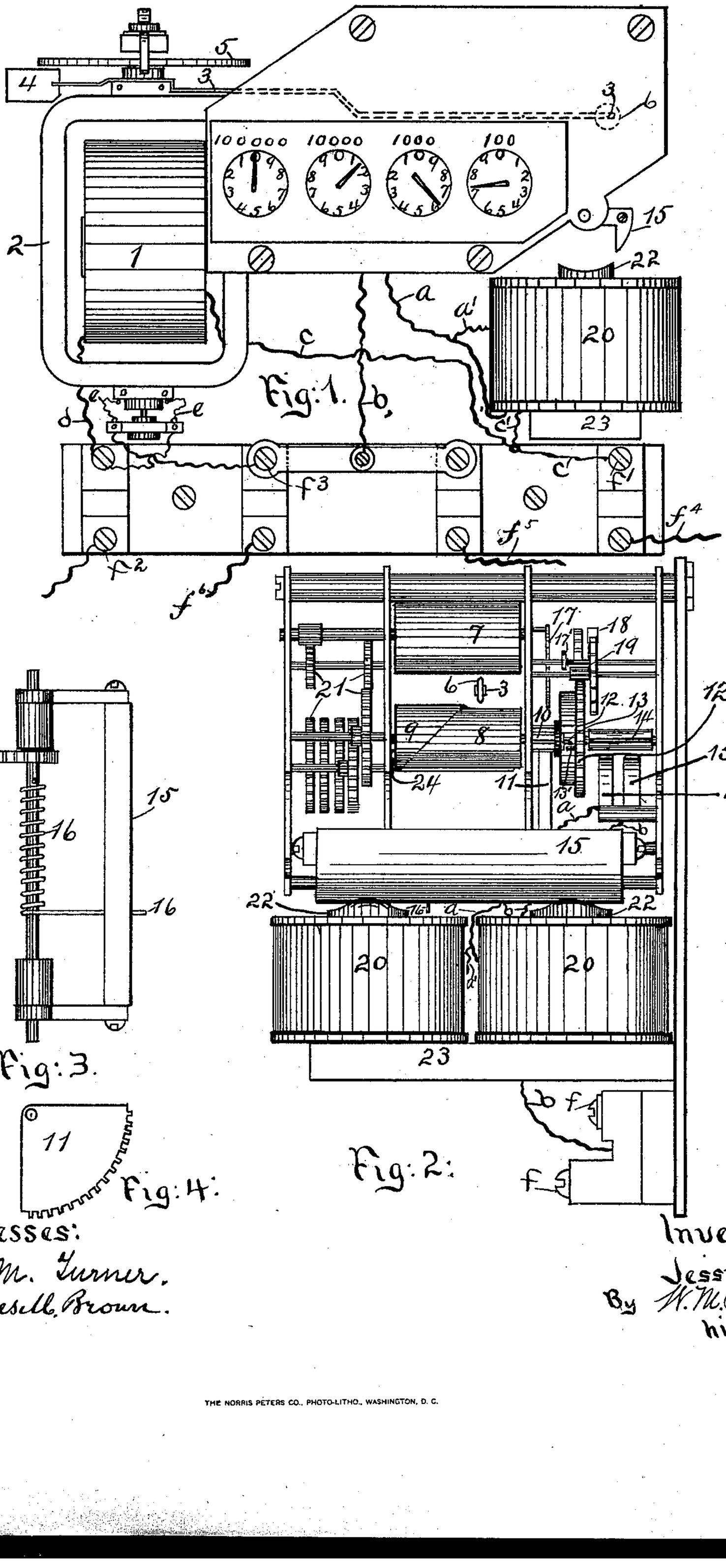

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses:
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James H. Brown.

Inventor:
Jesse Harris.
By W. M. Brown
his Atty.

