

(No Model.)

A. A. SIMONDS.  
VOLTMETER.

No. 572,380.

Patented Dec. 1, 1896.

Fig. 1.

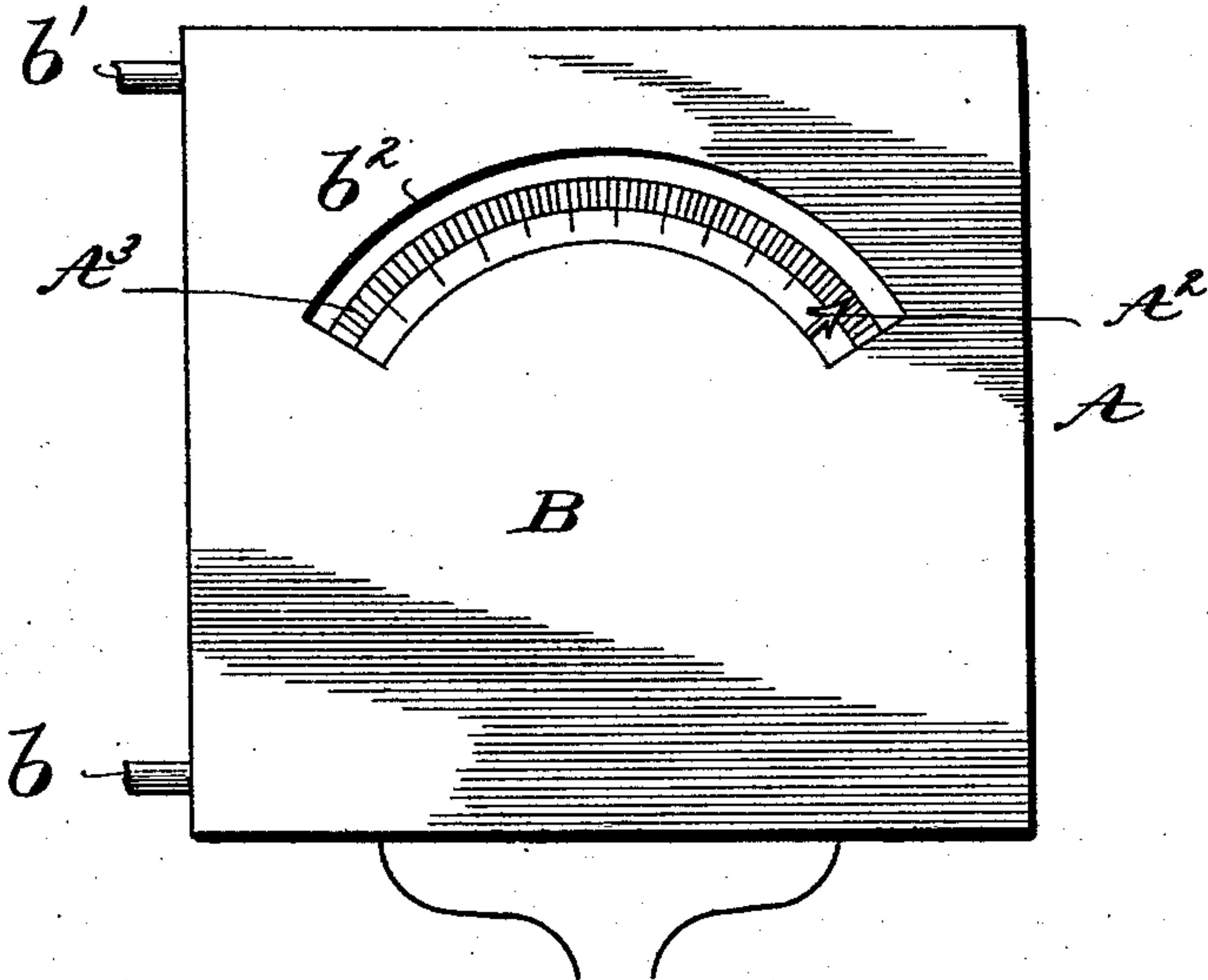


Fig. 2.

