

No. 669,310.

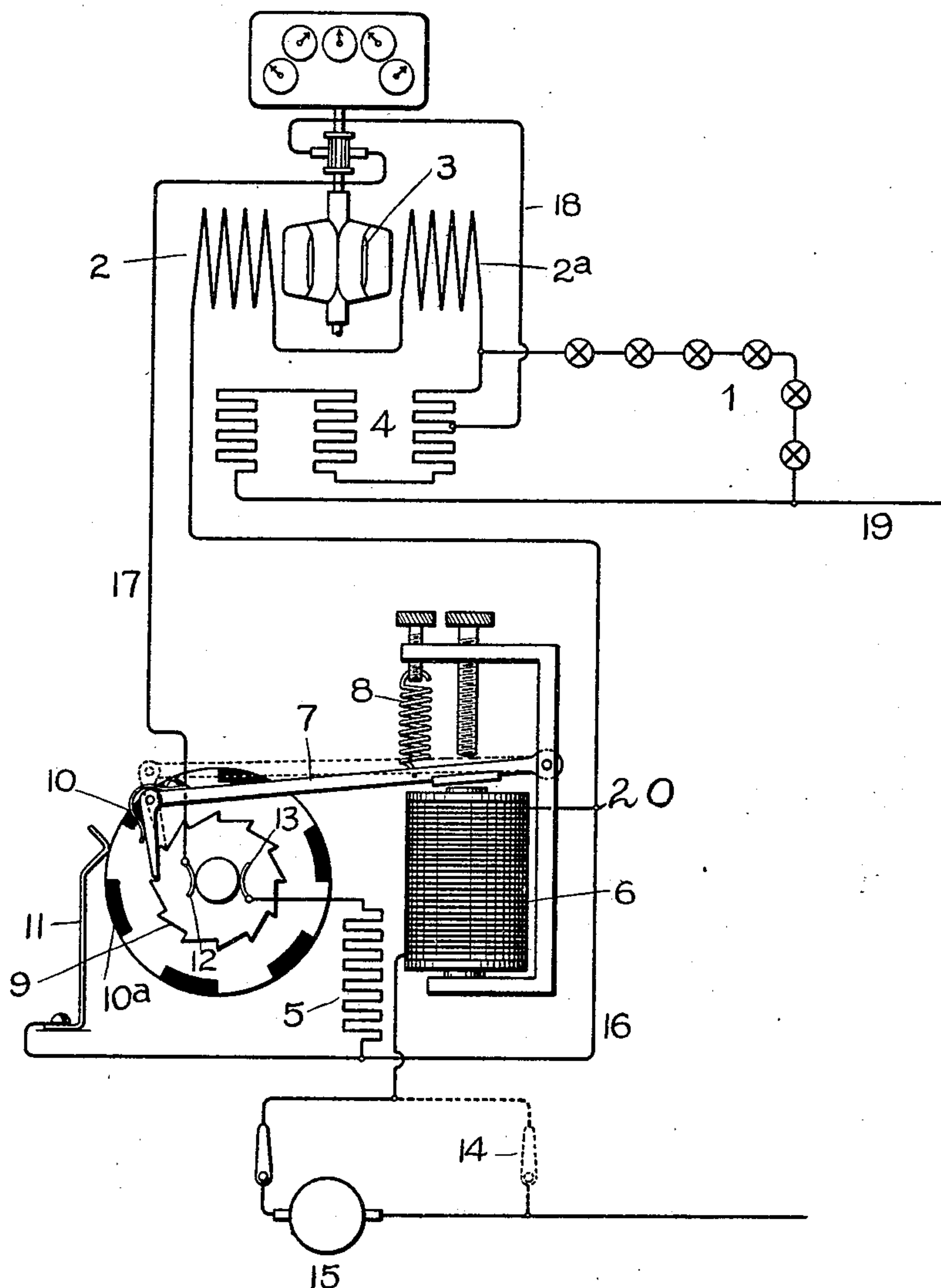
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E. OXLEY.

ELECTRIC METERING SYSTEM.

(Application filed Oct. 12, 1899.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC METERING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 669,310, dated March 5, 1901.

