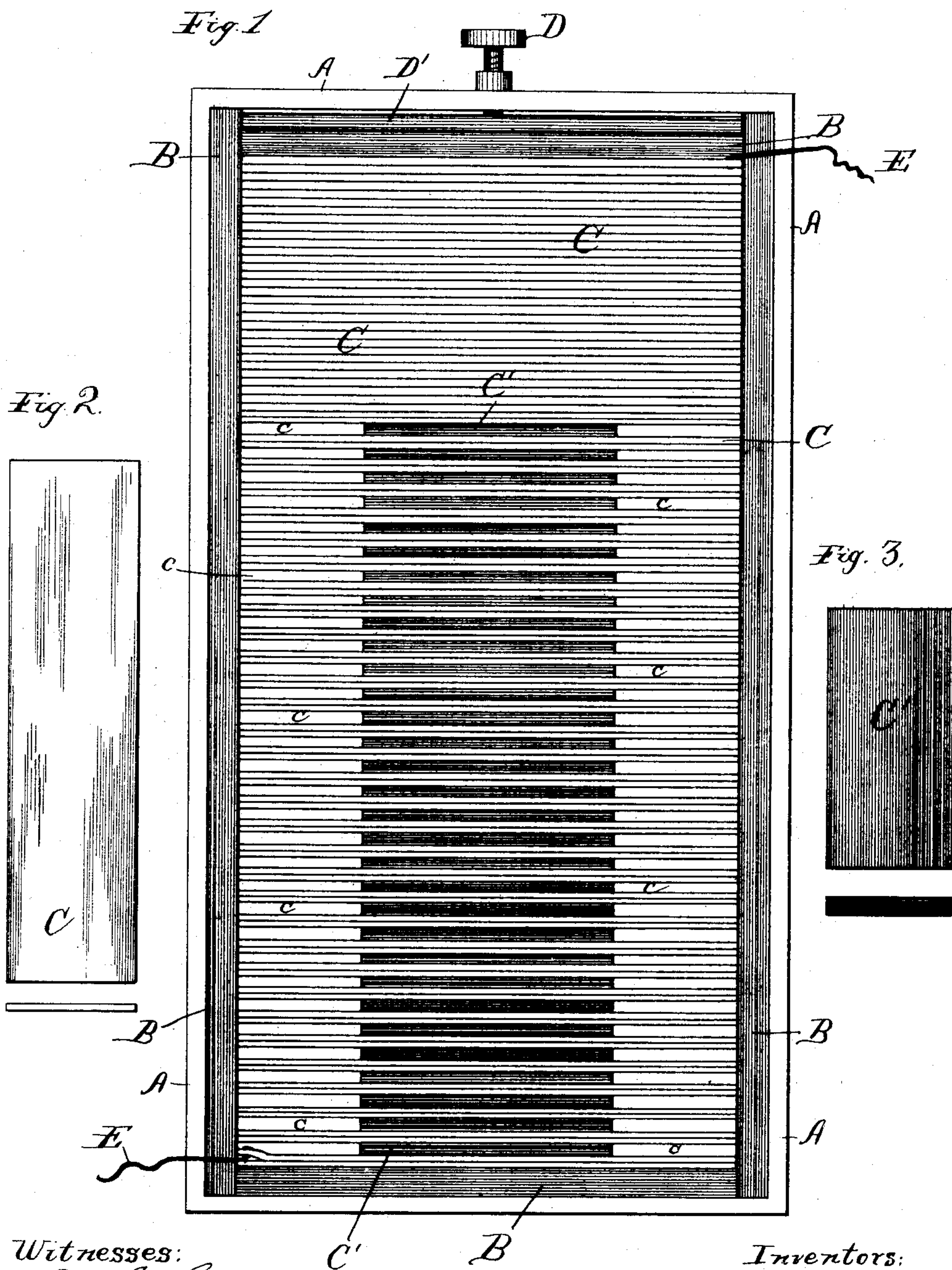


(No Model.)

H. P. & F. H. BROWN.
ARTIFICIAL ELECTRIC RESISTANCE.

No. 338,708.

Patented Mar. 30, 1886.



Witnesses:
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UNITED STATES PATENT OFFICE.

HAROLD P. BROWN AND FRANCIS HERBERT BROWN, OF CHICAGO, ILL.

ARTIFICIAL ELECTRIC RESISTANCE.

SPECIFICATION forming part of Letters Patent No. 333,708, dated March 30, 1886.

Application filed December 8, 1885. Serial No. 185,030. (No model.)

To all whom it may concern:

Be it known that we, HAROLD P. BROWN and FRANCIS HERBERT BROWN, citizens of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Artificial Electric Resistances, of which the following is a specification.