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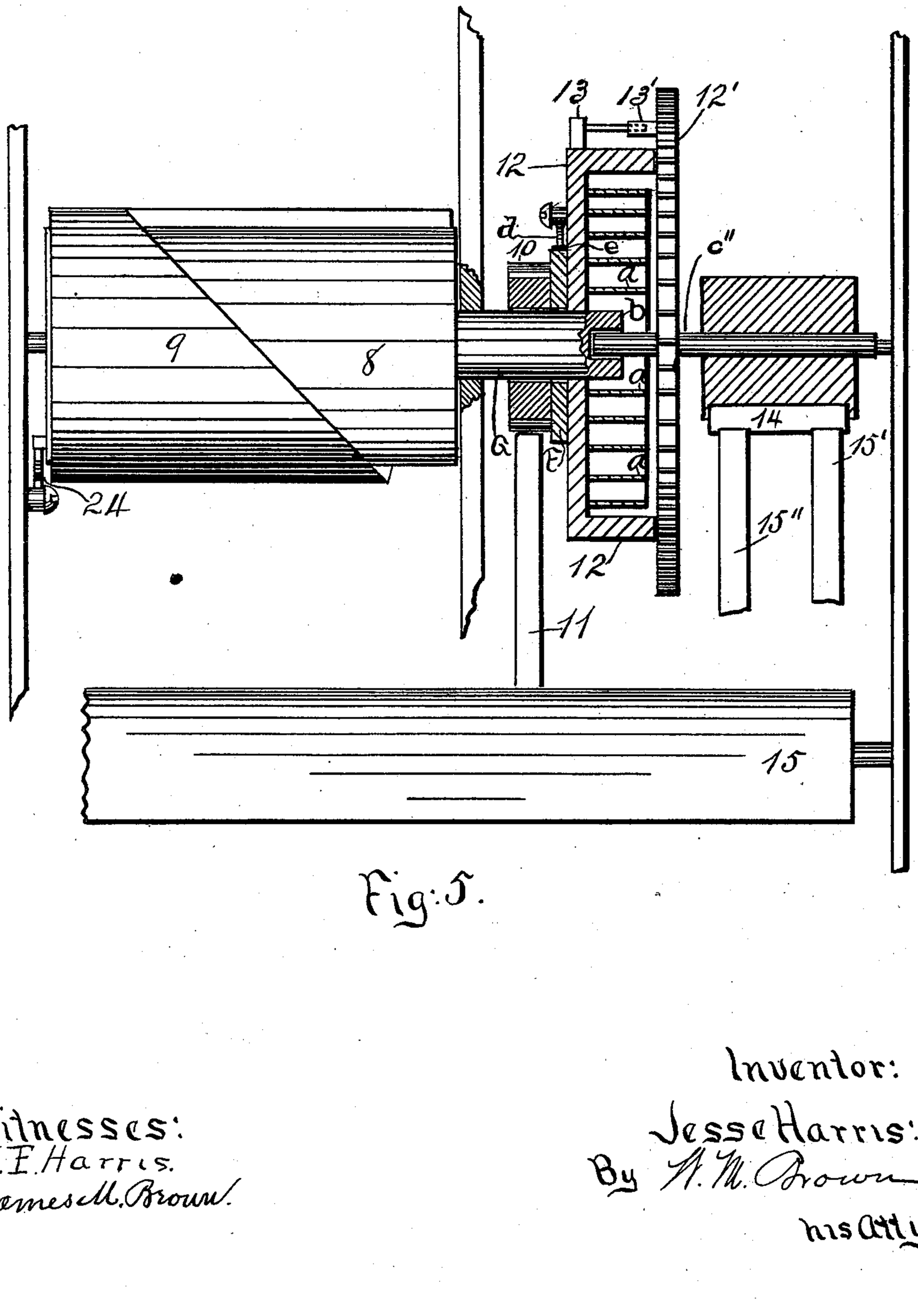

Fig. 5.

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UNITED STATES PATENT OFFICE.

JESSE HARRIS, OF LYNN, MASSACHUSETTS.

ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 657,983, dated September 18, 1900.

Application filed July 5, 1899. Serial No. 722,889. (No model.)

To all whom it may concern:

Be it known that I, JESSE HARRIS, a citizen of the United States, residing at Lynn, Massachusetts, have invented certain new and useful Improvements in Electric Meters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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 and figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a new and improved electric meter.

In the drawings, Figure 1 shows a plan view of my meter; Fig. 2, a side elevation thereof; Fig. 3, a plan of the armature and its parts; Fig. 4, a plan of the toothed segment used in winding the clockwork; and Fig. 5, a side elevation, shown partly in longitudinal section, of the driving mechanism of the clockwork employed.

In the drawings, the numeral 1 shows the current-coil of the dynamometer, and 2 the pressure-coil, the pressure-coil being arranged pivotally to move against the resilience of the spring 5 as the current flows through elements 1 and 2. To the pressure-coil is affixed the arm 3, having the counterweight 4 at one end and the transmitting-wheel 6 at the other, said wheel 6 being arranged to move longitudinally between rollers 7 and 8 (see Fig. 2) and to communicate motion to roller 7 whenever the torque of the coil 2 swings the wheel longitudinally and the raised surface of the roller 8 (seen at 9) comes in contact with said wheel, the motion thus given roller 7 being communicated to the counting-train 21 and to the pointers on the face of the dial. The roller 8 has a portion of its surface raised, as seen at 9, by wrapping a strip about the roller, preferably, and intermittent motion is communicated to roller 8 by means of the pinion 10 as follows:

12 is a drum containing the mainspring *a* of the clockwork shown. The mainspring *a* is attached at one of its ends to the driving-wheel 12′ and at the other to the interior surface of the drum, preferably, practically as is the mainspring of a clock or watch.

15 is an armature caused to partly rotate or swing whenever the current flows through electromagnets 20 20, and as it rotates or swings it carries toothed segment 11 with it, the teeth of which, meshing with the basket-pinion 10, revolve that pinion rearward. Pinion 10 and plate F are made fast to each other or made to move in unison, and pawl *d* on drum 12 rests on catch *e*, so that when pinion 10 is revolved plate F and drum 12 also revolve, all being loose on journal G. On drum 12 is a stop 13, and a stud 13′ is seen on wheel 12′, and when pinion 10, plate F, and drum 12 revolve (they make but one complete revolution at each winding) the stop 13 also revolves until it presents itself to the opposite side of the stud 13′ from that shown as its position in Fig. 5, the driving-wheel 12′ remaining stationary during the travel of the stop 13, and this is accomplished by journal *c*″ being entered in and free to revolve in a boring in the end of the journal G. When stop 13 has revolved one revolution, and thus wound the spring *a*, pinion 10 being free to revolve about journal G, the spring 16 (see Fig. 3) throws toothed segment 11 to its normal position, carrying pinion 10 with it—*i. e.*, revolves pinion 10 backward. When pinion 10, plate F, and drum 12 are revolved in the act of winding spring *a*, roller 8 also revolves with them, making one complete revolution, roller 8 being only revolved when the spring is wound up, standing stationary at all other times. The dog 24 catches on a stop on the end of roller 8 and prevents the spring *a*, drum 12, and plate F from revolving backward, and thus allowing of driving-wheel 12′ receiving the force of said spring with which to run the clockwork. When driving-wheel 12′ revolves, it carries stud 13′ around until it strikes against stop 13 and the clock must stop; but so long as a current is passing through the line the clock will not stop, as at the instant stud 13′ reaches stop 13 the brushes 15′ and 15″ have met contact-piece 14, which revolves in unison with driving-wheel 12′, and the current is caused to pass into the electromagnets 20 20, which draws armature 15 to the magnets and causes it to partly revolve or swing, when the winding operation is again repeated, as above described, and stop 13 is carried away from stud 13′, which allows the driving-wheel to continue running. If the current

is cut off the line at any time, no matter at what point driving-wheel 12′ and stud 13′ may be, the clockwork will continue to run until stop 13 and stud 13′ again meet, at which time brushes 15′ and 15″ will be in contact with contact-piece 14, and therefore when the current is again turned on the clockwork is ready to instantly be wound and set going.

