

H. R. WOODROW.
 DEVICE FOR CONTROLLING ENERGY DELIVERED TO WELDING ELECTRODES.
 APPLICATION FILED NOV. 17, 1915.

1,230,357.

Patented June 19, 1917.

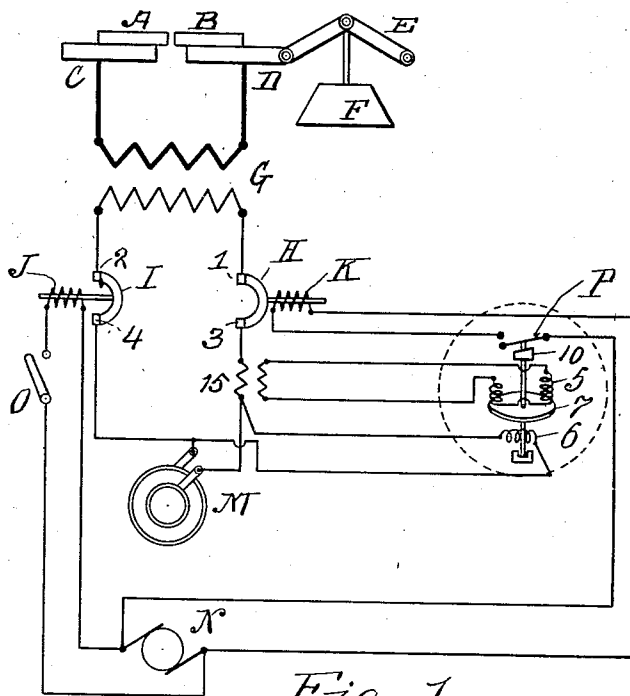


Fig. 1.

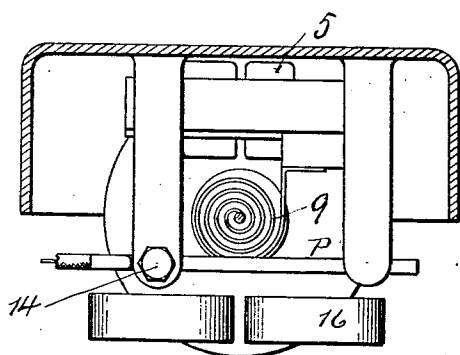


Fig. 2

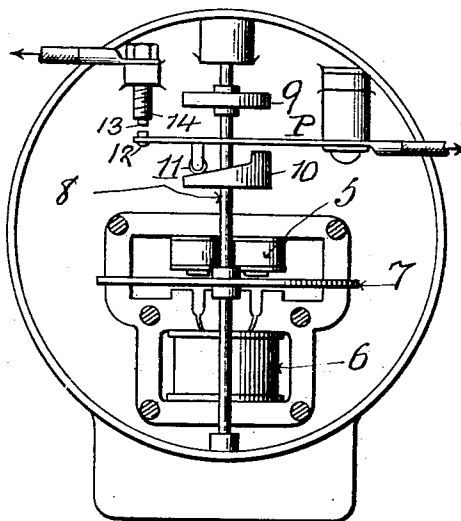


Fig. 3.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR CONTROLLING ENERGY DELIVERED TO WELDING-ELECTRODES.

1,230,357.

Specification of Letters Patent.

Patented June 19, 1917.

Application filed November 17, 1915. Serial No. 61,864.

To all whom it may concern:

Be it known that I, HARRY R. WOODROW, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Devices for Controlling Energy Delivered to Welding-Electrodes, of which the following is a specification.

The invention is a device for measuring the amount of energy passing to welding electrodes, and for automatically disconnecting said electrodes from the source of energy when a predetermined amount has passed—this, independently of fluctuating voltage or varying conditions of the welding contacts.

In the accompanying drawings—

Figure 1 is an electrical diagram illustrating symbolically my invention, Fig. 2 is a top view and Fig. 3 is an elevation of the watt-meter relay.

Similar numbers and letters of reference indicate like parts.

The objects A, B to be welded together are respectively carried by the fixed electrode C and the movable electrode D. The movable electrode D is actuated by any suitable means toward the electrode C in order to press the ends of the objects A, B together. This pressure may be applied, for example, by a toggle E having one end fixed and the other end connected to electrode D, which toggle is straightened out by the weight F suspended from the middle joint.

