No. 757,056. PATENTED APR. 12, 1904.

M. C. RYPINSKI.

MEANS FOR PROTECTING ELECTRICAL MEASURING INSTRUMENTS.

APPLICATION FILED JULY 25, 1901.

NO MODEL.

Fig. 1

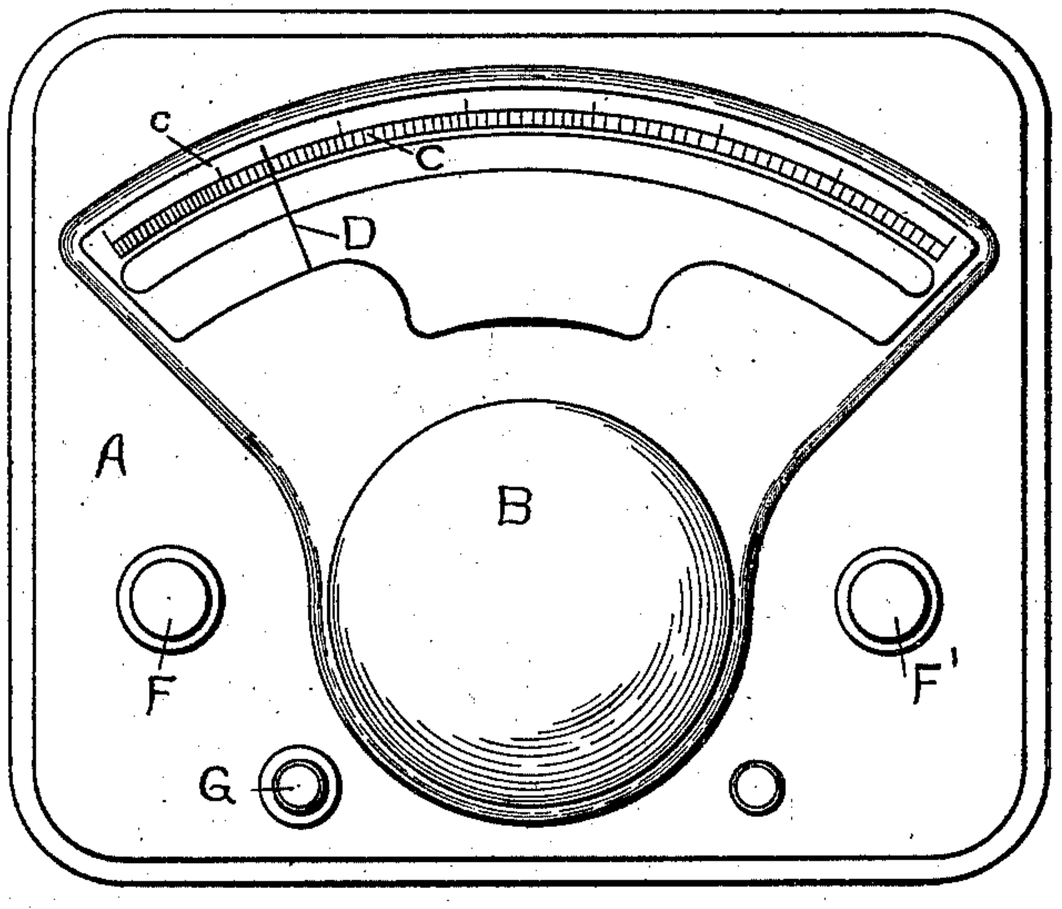


Fig. 2.