The operation is as follows: The current enters at f^2, passes through current-coil of dynamometer 1 by wire d and by wire c to f', thence to the lamps or other transmitting devices through f^4, returning by f^5 through f^3 and then through wire f^6 to generator. The pressure-coil is connected in shunt across the line by means of wires e e, which are connected to binding-posts f^2 and f^3. These circuits constitute the circuit for the dynamometer which indicates the watts in the circuit. The electromagnet which operates the clockwork is operated by a circuit placed in shunt across the line and starts from wire c, then through c' to coil 20, and by a' and a to the brush 15″, and then across contact-piece 14 when said contact-piece 14 is in contact with the brushes to 15, and by wire b to f^3 and wires d and c and post f'. The current for potential coil is completed through f^2, e e, and f^3. When the current passes through the dynamometer consisting of elements 1, 2, and 5, a torque is produced, deflecting arm 3 in extent determined by the resilience of spring 5, and carries transmitting-wheel 6 longitudinally between the rollers 7 and 8. When the current is completed by contact-piece 14 coming in contact with brushes 15′ and 15″, armature 15 is attracted by electromagnets 20 20 and is caused to swing across the faces of poles 22 22 against the resilience of spring 16, and this motion of armature 15 causes toothed segment 11 to rotate pinion 10, and the clockwork is wound, as has been fully described hereinbefore, the clockwork running until the driving-wheel 12′ makes one revolution, when contact 14 and brushes 15′ and 15″ meet, when the clockwork is again wound, revolving roller 8 one revolution. As roller 8 is thus revolved one revolution on each winding of the clock, which is preferably wound once in every sixty seconds, it rotates transmission-wheel 6, which rotates roller 7, which gives motion to the counting-train 21 and the pointers on the face of the dial, and therefore this meter operates its recording mechanism but once in sixty seconds of time, preferably. By properly adjusting and calibrating it a watt-hour meter is produced.

Having fully described my invention, what I claim is—

1. An electric meter having a source of power consisting of an electromagnet and a clockwork; the electromagnet being arranged to receive initial power intermittently and to intermittently wind the clockwork; the clockwork being arranged to complete an electric current whereby the electromagnet is energized, the meter also having a registering-train and an indicating device, the registering-train being arranged to intermittently receive motion from the transmitting device, and the transmitting device arranged to receive motion from the electromagnet and communicate said motion to the registering-train and indicating device substantially as described.

2. In an electric meter a dynamometer and an arm arranged to be swung or moved by the torque of the coil, said arm carrying a transmission-wheel and having a plurality of rollers, one of them having an irregular surface between which the transmission-roller lies and moves horizontally along the surface of the rollers and communicates motion to one of said rollers, said roller so receiving motion being in operative connection with a train of gearing operating pointers on the face of a dial, the rollers arranged to receive motion from an electromagnet arranged to operate intermittently, said electromagnet being in operative connection with a clockwork and arranged to wind the same intermittently, said clockwork being arranged to carry a movable contact-piece and bring it in electrical connection at predetermined times with electrodes said electrodes being in operative connection with a source of electric power and arranged to energize the electromagnet when in contact with the contact-piece substantially as described.

3. In an electric meter an indicating-train and a transmitting device in operative connection, and an electromagnet and a clockwork, the transmitting device consisting of a wheel and a plurality of rollers arranged to operate by surface contact one roller being operatively connected with the electromagnet the clockwork being arranged to complete an electric circuit intermittently and to intermittently energize the electromagnet, the said magnet being arranged to intermittently wind the clockwork substantially as described.

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

JESSE HARRIS.

Witnesses:
WM. BROWN,
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