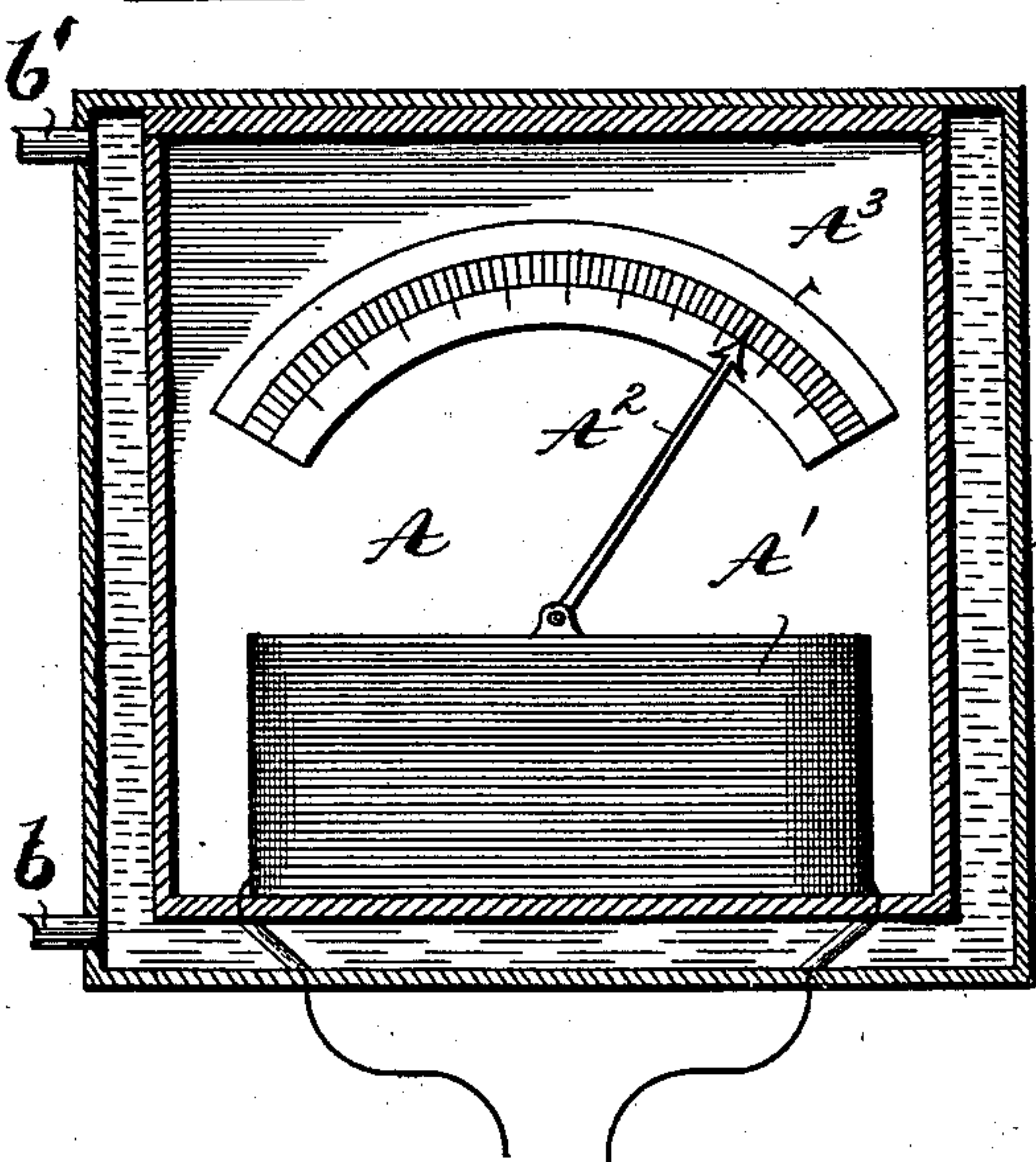


Fig. 3.

