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W. L. SAUNDERS.

DEVICE TO DISCLOSE SHUNTING OF THE CIRCUITS AROUND ELECTRIC METERS.

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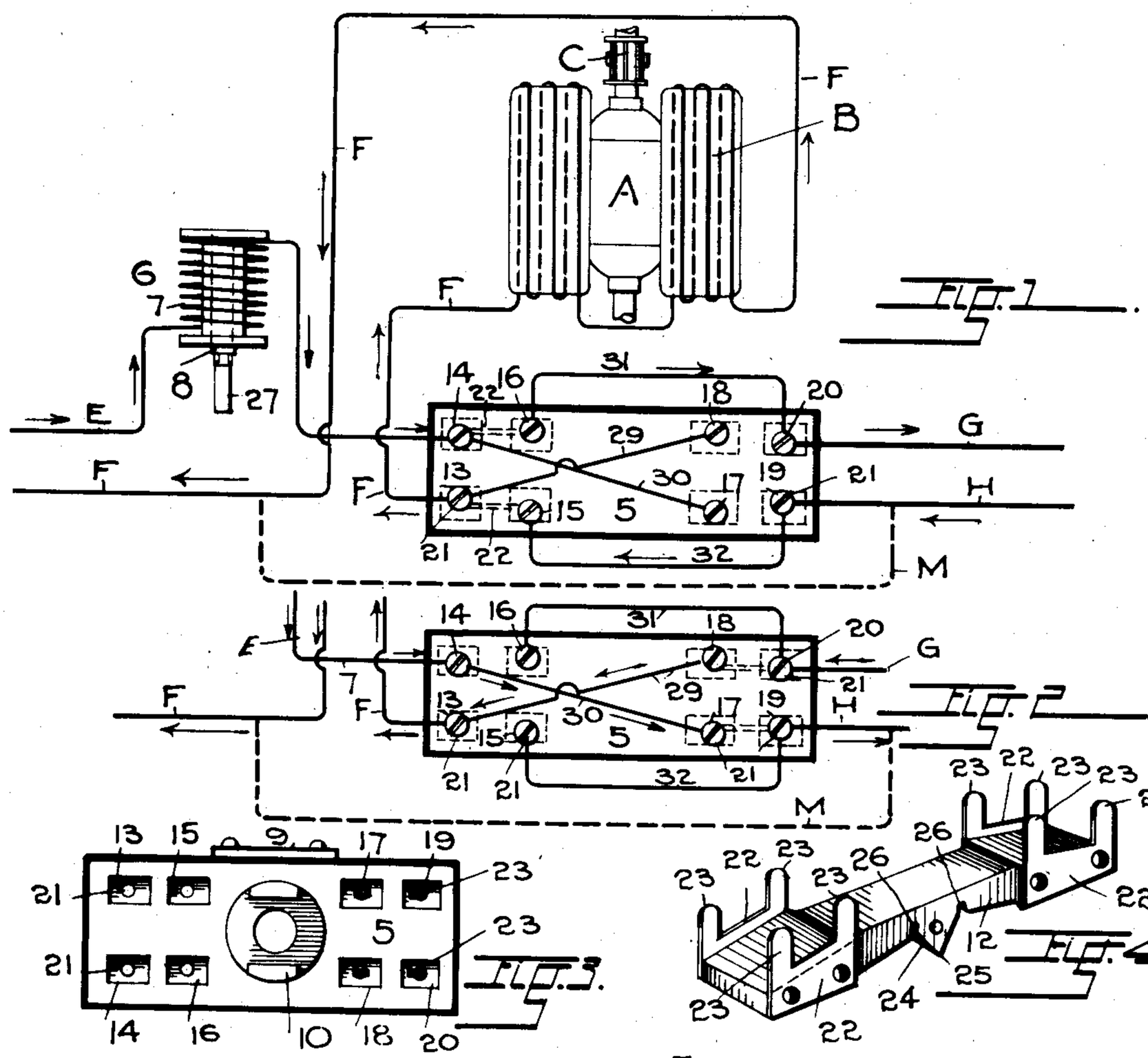

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 6.

FIG. 5.

FIG. 7.

WITNESSES:
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DEVICE TO DISCLOSE SHUNTING OF THE CIRCUITS AROUND ELECTRIC METERS.

No. 871,238. Specification of Letters Patent. Patented Nov. 19, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM L. SAUNDERS, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Devices to Disclose Shunting of the Circuit Around Electric Meters, of which the following is a specification.