In rheostats, current-regulators, electric heaters, and other like devices electric resistances have heretofore usually been employed consisting either of coils of fine wire or piles of carbon plates or blocks. Coils of wire are both expensive and very bulky where any considerable resistance is required, and are also not calculated to withstand without injury any considerable degree of heat. The pile of carbon blocks, when used as a resistance, is also somewhat expensive; but a more serious objection to its use is the liability of the carbon blocks to disintegrate in time, especially if subjected to much heat, and a considerable bulk of carbon blocks is frequently required to produce the desired resistance, which in many kinds of apparatus is very objectionable.

In our invention we have discovered a means of producing an artificial resistance which overcomes all these objections, and which is at once extremely cheap, durable, will withstand any reasonable degree of heat without injury, and occupies very much less space than even the carbon pile to produce a given amount of resistance; and our invention consists in an artificial resistance consisting of a pile of thin sheet metal, preferably ordinary sheet-iron plates placed one on top of another.

It is desirable in practicing our invention to remove the gloss usually found upon the surface of the sheet-iron, either by hammering the same or by heating the sheet-iron plates to a bright cherry-red in a suitable fire. The sheet-iron plates we have used with very good results have been about three sixty-fourths of an inch in thickness, and an inch wide by four inches in length, but the thickness, area, and shape of the plates may be varied.

Where it is desired to produce the required resistance without causing any considerable degree of heat in any part of the pile, we ar-

range the plates in such manner that the air can have ready access to or circulate through the pile. A convenient means of effecting this is to place thicker blocks of smaller area in the pile at intervals—as, for example, between each two alternate plates, so as to separate the plates, and thus increase the area of the plates to which the air can have access. As the metal plates are good conductors of heat, each plate will be approximately of the same temperature throughout, so that the air having access to part of the plate it will thus cool the whole plate. The pile of sheet-metal plates may be inclosed in any suitable insulating-case; but we preferably make the case of cast-iron and line the same with slate or other insulating material, so that no change or injury will be produced by the heat generated by the resistance. This case should of course be partially open where it is desired to prevent accumulation of heat. The resistance of the sheet-metal pile as a whole may be somewhat varied by the degree of pressure with which the plates are pressed together, and for this purpose we provide the box or case with a screw or other suitable device for regulating the pressure. The resistance of the pile may be diminished by increasing the area of the plates, and vice versa.

Our improved artificial resistance may be used for almost any purpose that other resistances are used, and the same may be connected in any desired electric circuit. Where it is desired to vary the resistance, one terminal of the circuit-wire may be connected at different points in the pile; or a number of branch wires may be used leading to various parts of the resistance-pile.

In practice we have found that a pile of sheet-iron plates will give about four or five times the resistance that a pile of carbon plates of the same size will produce. This reduction in bulk, to produce any given resistance, is a very great advantage over the ordinary carbon pile.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a side elevation of a device embodying our invention. Fig. 2 is a detail plan and end view of one of the thin sheet-metal resist-

ance-plates; and Fig. 3 is a like view of one of the intermediate thicker plates, of smaller area, used to give free access of air to the pile.

In said drawings, A represents a case, preferably of cast-iron; B, an insulating-lining therefor, preferably of slate.

C C C represent thin sheet-metal plates, forming the pile, preferably of sheet-iron with the gloss upon its surface removed; and C' are thicker plates, of smaller area, interposed at intervals between the plates C, so as to afford an air-space, *c*, between alternate plates C at each end thereof.

D represents a screw or other equivalent device for regulating or adjusting the pressure upon the plates.

D' is a movable metal plate, to afford a proper bearing for the end of the screw. But for this plate, the end of the screw would be likely to break the insulating-plate of slate at the top of the box.

E E represent the terminals of the circuit-wire, in which the resistance-pile is or may be included in whole or in part. The plates C are preferably made rectangular in shape, as in this way the sheet metal may be cut without waste.

Scraps of sheet-iron that are too small for other use may by our invention be utilized in making artificial resistances.

The thicker plates, C', which serve to separate the plates C at intervals, and thus produce air-passages *c* between them, may preferably be made of sheet-iron, steel, or other metal; but they may be made of any conducting substance, and instead of being in the form of plates they may have other suitable form to support and separate the plates C, and at the

same time afford an electrical connection between them. We prefer, however, to make them in the shape of plates, as this is a very cheap construction, and they thus produce, with the plates C, a firm pile or structure.

We claim—

1. The artificial electric resistance consisting of a pile of thin sheet-metal plates, substantially as specified.

2. The artificial electric resistance consisting of a pile of thin sheet-iron plates placed one on top of another, substantially as specified.

3. The artificial electric resistance consisting of a pile of thin sheet-iron plates placed one on top of another, said plates having the gloss removed from their surface, substantially as specified.

4. The artificial electric resistance consisting in a pile of thin sheet-metal plates, in combination with thicker plates of smaller area interposed at intervals between them, substantially as specified.

5. The artificial electric resistance consisting in a pile of thin sheet-metal plates placed one on top of another, and provided with open spaces or passages for circulation of air, substantially as specified.

6. The combination, with a box or case, of a pile of thin sheet-metal resistance-plates therein and a screw for regulating the pressure upon said plates, substantially as specified.

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