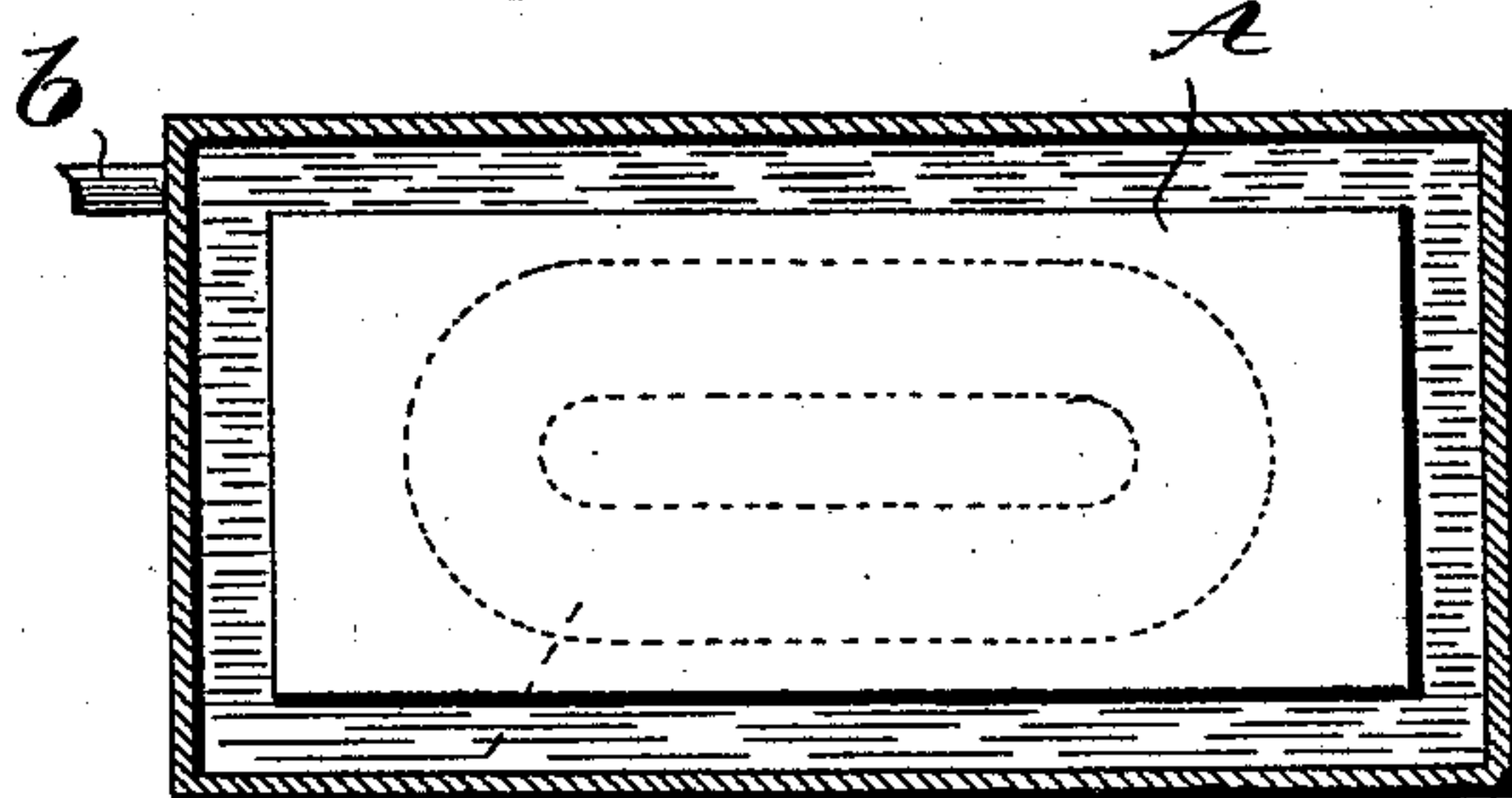
