A. KRAUSS.

ELECTROMAGNETIC REGULATOR.

APPLICATION FILED JULY 30, 1913.

1,162,174. Patented Nov. 30, 1915.

Fig. 1.

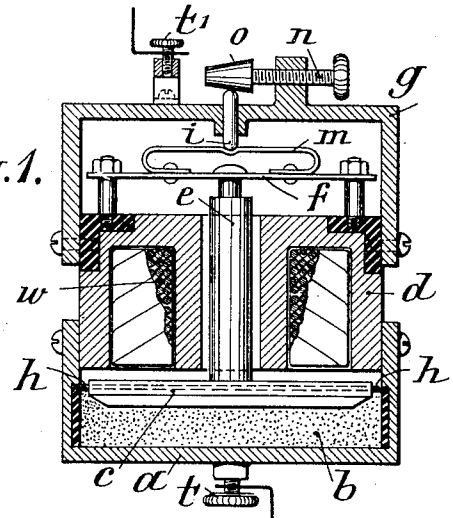


Fig. 2.

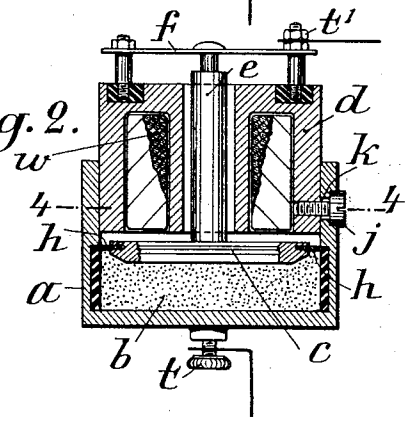


Fig. 3.

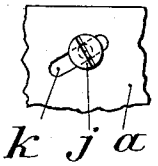
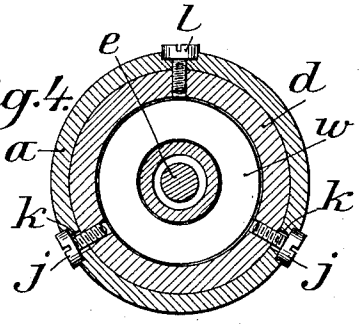


Fig. 4.



WITNESSES

L. B. Schroeder

L. Bates

INVENTOR

Adolf Krauss

By Fennie Davis & Goldsborough

Attys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ADOLF KRAUSS, OF CANNSTATT, GERMANY, ASSIGNOR TO THE FIRM OF ROBERT BOSCH, OF STUTTGART, GERMANY.

ELECTROMAGNETIC REGULATOR.

1,162,174. Specification of Letters Patent. Patented Nov. 30, 1915.

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To all whom it may concern:

Be it known that I, ADOLF KRAUSS, a subject of the German Emperor, residing at 8 Bryestrasse, Cannstatt, Wurttemberg, Germany, have invented certain new and useful Improvements in Electromagnet Regulators; 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.

The present invention relates to resistance regulators comprising a mass of loosely-packed divided resistance material on which presses a pressure member, preferably a floating armature, in response to an electromagnet excited with current from the circuit to be regulated and effective to thereby vary the resistance of the field circuit of the generator. In such regulators it is desirable to be able to adjust the normal resistance between the circuit terminals, that is the resistance between the circuit terminals when the electromagnet is not excited, because the value to which the regulated quantity is to be maintained constant is thereby made adjustable at will, or a certain value may be maintained constant in spite of variations of other factors entering into consideration. Tests have shown that even relatively small variations of the normal pressure exerted upon a resistance mass of this kind produces comparatively large changes in the resistance between the circuit terminals, so that the means herein disclosed are of much importance in adapting the regulator to its best performance under given requirements. In the preferred construction disclosed herein, the adjustment of the normal resistance between the circuit terminals of the regulator is attained by adjusting the normal pressure of the floating armature on the mass of resistance material.

In the accompanying drawings, illustrating the preferred and a modified arrangement within my invention, Figure 1 represents a central vertical section of the preferred embodiment; Fig. 2 represents a central vertical section of a modified construction; Fig. 3 represents a side view of a portion of the regulator of Fig. 2, and Fig. 4 represents a cross-section on line 4—4 of Fig. 2.