To the electrodes C, D are connected the terminals of the secondary coil of a transformer G, the primary coil terminals being connected to contact 1 of switch H and contact 2 of switch I. Said switches also cooperate respectively with the contacts 3 and 4. Each switch carries the plunger armature of an actuating solenoid J, K for operating said switches. The welding current is derived from the alternating generator M, the terminals of which are connected to the switch contacts 3 and 4. The coils J, K are connected in multiple with the terminals of a direct current auxiliary generator N. In the branch circuit which includes coil J is a hand switch O. In the branch circuit which includes the coil K is a switch P.

The switch P is controlled by a watt-

meter relay constructed as follows (Figs. 2 and 3):

5 is the current coil, and 6 is the potential coil. 7 is the usual disk armature supported on the spindle 8. To said spindle is connected one end of a Hooke spring 9, the other end being secured to a fixed abutment, which spring counterbalances the rotary movement of the armature, so that the energy of the current is balanced against the resilience of the spring and measured by the extent of angular or rotatory movement of the armature. Any suitable indicating mechanism—here omitted for clearness—may be combined with the armature for obtaining a reading of the extent of said movement in terms of watts and fractions thereof.

The armature spindle controls the switch P by means of a cam 10, upon which cam runs a roller 11 carried by said switch. Said switch at its end carries a contact 12 cooperating with contact 13 carried by an adjusting screw 14, by means of which the operation of switch P may be timed in accordance with any desired position of roller 11 on cam 10, and hence with regard to any predetermined angular movement of rotation of armature 7, and hence with regard to a predetermined amount of energy delivered to the watt-meter relay. The current coil 5 is connected to a current transformer 15, of which the primary is in circuit with the secondary coil of the transformer G. The potential coil 6 is connected to one terminal of said primary and to the switch contact 4. The usual armature brake is shown at 16.

The operation is as follows:

Switch H is closed, and switches O and P are open. The objects A, B are pressed together. Switch O is closed, thereby closing switch I. Circuit is thus established to the welding point and to the watt-meter relay. The armature 7 of said relay rotates, and in turn rotates cam 10. After the armature has moved over the predetermined angle corresponding to a certain expenditure of energy, circuit is thus closed at switch P, to coil K, which opens switch H, thus cutting off the current supply to the weld. As the armature also operates the usual indicating apparatus, the device will measure the amount of energy passing to the weld,

besides automatically disconnecting the weld when a predetermined amount has passed, regardless of fluctuating voltage or variations in conditions at the welding contacts.

I claim:

1. In combination with welding electrodes and a source of energy communicating therewith, means automatically operating to disconnect said source when a predetermined amount of energy has passed to said electrodes.

2. In combination with welding electrodes and a source of energy communicating therewith, means automatically operating to disconnect said source when a predetermined amount of energy has passed to said electrodes, and to measure said amount.

3. In combination with welding electrodes a source of welding current, and a watt-meter relay in circuit with said source and controlling said circuit.

4. In combination with welding electrodes, a source of welding current, a watt-meter relay in circuit with said source, and means controlled by said relay for opening said circuit when a predetermined amount of energy has passed to said electrodes.

5. In combination with welding electrodes, a source of welding current, a watt-meter relay in circuit with said source, a

switch in said circuit, and a switch controlled by said relay and operating to open said first-named switch when a predetermined amount of energy has passed to said electrodes.

6. In combination with welding electrodes, a source of welding current, two switches respectively placed in the leads from said source to said electrodes, an independent source of current controlling said switches, a manually operable switch in one of said leads, a watt-meter relay in circuit with said source of welding current, and a switch operated by said relay to open the switch in the other of said leads when a predetermined amount of energy has passed to said electrodes.

7. In combination with welding electrodes and a source of welding current, a watt-meter relay in circuit with said source, a switch in said circuit, an independent source of current for actuating said switch, a switch in circuit with said source, and a cam on the armature spindle of said relay for opening said last-named switch.

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

HARRY R. WOODROW.

Witnesses:

GERTRUDE P. PORTER,
MAY T. MCGARRY.