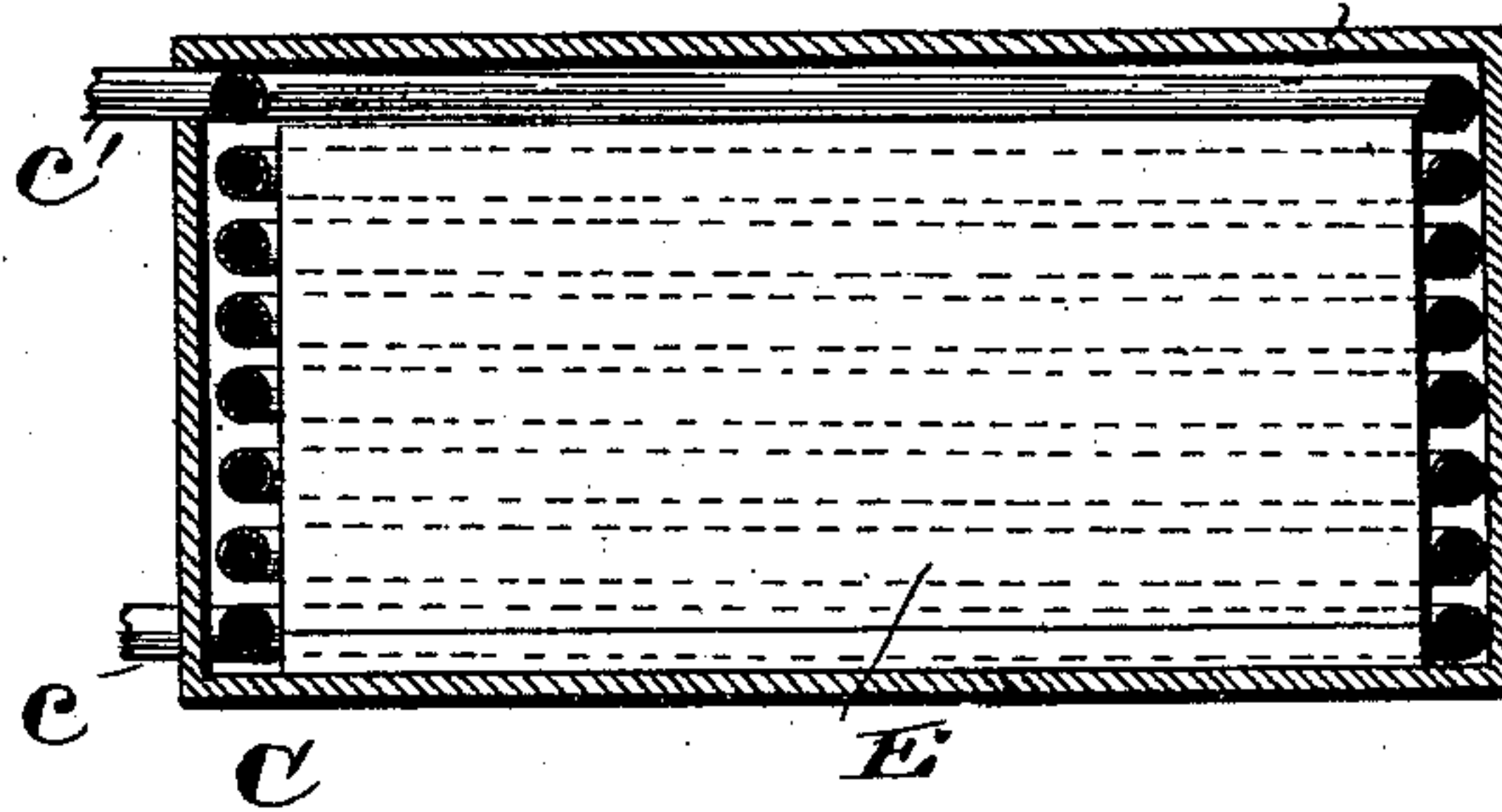