My invention relates to a device adapted to disclose shunting of the current in the wire leading into an electric meter and the service wire leaving it and has for object the detection of attempt made by unauthorized and fraudulently inclined persons to cut the meter out of the electric circuit for the purpose of preventing registration of electricity consumed. I attain this object by transposition of the terminals of the two service wires at each interruption of the current or with other words to connect each of the two leading-in wires with a different service wire each time the flow of electricity is arrested, either by entinguishing the lights on the circuit, reversing the service switch or rheostat, or transposing the circuit from one dynamo to another as in extensive lighting and power plants which usually change dynamos twice in twenty-four hours.

I attain the above named results by the use of a simple attachment interposed between the leading-in and service wires, as illustrated in the accompanying drawings in which

Figure 1—represents a diagrammatical view of the circuit in connection with the main parts of the meter mechanism and of my attachment, Fig. 2—an underneath view of the insulating base plate of my device showing the course of the current after one of the above named interruptions has occurred, Fig. 3—a plan view of the base-plate, Fig. 4—a perspective inverted view of the teetering or oscillating lever of the device, Fig. 5—a front elevation of the device, the base having been shown in section and the core of the magnet in the energized position, Fig. 6—a vertical section through the attachment, the core being deënergized and the lever being reversed and Fig. 7—a vertical section taken along the line 7—7, Fig. 5, the solenoid having been shown in elevation.

Similar reference characters refer to similar parts throughout the various views.

In Fig. 1, let A represent the armature and B the field of the driving mechanism of the meter, C the commutator, E and F the leading-in wires, G and H the service wires and M the wire or connection employed by the fraudulently inclined consumer to shunt the circuit in the leading-in wire F and the service wire H which form the meter loop when the switch is in the position shown in Fig. 1.

My attachment is preferably located in the meter-box or it may be placed in a separate casing, depending on circumstances as well as on the style and size of the meter. It consists of a suitably supported base plate 5, upon which is mounted the vertically extending solenoid 6, comprising the coil 7 and soft iron core 8. The solenoid is held in elevation above the base plate by an upright 9 to which it is secured and which extends from the side of the base. Plate 5 is furthermore provided with a centrally located metal forked bearing-block 10 to which is fulcrumed at 11 the oscillating lever 12.

Eight mercury wells, 13, 14, 15, 16, 17, 18, 19 and 20 are formed by depressions in the upper surface of the base plate and are divided into two sets of four, at equal distances from the center of plate 5. The wells comprising each set are furthermore arranged into two pairs, placed along parallel lines, transversely of the base plate and the mercury in each well of the two sets connects with one of a series of set screws 21, screwed into the lower surface of the insulating base.

Lever 12, which is composed of insulating material, is provided at each of its outer extremities with metal contact-plates 22, oppositely secured along the sides of said lever and each provided with two depending integral fingers 23. The length and width of lever 12 and the distance between the fingers on each contact plate is such in relation to the location of the mercury wells, that when either of the extremities of the lever is depressed, its four fingers will simultaneously dip into the four wells at the corresponding end of the base plate. Lever 12 is furthermore provided at its upper surface with a centrally located, upwardly extending, inverted V-shaped projection or ridge 24, the vertex 25 of which extends transversely of said lever. At each side of this projection and at equal distances from ful-

crum 11, is a transversely extending depression or groove 26, into which the inclined surfaces of ridge 24 lead.

Solenoid 6 is located in relation to base 5 and lever 12, so that the vertical center line of its core, if extended downwardly, will pass through the center of the base and consequently through the fulcrum 11 of lever 12.

A downwardly pointing wedge 27 depends from the lower extremity of core 8, the upper end of said wedge being pivotally secured thereto at 28. Normally, when the core is in its raised position and one of the extremities of lever 12 is down, the lower sharp end of the wedge extends above the inclined surface of the projection 24 on the raised end of the lever, so that should, by reason of demagnetization of the solenoid, the core descend, the lower edge of wedge 27 shall enter the groove 26 on the corresponding side of fulcrum 11. The force with which this action takes place is sufficient to reverse the position of the lever

Having thus explained the mechanical features of my device, I will now proceed to describe its operation as well as its connection with the various wires leading to and from the meter. To facilitate this explanation, the solenoid as illustrated in Fig. 1, has been separated from the base and the latter shown in an inverted position.

Base 5, having been secured to any convenient portion of the meter, the set screws leading to the outer pair of mercury wells at each end of the base, are respectively connected with the leading-in wires E and F and the service wires G and H.

For convenience in describing, I shall designate the ends of the base corresponding with the leading-in and service wires, respectively as the leading-in end and the service end of the apparatus.

