

(No Model.)

G. A. LINTNER.
POTENTIAL INDICATOR.

No. 509,578.

Patented Nov. 28, 1893.

Fig. 1.

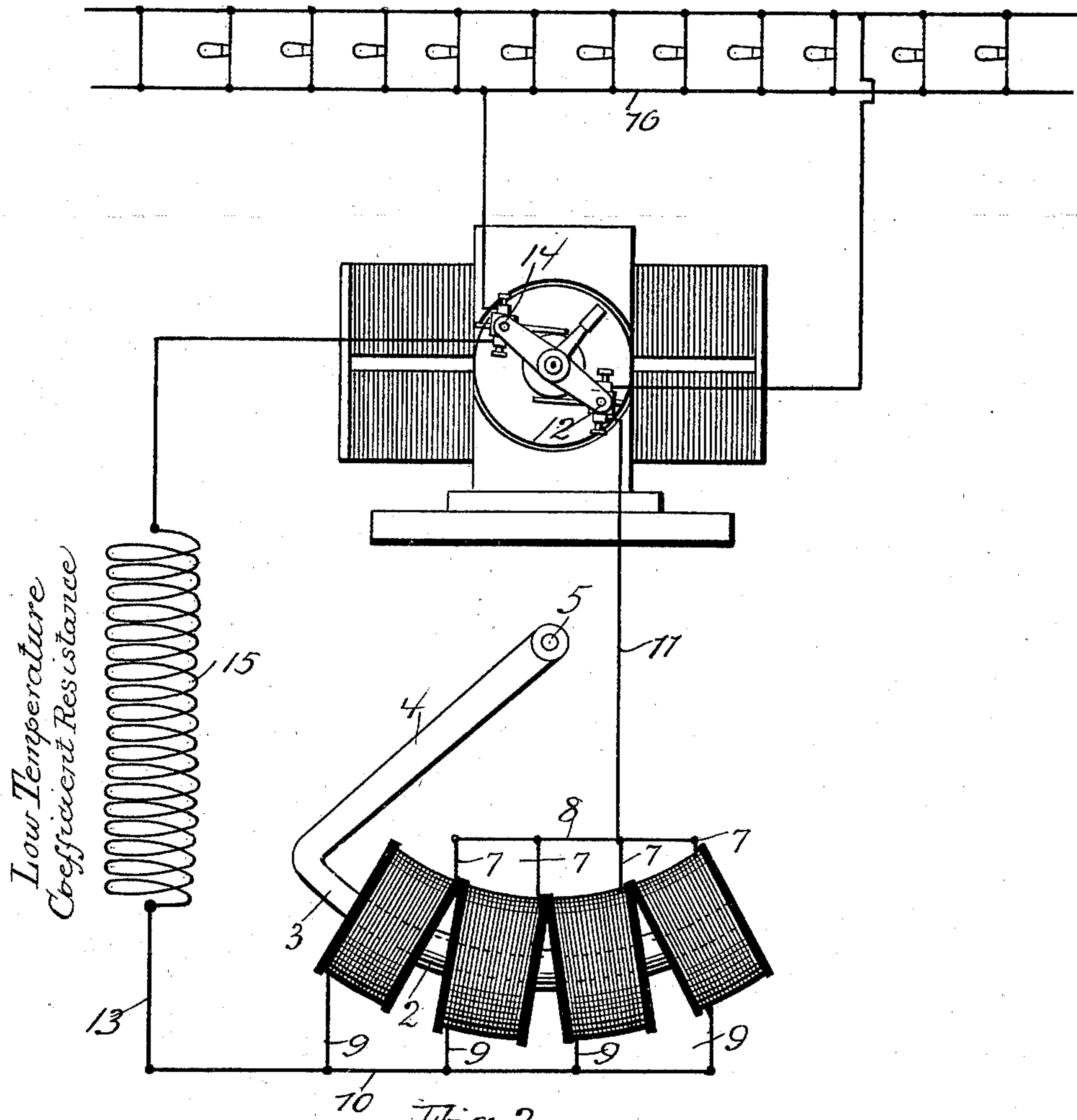
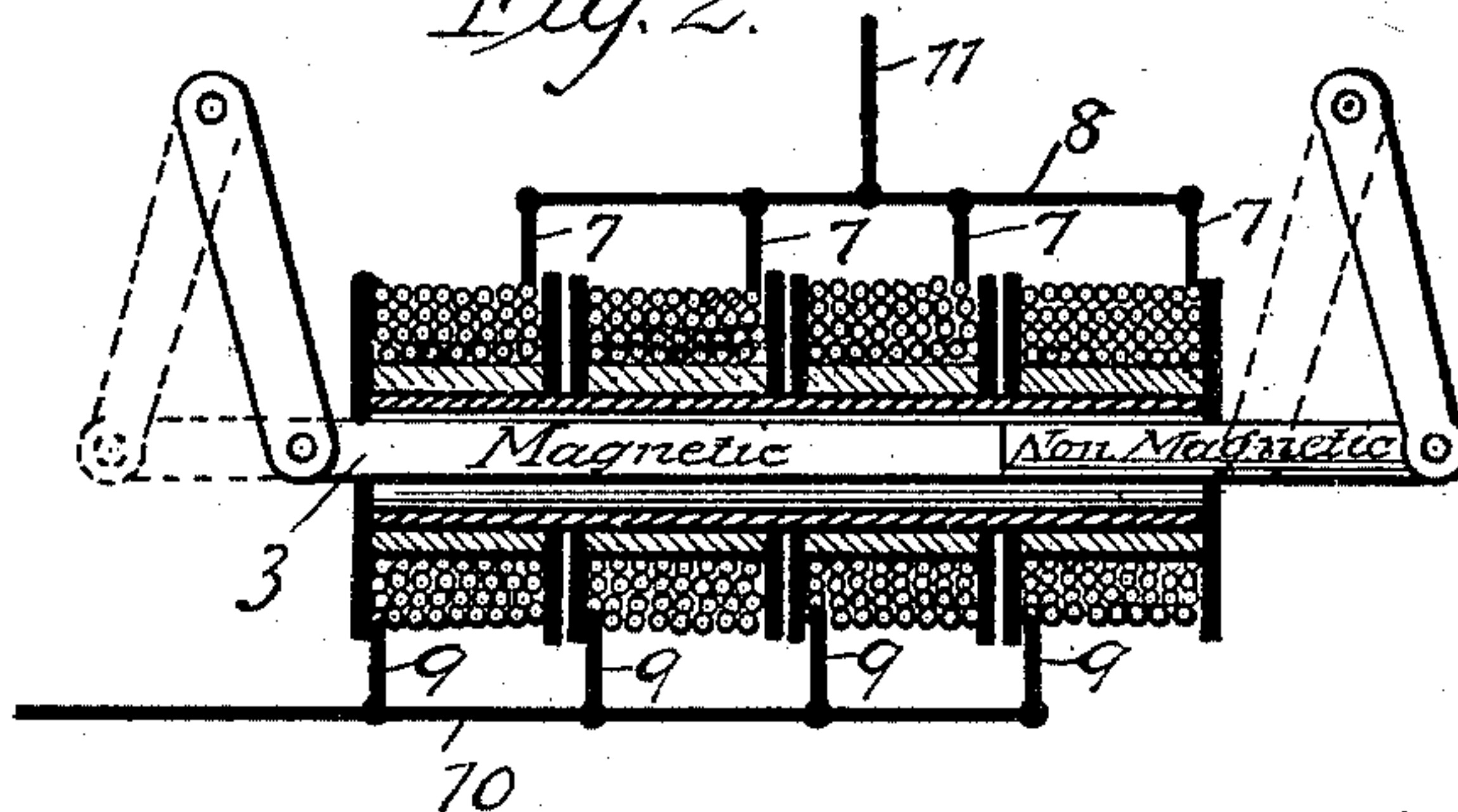