Application filed October 12, 1899. Serial No. 733,355. (No model.)

To all whom it may concern:

Be it known that I, EUSTACE OXLEY, a subject of the Queen of Great Britain, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electric Metering Systems, (Case No. 1,230,) of which the following is a specification.

The object of this invention is to provide a meter for arc-light circuits capable of recording at a plurality of rates. The advantages of such a meter are those incident to all multirate meters—viz., inducing the consumer to use current more freely during periods of light load.

In carrying out the invention I provide a meter at the consumer's station the recording element of which is in a shunt-circuit, where a meter-motor is employed to operate a recording device. One of the operative circuits of the motor is placed in series relation to the circuits of the arc-lamps or other constant-current translating devices and the other operative circuit in a shunt to the translating devices, or part of them, where of uniform consuming power, said shunt including means for cutting down the potential of the motor during periods of light load, according to the discount allowed for service during such periods. As a means of controlling this change of potential I provide a step-by-step device at the consumer's station, controlled by an electromagnet operated by a change of the circuit at a desired controlling-point, such as the supply-station. I prefer to establish such control by providing a temporary short circuit for the machine, and thereby deenergizing the controlling-magnet inserted at the consumer's station in the main circuit. The changes of position of the armature of the controlling-magnet operate the step-by-step device and successively cut in or out the device which varies the recording rate of the meter.

The several features of novelty will be more fully hereinafter described and will be definitely indicated in the claims.

In the accompanying drawing, which diagrammatically illustrates my invention, 1 represents a group of arc-lamps installed at a consumer's station, in series relation to which

is the field-magnet winding 2 of a meter-motor.

No special type of motor is essential to my invention. I have, however, shown the well-known Thomson recording-wattmeter type, in which an armature 3 operates a counting-train and shows upon a dial the number of units of energy used in the consumption-circuit. The armature is included in a shunt to the group of lamps, including a fixed resistance 4. An auxiliary resistance 5 may be cut into or out of this shunt, accordingly as it is desired to operate the meter at a high or low rate. Various ways of effecting this result will occur to those skilled in the art. That shown comprises a device for periodically short-circuiting the auxiliary resistance 5, the operating device consisting of an electromagnet 6, included in the main circuit and normally holding its armature 7 in an attracted position against the tension of the retractile spring 8. The armature operates by means of a pawl upon a ratchet-wheel 9, to the shaft of which is fixed a disk of conducting material having a series of equidistantly-spaced insulating-spots 10, &c., and a contact-spring 11, so arranged as to bear alternately upon the edge of the disk or the insulating-spots as the disk is rotated. The disk is in permanent electrical connection, as by means of a brush 12, with one of the armature-brushes of the motor, and the brush 11 is directly connected with one end of the resistance 5, the other end being in permanent connection with the movable disk by means of a brush 13. At the supply-station is provided a circuit-closer 14, by which the supply-generator 15 may be short-circuited.

It is not essential to the carrying out of my invention that the specific organization shown in the drawing for reducing the potential upon the motor should be employed, as any means by which a variation of meter-potential may be effected when it is desired to change the recording rate may be employed.

The operation of my system is as follows: When a change of rate is to be effected, the central-station attendant provides a temporary short circuit for the generator by throwing the switch 14 to the dotted position in

the diagram, thereby momentarily cutting off the supply of current from all circuits supplied by the machine. As it is necessary to produce only a momentary interruption, this will effect a mere blinking of the lamps and will not cause any noticeable interruption of the lighting-service. The magnet 6 becomes thereby deenergized and the armature 7 is retracted, engaging another tooth of the ratchet-wheel, and on opening the switch the armature is again attracted, thereby impelling the ratchet-wheel one tooth forward and causing the brush 11 to ride on or off the insulating-segment, according to the previous condition of adjustment of the disk with which it engages. Assuming that the change thus effected leaves the apparatus in the status indicated in the diagram, the resistance 5 is short-circuited and the potential upon the armature branch of the motor raised, thereby increasing its speed and increasing the recording rate of the meter.

