No. 648,692. Patented May 1, 1900.

J. F. BACHMANN & A. VOGT.

ELECTRICAL RESISTANCE.

(Application filed Dec. 12, 1899.)

(No Model.)

Fig. 1.

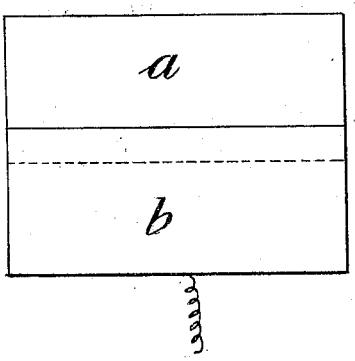


Fig. 2. Fig. 3. Fig. 4. Fig. 5.

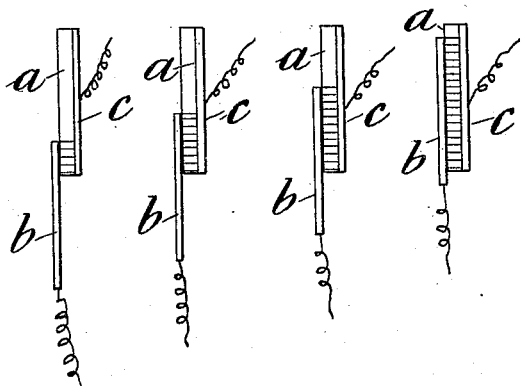
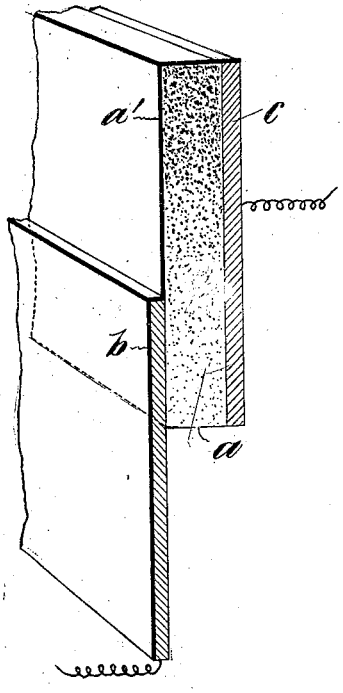


Fig. 6.



Witnesses.
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Atty

UNITED STATES PATENT OFFICE.

JOSEF FRANZ BACHMANN AND ADOLF VOGT, OF VIENNA, AUSTRIA-HUNGARY, ASSIGNORS TO THE ELECTRIC RESISTANCE AND HEATING COMPANY, LIMITED, OF LONDON, ENGLAND.

ELECTRICAL RESISTANCE.

SPECIFICATION forming part of Letters Patent No. 648,892, dated May 1, 1900.

Original application filed November 22, 1898, Serial No. 697,192. Divided and this application filed December 12, 1899. Serial No. 740,098. (No model.)

To all whom it may concern:

Be it known that we, JOSEF FRANZ BACHMANN, residing at 81 Kaiserstrasse, Vienna VII, and ADOLF VOGT, residing at 41 Zentagasse, Vienna V, in the Empire of Austria-Hungary, citizens of Germany, have invented certain new and useful Improvements in Electric Resistances, (for which we have obtained patents in Argentina, dated August 29, and September 19, 1899, No. 2,659; in Belgium, dated October 4, 1898, No. 138,204; in Brazil, dated August 3, 1899, No. 2,874; in Cape of Good Hope, dated May 26, 1899, No. 1,772; in Egypt, dated May 20, 1899, No. 92; in Finland, dated October 20, 1898, No. 898; in France, dated October 4, 1898, No. 281,883; in Great Britain, dated August 24, 1898, No. 18,232; in Hong Kong, dated July 24, 1899; in India, dated July 10 and August 4, 1899, No. 205; in Italy, dated December 23, 1898, No. XXXV, 49,504, CII, No. 182; in Luxemburg, dated June 23, 1899, No. 3,633; in Natal, dated May 27, 1899, No. 77; in Rhodesia, dated June 3, 1899, No. 64; in South Australia, dated June 14, 1899, No. 4,470; in Spain, dated November 9, 1898, No. 23,162; in Switzerland, dated October 4, 1898, No. 17,987, and in Tasmania, dated June 19, 1899, No. 2,506,) of which the following is a specification.