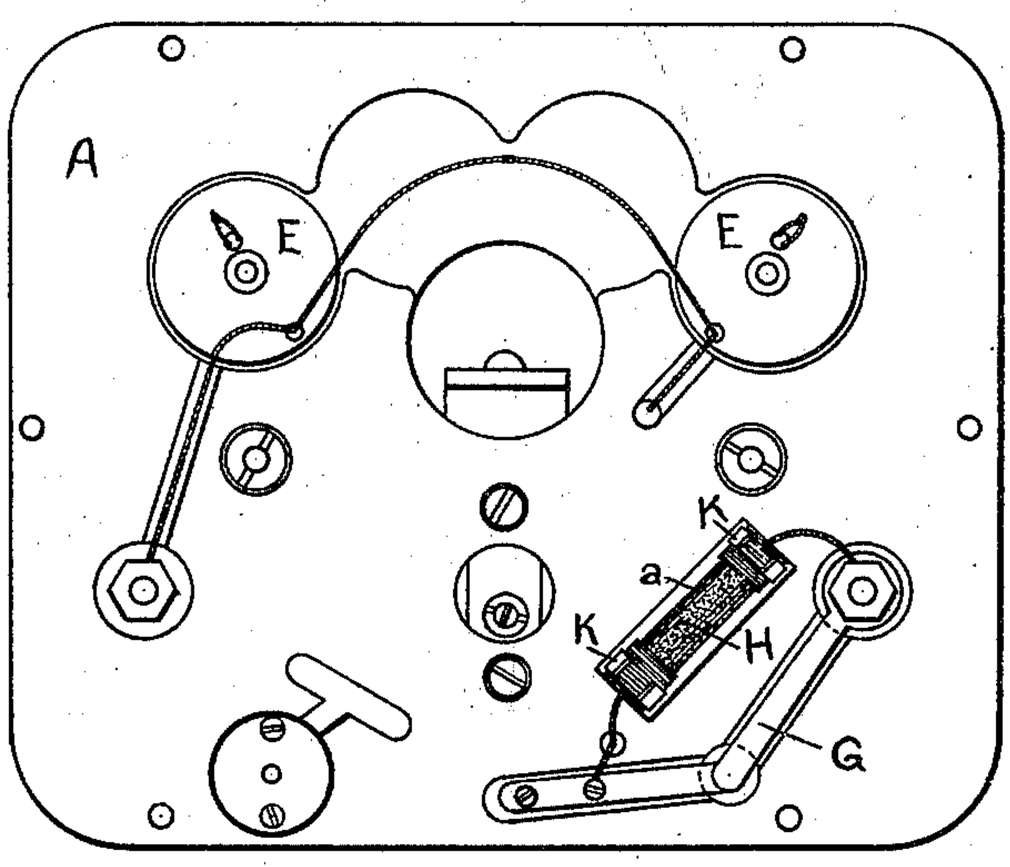


Fig. 3.

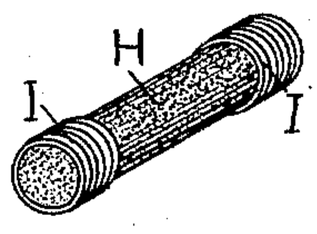


Fig. 4.

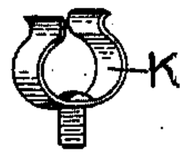
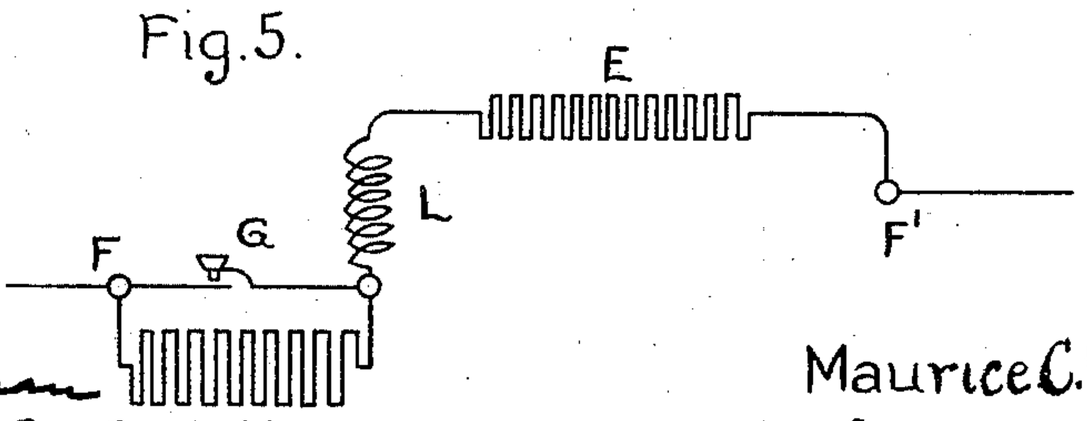


Fig. 5.



Witnesses;
Robt. L. Hopkins
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No. 757,056. Patented April 12, 1904.

UNITED STATES PATENT OFFICE.

MAURICE C. RYPINSKI, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MEANS FOR PROTECTING ELECTRICAL MEASURING INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 757,056, dated April 12, 1904.

Application filed July 25, 1901. Serial No. 69,664. (No model.)