The operating-circuits of the system may be traced as follows: Proceeding from the generator the circuit leads to the consumer's station and then into the magnet 6, after which it divides, one branch passing over the field-magnet coils and through the group of lamps and the other branch passing by way of conductor 16, brush 11, conducting-disk, brush 12, conductor 17, armature 3, conductor 18, and such portion of the resistance 4 as the initial adjustment of the meter requires to be inserted to line 19. The two circuits of the meter branch at the point 20, one branch including the series coils and a group of arc-lamps and the other branch including the resistance 5 and that portion of the resistance 4 which is determined by the initial adjustment of the meter and the armature. The armature-shunt is closed by way of resistance 5, wire 17, armature-coils, wire 18, the main body of resistance 4, to the outgoing side of the circuit 19. The field-magnet branch takes in the field-coils 2 2^a and the group of translating devices. When, however, the rate has been changed by the operation of the switch 14 at the central station, the brush 11 will rest upon the insulating-segment 10, and current must pass to the armature by way of resistance 5, thereby lowering the potential upon the armature and cutting down the recording rate of the meter.

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

1. A system of electric metering, comprising a consumer's circuit including a group of constant-current translating devices, a meter-motor having one of its operative circuits in series with said translating devices and the other in shunt relation, and means controlled by the same circuit which supplies the translating devices for varying the potential at the terminals of the shunt member to change the recording rate of the meter.

2. A system of multirate metering, comprising a group of constant-current translating

devices at a consumer's station, a meter-motor controlled by a shunt-circuit, a potential-changing device in said shunt-circuit, and means controlled by the constant-current circuit for periodically operating said potential-changing device.

3. A system of multirate metering, comprising a group of constant-current translating devices at a consumer's station, a meter-motor having one member in series with said translating devices and the other member in a shunt-circuit, a potential-changing device in said shunt-circuit, a magnetically-controlled device in series relation to the main circuit for cutting in and out said potential-changing device, and a controlling device at the central station for operating said controlling device.

4. A system of electric metering, comprising a consumer's circuit including constant-current translating devices, a meter controlled by a shunt-circuit, and a periodically-operated potential-varying device in series with the translating devices to operate said shunt.

5. A system of multirate metering, comprising a group of constant-current translating devices at a consumer's station, a meter-motor having one member in series with said translating devices and the other member in a shunt-circuit, a magnetically-controlled device in series relation to the main circuit controlling the potential in the shunt, and means for periodically operating said device.

6. A system of multirate metering, comprising a constant-current work-circuit at a consumer's station, a meter-motor having one member in series therewith and the other member in a shunt-circuit, a magnetically-controlled device in series relation to the main circuit controlling the potential of said shunt, and means at the central station for varying the flow of current through said device.

7. A system of multirate metering, comprising constant-current translating devices at a consumer's station, a meter-motor having one member in series with said translating devices and the other member in a shunt-circuit, a potential-changing device for the shunt, a magnetically-controlled device in the main circuit controlling said potential-changing device, and a switch at the central station for short-circuiting the supply-generator.

8. An electric metering system for constant-current circuits, comprising one or more consumer's circuits including constant-current translating devices, a meter-motor having one of its operative elements in series relation to said translating devices and the other in a shunt, an auxiliary resistance in said shunt, and means controlled by the current supplying the translating devices for cutting in or out said resistance at periodic intervals.

9. An electric metering system for constant-current circuits, comprising one or more consumer's circuits including constant-current translating devices, a meter-motor having one of its operative elements in series relation to

said translating devices and the other in a shunt, an auxiliary resistance in said shunt, an electromagnetic device for cutting in and out said resistance, comprising a magnetic-ally-operated armature and an impulse-wheel controlled by said armature containing symmetrically-placed contact-spots in coöperative relation to a short-circuiting brush for the resistance.

ter, translating devices metered thereby, and means actuated by a change in the potential of the current passing through the translating devices for effecting the change of rate.

In witness whereof I have hereunto set my hand this 9th day of October, 1899.

EUSTACE OXLEY.

Witnesses:

ALEX F. MACDONALD,

DUGALD MCKILLOP.

10 10. The combination with a multirate me-