This invention, which was originally included in our application for United States Patent, filed November 22, 1898, Serial No. 697,192, of which this is a division, relates to electrical resistances made of an artificial-stone compound, such as is described in our application of October 8, 1897, Serial No. 654,560, which consists of a mixture of a conductor, such as carbon or metals, and a non-conductor, such as kaolin or oxids, prepared by mixing these substances together with water or other liquid in the form of a paste or dough and after molding or running the mixture into molds and drying the same heating the body to a high temperature while it is either embedded in carbon powder or is surrounded by reducing-gases. With resistance-bodies so prepared it is of considerable importance with a view to the possibility of being able to prepare them with a very low degree of conductivity that with a very small movement of the circuit-closing device or switch employed comparatively-large surfaces of the resistance-body shall be included in or excluded from the circuit. By this means the resistance is capable of being regulated within comparatively-wide limits without requiring the apparatus to be made of proportionately-large dimensions. For this purpose according to the present invention the resistance-body is made in the form of a plate or slab, so that by shifting the circuit-closing device, which is also made of a plate form, large portions of the resistance-surface are either brought into or put out of contact with the circuit-closing device with a comparatively-small motion of the latter. The resistance material of which the slabs or plates are made can either be of uniform composition throughout or the proportions of the conductor and non-conductor employed can be varied in different parts of the plate, so as to produce a variable resistance at different points, whereby the limits within which regulation can be effected can be still farther widened.

On the accompanying drawings, in which Figure 1 is a front view, and Figs. 2 to 5, inclusive, side views of our device, said Figs. 2 to 5, inclusive, showing various relative positions of the terminals *b* and *c* between open and fully-closed circuit, and Fig. 6 a perspective view showing our resistance material of varying composition and conductivity, is shown, by way of example, a resistance-body of plate form according to the present invention.

Fig. 1 shows a front view, and Figs. 2 to 5 show end views with the sliding contact device in different positions upon the resistance-body. The plate or slab *a*, formed of the artificial-stone compound hereinbefore referred to, has a metal backing *c*, while on the front surface bears the circuit-closing plate *b*, the surfaces in contact being ground upon each other, so as to insure effectual contact. It will be seen that by shifting the plate *b* from the position at Fig. 2 successively into the positions at Figs. 3, 4, and 5 a consider-

able increase of contact-surface, extending over the entire breadth of the plate *a*, is included in the circuit by a comparatively-small motion of the contact-plate *b*, so that the degree of resistance can be greatly varied, notwithstanding the small amount of conductivity of the resistance-body.

Fig. 6 shows a resistance-slab formed of the said artificial-stone compound in which the proportion of particles of the conductor (represented by the black dots) is gradually increased relatively to that of the non-conductor in the upward direction, the electrical resistance of the material being thus decreased in a corresponding manner from the lower side of the slab at *a* toward the upper side at *a'*, so that on shifting the contact-plate *b* upward to a slight extent the resistance is reduced not only by the increase of surfaces in contact, but also by the greater conductivity of the part of the slab which is freshly brought into contact.

Having thus described this invention and the best means we know of carrying the same into practical effect, we claim—

1. An electrical resistance of an artificial-stone compound composed of a mixture of a conductor and of a non-conductor, made in the form of a plate or slab, and a circuit-closing device also made of a plate or slab form, extending across the entire width of the resistance-body, so that by a comparatively-small motion of such device a regulation of the electrical energy between wide limits is obtained, substantially as described.

2. An electrical resistance of an artificial-stone compound composed of a mixture of a conductor and a non-conductor made in the form of a plate or slab, the proportion of the said conductor and non-conductor being made to vary in different parts of the plate or slab, and a circuit-closing device also made of a plate or slab form extending across the entire width of the resistance-body, so that by a comparatively-small motion of such device a regulation of the resistance between wide limits is obtained, substantially as described.

3. In a circuit-closer, a metallic terminal, a resistance material on a surface of said terminal, said resistance material decreasing in conductivity from one side of the terminal to the other, and a second metallic terminal slidable on the resistance material, substantially as set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOSEF FRANZ BACHMANN.
ADOLF VOGT.

Witnesses:
GERALD L. SMITH,
C. S. HOPKINS.