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## VOLTMETER.

SPECIFICATION forming part of Letters Patent No. 572,380, dated December 1, 1896.

Application filed March 20, 1896. Serial No. 584,093. (No model.)

*To all whom it may concern:*

Be it known that I, ALVAN A. SIMONDS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Voltmeters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in voltmeters; and it consists in the novel features of construction hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention and a slight modification of the same, the said invention being fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a front view of a voltmeter having my improvements applied thereto. Fig. 2 represents a vertical sectional view of the same. Fig. 3 represents a horizontal sectional view of the same. Fig. 4 represents a similar sectional view of a slightly-modified construction.

In the following description I shall use the word "voltmeter" as meaning any usual or preferred form for measuring the voltage of an electric current, and which includes among its members a coil of wire through which the electrical current is passed, and a suitable indicating mechanism. In the use of voltmeters it will be readily understood that the conductivity of the wires used in the coil which actuates the indicating mechanism is increased or decreased by changes in the temperature of the wire, thereby producing variations in the reading of the instrument. In order to render the readings from the instrument absolutely accurate, it is essential, therefore, that the coil should always be maintained at the same temperature.

The object of my invention is to provide a voltmeter with means for regulating the temperature of the metallic coil so as to render the readings therefrom certain and accurate.

In Figs. 1, 2, and 3 I have illustrated one form in which I have contemplated carrying

my invention into effect. In these figures, A represents the voltmeter, constructed in the usual or any preferred manner (including among its members the coil A' of insulated conducting material, the pointer or indicating-arm A<sup>2</sup>, actuated thereby, and the indicating-scale A<sup>3</sup>) and inclosed in a suitable receptacle or casing. B represents an outer casing of greater size than the case of the voltmeter, thus providing a space between it and the walls of the outer casing, forming a water-jacket. The water-jacket is supplied with water of an even or uniform temperature through the inlet-pipe b, preferably at the bottom, the water leaving the casing B at the top through a discharge-pipe b'. Water can be supplied in any desired way, preferably by connecting the outlet-pipe b with some suitable water-supply system. The water-jacket will preferably surround the voltmeter-case as much as possible and except where necessary to properly disclose the indicating apparatus. In this instance I have shown the voltmeter-case provided with a glass-covered opening a, through which the indicating-scale and needle are visible, and the outer casing is also provided with a similar glass-covered opening b<sup>2</sup>, registering with that of the inner case.

In using the device it will be seen that the water coming from any ordinary supply will be practically of the same temperature during an entire day, and all the readings taken from the instruments in any day will therefore be accurate, although the temperature of the air might vary a large number of degrees during the day, which variation would affect the readings if my improved device were not used.

In Fig. 4 I have shown a coil of pipes C, located in the space between the outer casing and the case E of the voltmeter, said coil being fed by pipe c and the water discharged by the pipe c'.

It is also obvious that by feeding water, the temperature of which has been previously raised or lowered to a desired degree, the readings may be made uniform throughout a long period if found desirable. In practice, however, it will be found that for ordi-

nary purposes it will be sufficient to simply attach the device to an ordinary water-supply system.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with a voltmeter comprising among its members, a coil of electrical conducting material, and indicating mechanism operated thereby, of means for regulating the temperature of said conducting material to maintain the uniform conductivity thereof, and secure uniform action of said indicating mechanism, substantially as described.

2. The combination with a voltmeter comprising among its members, a coil of electrical conducting material and indicating mechanism operated thereby, of means for

circulating a fluid of uniform temperature around said conducting material to maintain its uniform conductivity and secure uniform action of said indicating mechanism, substantially as described.

3. The combination with a voltmeter comprising among its members, a coil of electrical conducting material, of a water-jacket surrounding said coil and inlet and outlet pipes communicating with said water-jacket, substantially as described.

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

ALVAN A. SIMONDS.

Witnesses:

T. A. SIMPSON,

M. C. SIMONDS.