The two wells 13 and 14, comprising the outermost pair at the leading-in end are electrically connected by means of wires 29 and 30 with the diagonally opposite wells 18 and 17 of the inner pair at the service end of the device, while the two wells 19 and 20 of the outermost pair at the service end have been electrically connected with the directly opposite wells 15 and 16 of the innermost pair at the leading-in end by means of wires 31 and 32. Now, supposing that the leading-in wire F, passing through the meter has been connected with the service wire H by means of the shunt M, and the fingers 23 at the leading-in end of the device are dipped in the mercury wells, as illustrated in Figs 1 and 5, the current of electricity flowing through F, which under normal circumstances would have passed through the field of the meter and by means of the electrically connected wells 13 and 15 and wire 32 to the service wire H, now flows directly to the latter through shunt M, while the return current at G, being connected with the coil of the solenoid, passes therethrough by means of the wire 31 and connected wells 14 and 16 to wire E. The meter is in this case deprived of the greater portion of the electric current and in consequence does not register the full amount of electricity consumed. Now presuming that the current of electricity is interrupted by reason of any of the causes heretofore enumerated, the solenoid, being momentarily deënergized, will allow the core to drop and wedge 27 sliding along the inclined surface and engaging the groove 26 at the raised end of the lever will cause the latter to reverse its position with the result that the contact between wells 13 and 15 and 14 and 16 at the leading-in end is broken and wells 17 and 18 are respectively connected with wells 19 and 20 by means of fingers 23 on plates 22 at the corresponding or service end of the device, (see Figs. 2 and 6). The wells 13 and 14 at the leading-in end being connected with the diagonally opposite wells 18 and 17 at the service end, the current coming through wire F will the moment the flow of electricity is resumed, instead of passing to H and returning through G, cross over through wells 19 and 17 and wire 30 to the wire E, thus establishing a short circuit between F and E causing the blowing of the fuse, and consequent interruption on the current. It may thus be said that the use of my device in case a shunt is passed in the circuit wires F and H, will, at each interruption of the current, substantially reverse the connections between the leading in and service wires.

Having thus described my invention what I claim is:—

1. The combination with an electric meter of suitable means adapted to reverse the connections between the service wires and the leading in wires at each interruption of the current.

2. The combination with an electric meter of means interposed between the leading-in and service wires and adapted to reverse the connections between the said service wires and leading in wires at each interruption of the current.

3. The combination with an electric meter of a terminal changing switch interposed between the leading-in and the service wires and adapted to reverse the connections between the said service wires and leading in wires at each interruption of the current.

4. The combination with an electric meter of an electrically actuated switch interposed between the leading-in and the service wires and adapted to reverse the connections between the said service wires and leading in wires at each interruption of the current.

5. The combination with an electric meter of a switch comprising a base having a plu-

rality of contact points at each end and interposed between the leading-in and service wires of the circuit, a lever fulcrumed thereon and having a corresponding number of contacts at each end adapted to engage those on the base, a solenoid arranged above said base, and means on said lever and the solenoid-core to cause the former to reverse its position each time the solenoid is deënergized.

6. The combination with an electric meter of a switch comprising a base having two pairs of contact points at each end, the outermost of which are respectively connected with the leading-in and service wires of the circuit, electrical connections between the outer contact points at one end with the diagonally opposite innermost points at the other end, electrical connections between the innermost contact points at the first named end with the directly opposite outermost points at the other end, a lever fulcrumed on said base and having two insulated pairs of contacts at each extremity adapted to simultaneously engage the contacts at the corresponding end of the base, a solenoid mounted above said base, its core being adapted to cause reversion of the lever each time the solenoid is deënergized.

7. The combination with an electric meter of a switch interposed between the leading in and service wires and comprising a base having a plurality of contact points at each end, a lever centrally fulcrumed on said base and having contacts at each extremity adapted to engage those on the base and a central inverted V-shaped ridge, a solenoid mounted above said lever, a depending wedge pivotally mounted on its core and adapted to engage one of the inclined surfaces of said ridge during the downward movement of the core.

8. The combination with an electric meter of a switch comprising a base having two pairs of contact points at each end, the outermost ones of which are respectively connected with the leading-in and service wires of the circuit, electrical connections between the outer contact points at one end with the diagonally opposite innermost points at the other end, electrical connections between the innermost contact points at the first named end with the directly opposite outermost points at the other end, and suitable means to alternately connect the directly opposite points at each end of the base.

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

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Witnesses:

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