Referring to Fig. 1, *a* is a container for the mass *b* of loosely-packed divided resistance material, such as grains of carbon to which may be added, if desired, a quantity of mica flakes in order to form a resilient resistance mass. The electromagnet *d* is of the ordinary "pot" form having annular arms of magnetic material as iron, with an exciting winding *w* between the arms. The floating armature *c* of magnetic material forms a pressure member for the resistance mass *b*, and the flexible ring *h* of inelastic insulating material such as fabric is fastened to the armature *c* and to the container *a*. The armature *c* is fastened to the post *e*, which extends through a central opening in the magnet and is fastened at its other end to the flat spring *f* supported on blocks from the magnet as shown. Thus the armature is supported from the spring *f* in addition to being supported by the flexible ring *h*, but the spring *f* is so selected that it is stiffer than the ring *h*, whereby the armature *c* may be adjusted in depressed position by the pressure of the sliding pin *i* on the yoke spring *m* supported by the spring *f*. Thus the normal resistance of the mass *b* may be adjusted at will by adjusting the screw *n* having the conical end *o* to thereby adjust the contact pressure of the floating armature *c*. The container *a* is made of electrical conducting material and is electrically insulated from the parts *c*, *e*, and on the sides from the resistance mass *b* in any suitable way, while the yoke or cover *g* of metal is insulated from the magnet *d*. Thus the current flowing into the circuit terminal *t* passes with substantially uniform density from the bottom of the container *a* through the resistance mass *b*, thence to and out of the circuit terminal *t'*. The exciting winding *w* has outgoing terminals (not shown) which are adapted to be connected to the circuit to be regulated. Upon variations of the quantity to be regulated, the current in winding *w* varies and thereby alters the pull of the electromagnet on the floating armature and thus alters the resistance of the mass *b* between the circuit terminals *t* and *t'* of the regulator.

The modification shown in Figs. 2, 3 and 4 differs from that described in the means for adjusting the normal resistance between the circuit terminals of the regulator. In this modification, the container *a* for the resistance mass is provided with two in-

clined slots *k* through which the screws *j* extend into threaded holes in the magnet *d*. The flat spring *f* is effective on the floating armature *c* through the post *e* and, as before, is stronger than the flexible insulating ring *h*. Thus by adjusting the position of the container *a* relatively to the magnet *d*, the pressure of the floating armature *c* on the resistance mass *b*, is effective to adjust the normal resistance thereof between the circuit terminals *t* and *t'*. The screws *j* are then only partly tightened up until the desired operation of the regulator is secured by subsequent and more precise adjustment of the air gap between the floating armature *c* and the outer faces of the poles of the magnet *d*, and of the pressure of the flat spring *f*, whereupon the screws *k* are fully tightened, and the screw *l* secured in place to fix the position of the parts. The method of operation of this arrangement in regulating electric circuits will be apparent from the drawings and the previous description.

Having thus described my invention what I claim is:

1. In a regulator having circuit terminals for connection to an electric circuit, an electromagnet, a variable electrical resistance embodying resistance material and a container therefor, a pressure member effective on the resistance material to vary its electrical resistance in response to the electromagnet, flexible material fastened to the pressure member and to the container, a yielding support for the pressure member, and means for adjusting at will the normal resistance of the resistance material between the circuit terminals; substantially as described.

2. In a regulator an electromagnet, a variable electrical resistance embodying resistance material and a container therefor, a pressure member effective on the mass to vary its electrical resistance in response to the electromagnet, flexible material fastened to the pressure member and to the container, and pressure adjusting means embodying a spring, which is stiffer than the flexible material, for adjusting at will the pressure of the pressure member on the resistance material in order to adjust the normal resistance thereof between the circuit terminals; substantially as described.

3. In a regulator having circuit terminals for connection to an electric circuit, an electromagnet, a variable electrical resistance embodying resistance material and a container therefor, a floating armature effective by pressure to vary the electrical resistance of the resistance material in response to the electromagnet, flexible material fastened to the floating armature and to the container, a resilient member supporting the floating armature in contact with the resistance material, and means for adjusting the pressure of the floating armature on the resistance material in order to adjust at will the normal resistance thereof between the circuit terminals; substantially as described.

4. In a regulator having circuit terminals for connection to an electric circuit, an electromagnet, a variable electrical resistance embodying a mass of resistance material and a container therefor, a floating armature effective on the mass to vary its electrical resistance in response to the electromagnet, a strip of fabric fastened to the floating armature and to the container, a resilient member supporting the floating armature in contact with the resistance material, and means for adjusting the pressure of the floating armature on the mass of resistance material in order to adjust at will the normal resistance thereof between the circuit terminals; substantially as described.

5. In a regulator having circuit terminals for connection to an electric circuit, an electromagnet, a variable electrical resistance embodying resistance material and a container therefor, a floating armature effective by pressure on the resistance mass to vary its electrical resistance in response to the electromagnet, a flat spring supporting the floating armature in contact with the resistance material, a yoke spring fastened to the flat spring, and means for adjusting the pressure on the yoke spring in order to vary the pressure of the floating armature on the resistance mass to thereby adjust at will the normal resistance thereof between the circuit terminals; substantially as described.

6. In a regulator having circuit terminals for connection to an electric circuit, an electromagnet, a variable electrical resistance embodying resistance material, a floating armature effective by pressure on the resistance material to vary its electrical resistance in response to the electromagnet, a spring supporting the floating armature in contact with the resistance material and a member having a conical end designed to depress the spring in order to vary the pressure of the floating armature on the resistance material to thereby adjust at will the normal resistance of the resistance mass between the circuit terminals; substantially as described.

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

ADOLF KRAUSS.

Witnesses:
PAUL WOLFART,
HERMANN SCHNEIDER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."