To all whom it may concern:

Be it known that I, MAURICE C. RYPINSKI, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Means for Protecting Electrical Measuring Instruments, of which the following is a specification.

This invention relates to voltmeters or other electrical measuring instruments; and its object is to protect such instruments from damage in case an excessive potential is applied to their terminals.

The invention consists in a conductor of high resistance normally in series with the instrument, with means for shunting said conductor when readings are to be taken. The resistance should be great enough to prevent injury to the instrument in case an abnormally high potential or heavy current is accidentally thrown upon the line.

In the accompanying drawings I have illustrated the application of my invention to a Thomson voltmeter, Figure 1 being a front elevation of the instrument; Fig. 2, a rear view with the back cover-plate removed; Fig. 3, a perspective view of the high-resistance conductor; Fig. 4, a perspective view of one of the clamps for holding said conductor, and Fig. 5 a diagram of the circuits.

The base A, metallic front cover B, scale C, index D, resistance E, binding-posts F F′, and circuit-closing push-button switch G are all of the construction usual in voltmeters of this class and need not be described in detail.

At some point on the instrument, preferably in a recess *a* in the back of the base A, I locate a conductor H of high resistance, preferably a rod composed of carbon and clay, a comparatively small piece of which can be made to offer a resistance of many thousand ohms. This conductor H is arranged in shunt to a switch, preferably the reading-key G. For convenience I wrap the ends of the rod with copper wire I, which is then soldered together. This makes a good electrical contact with the metal clips K, secured in the ends of the recess *a*, preferably U-shaped pieces of resilient sheet metal, as shown in Fig. 4.

If a potential is applied to the terminals of the instrument which is so high as to be dangerous to its coils L, the index D will swing so far over the scale C as to indicate this fact at once. The scale may have a safety-mark *c* to show the limit of safe movement of the index under a current of unknown potential. If this mark is not passed, the operator knows that it is safe to press the key and short-circuit the high resistance. If, for example, the instrument is of fifteen-volts capacity, let six hundred volts be assumed as the maximum potential which might accidentally be applied. Then if the resistance of the coil L and resistance E is about fifteen hundred ohms the high resistance H should be about sixty thousand ohms.

In addition to giving warning of the presence of an abnormally high potential, and thus preventing the closing of the short-circuiting key, another important advantage of my invention may be mentioned. Voltmeters are usually kept open-circuited to prevent excessive heating of the regular resistance-coils. When a reading is to be taken, a circuit-closing key is pushed. By my invention the instrument can be kept constantly in circuit, since my auxiliary high-resistance coil cuts down the current to so low a value that the small amount of heat generated by the coils is easily radiated. The potential on the line is thus constantly indicated by the voltmeter-needle, so that from the position of the needle with reference to the safety-mark the observer can tell at a glance whether it is safe to shunt the auxiliary resistance.

The improvements are not restricted to any particular type of measuring instrument. For example, they might be applied to ammeters by employing an auxiliary shunt of proper carrying capacity to protect the instrument under extreme current conditions.

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

1. An electrical measuring instrument provided with means for gaging the energy of a circuit for one of its factors, and means for accurately measuring said energy in the same factor, if not excessive.

2. An electrical measuring instrument provided with a large impedance in circuit with its measuring-coil to roughly gage a factor of the energy of a circuit, and means for short-circuiting said impedance to accurately measure said energy in the same factor, if found not excessive.

3. A voltmeter having an impedance large relatively to the possible maximum voltage of the circuit on which it is to be used, said impedance being auxiliary to the normal impedance in circuit with its measuring-coil, and means for short-circuiting the auxiliary impedance.

4. A voltmeter having a large resistance auxiliary to the normal resistance in circuit with its measuring-coil, and means for short-circuiting the auxiliary resistance.

5. An electrical measuring instrument having a base, a measuring-coil, a recess in its base, a rod of high resistance in said recess in series with the measuring-coil to roughly gage the energy of a circuit, and a circuit-closing switch in shunt to said rod to permit the energy to be accurately measured.

6. An electrical measuring instrument having a recess in its base, spring-clips in said recess, a rod of carbon of high resistance held in said clips, and a circuit-closing switch in shunt to said rod.

In witness whereof I have hereunto set my hand this 23d day of July, 1901.

MAURICE C. RYPINSKI.

Witnesses:

BENJAMIN B. HULL,

FRED RUSS.