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE A. LINTNER, OF MINNEAPOLIS, MINNESOTA.

POTENTIAL-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 509,578, dated November 28, 1893.

Application filed March 16, 1893. Serial No. 466,285. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. LINTNER, of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Potential-Indicators and Like Electrical Instruments, of which the following is a specification.

My invention relates to potential or current indicating or recording instruments, and especially to improvements whereby I am enabled to obtain a stronger and a more accurate and sensitive action in such electrical instruments, while interposing less resistance in the line wherein the instrument is located.

The object of this invention is to reduce the general temperature coefficient of electrical measuring and indicating instruments and to do so without the use of high temperature coefficient material in the windings of the instrument itself, and still retain the ability to employ a large number of windings or ampère turns in the magnetic parts of the instrument and so maintain the strength and sensitiveness thereof.

My invention consists in the combination with a core or armature, of a magnetic device, the windings of which are arranged in bobbins, which bobbins are connected in multiple arc with the dynamo circuit.

My invention further consists in winding said magnetic device with low resistance material, such as copper, and introducing into the circuit a high resistance material having a low temperature, whereby a comparatively large current may be employed in an instrument without a perceptible increase in the temperature coefficient of the instrument, and with a great increase in power and sensitiveness.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, in which—

Figure 1 is a diagrammatic view illustrating an instrument embodying my invention coupled with a dynamo. Fig. 2 shows the invention as employed with the straight solenoid.

As shown in the drawings, 2 represents a curved sleeve or tube adapted to admit a curved core 3 swinging upon an arm 4 piv-

oted upon a convenient post 5. Any suitable indicating mechanism may be provided in connection with the swinging core or armature. Upon this supporting tube I arrange a number of bobbins or coils that are composed of copper wire or other low resistance material and I connect the corresponding ends of each coil with one another, so that the ends of the several coils are joined by a common electrical connection 8 while the opposite ends 9 of the several coils are joined by a common connection 10. From the connection 8 a conductor 11 extends to one terminal 12 on the dynamo or other source of electricity, and from the opposite multiple-connection 10 of the solenoid coils a conductor 13 extends to the opposite terminal 14 of the dynamo. In the conductor or line 13, and arranged in series between the ends thereof, I include a large coil 15 composed of German silver wire or like material, and having a low temperature coefficient.

The working circuit 16 is connected with the dynamo in the usual manner. Suppose the resistance of each bobbin to be twenty ohms, making a total of eighty ohms if connected in series; connecting the bobbins, however, in multiple-arc reduces the total resistance to five ohms. The current required in each bobbin should be about one-fourth ampère in order to obtain a strong action upon the core, thus making it necessary to carry one ampère upon the circuit of the instrument. Suppose the pressure upon the dynamo circuit to be one-hundred volts. In this case the resistance of the German silver wire should be ninety-five ohms, which compared with the resistance of the solenoid would be as nineteen to one, which obviously greatly reduces the general temperature coefficient of the instrument, as only one-nineteenth of all of the resistance thereof is subject to any considerable increase in resistance from a rise of temperature in the room wherein the instrument is located. Compare this result with that obtained in a series wound electro-magnetic instrument, in which case eighty ohms resistance in the solenoid and one quarter ampère therein, outside resistance to the amount of three hundred and twenty ohms would be required on the line to obtain the

same result, manifestly greatly increasing the temperature coefficient of the magnetic parts of the instrument; and, furthermore, greatly increasing the cost of the instrument as a whole with a proportion of inside and outside resistance of one to four, which, compared with the above proportion of one to nineteen, would of itself exhibit the disproportion of resistance subject to change by variation in temperature.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in an electro-magnetic indicator, of a core or armature with the field portion thereof, having its windings arranged in sections or bobbins, multiple arc connections with said bobbins, and a resistance provided in series with said multiple arrangement of bobbins, and composed of a low temperature coefficient material, substantially as described.

2. The combination, with an electric circuit, of an electro magnetic indicator included

therein, the field portion of said indicator being wound in bobbins or sections, and said sections being connected in multiple arc with said circuit, and an outside resistance included in said circuit and composed of a low temperature coefficient material, substantially as described.

3. The combination, with an electric circuit, of a solenoid included therein, the windings of said solenoid being composed of a low resistance metal, and arranged in bobbins or sections, said bobbins being connected in multiple arc with said circuit, a core for said solenoid, and a further resistance included in one branch of said circuit and composed of a low temperature coefficient material, substantially as described.

In testimony whereof I have hereunto set my hand this 13th day of March, 1893.

GEORGE A. LINTNER.

In presence of—

C. G. HAWLEY,
M. E. GOOLEY.