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TEMPERATURE COMPENSATOR FOR VIBRATING REGULATORS.

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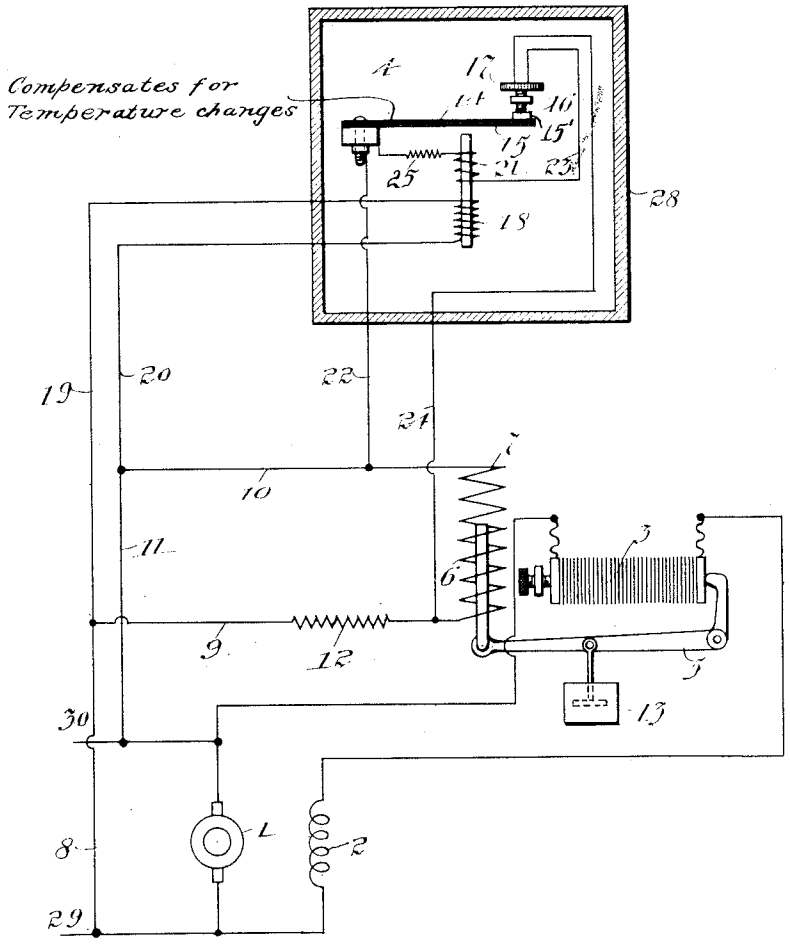

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UNITED STATES PATENT OFFICE.

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TEMPERATURE-COMPENSATOR FOR VIBRATING REGULATORS.

1,197,099. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed September 6, 1912. Serial No. 718,896.

To all whom it may concern:

Be it known that I, WILLIAM L. BLISS, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented new and useful Improvements in Temperature-Compensators for Vibrating Regulators, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to temperature compensators for vibrating regulators.

An object of the invention is to provide a vibrating regulator which shall be sensitive and constant in operation.

A further object is to provide a regulating system including vibrating regulators with means for compensating for the rise in resistance of the operating coils in the vibrating regulators due to temperature rise therein.

An embodiment of my invention is illustrated in the accompanying drawings which show diagrammatically a regulating system to which temperature compensating means has been applied.

The regulating system herein illustrated shows a generator 1 provided with a shunt field 2. The regulating elements here illustrated include a compressible rheostat 3 in series with the field and a vibrating regulator 4 controlling the operation of the operating means for the compressible rheostat. The compressible rheostat is controlled by a bell crank lever 5 provided with a plunger 6 of magnetic material, acted on by the coil 7 connected across the system as by conductors 8, 9, 10, 11. A suitable resistance 12 may be interposed in series with the operating coil. A dash pot 13 regulates the action of the bell crank lever.

The vibrating regulator comprises a flexible or elastic vibrating member rigidly attached at one end, composed of laminæ of dissimilar materials, such as the upper lamina 14 of brass and the lower lamina 15 of iron or steel. The vibrating member carries a contact 15′ adapted to coöperate with a contact 16 carried by an adjusting screw 17. The contacts are normally pressed together by the spring action in the vibrating member, and the amount of this pressure may be regulated by proper adjustment of the contact 16. A differential voltage coil 21 is connected across conductors 9 and 10 by conductors 22, 23, 24, and when energized, opposes coil 18. A suitable resistance 25 may be arranged in series with the coil 21. The vibrating member controls a circuit through contacts 15, 16, which, when the contacts are closed, short circuits the rheostat operating coil 7 and the differential coil 21. A suitable box or casing 28 incloses the vibrating member and its controlling coils. Conductors 29, 30, supply any desired translating devices.

The system illustrated may operate as follows: Upon rise in voltage of the system, the coil 18 vibrates the member 14, 15 in the manner of regulators of this type, this vibration being accelerated by the differential coil 21 which is energized to oppose coil 18 upon separation of the contacts 15′, 16. These contacts control the energizing coil 7, the mean energization of which determines the pressure exerted on the electrodes of the compressible rheostat 3, and consequently the resistance of the shunt field circuit. Upon rise in temperature, due to heating of the coil 18, the resistance thereof will increase and therefore the vibrating member would respond to increasing voltages only. To avoid this difficulty and to provide for constant regulation, the laminated structure of the vibrating member may be employed. The heat generated in the coil 18 affects the vibrating member, the laminæ thereof expanding at unequal rates, the brass more rapidly than the steel, thereby tending to move the vibrating member in a direction to separate the contacts. This action decreases the spring pressure between the contacts which the operating coil has to overcome in proportion to the weakened effect of the coil.

It is to be understood that other materials than the ones specified may be employed in the construction of the vibrating regulator and that the same may be used in other forms than that disclosed. The illustration is merely indicative of one method of practising the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A vibrating regulator having an op-

erating coil, and a vibrating member controlled thereby provided with means for compensating for temperature rise in said coil.

2. A vibrating regulator having an operating coil and a spring armature controlled thereby, provided with means for varying the spring action thereof to compensate for temperature rise in said coil.

3. A vibrating regulator having an operating coil, an elastic armature controlled thereby normally held away from said coil by the elasticity thereof, said regulator having means for varying the elasticity of said armature to compensate for temperature rise in said coil.

4. A vibrating regulator having an operating coil and a spring held vibrating armature controlled thereby, said armature composed of laminæ of materials having different coefficients of expansion whereby temperature rise in said coil may affect said armature to flex the same, thereby modifying the spring action thereof.

5. A vibrating regulator having an operating coil, a second opposing coil and a flexible armature under control of said coils, said armature composed of laminæ of materials having different coefficients of expansion whereby temperature rise in said coils may cause distortion of said armature to vary the flexibility thereof, thereby compensating for the increased resistance of said coils due to temperature rise.

6. A regulator having an operating coil, a resilient vibrating armature composed of laminæ of dissimilar materials, and an inclosing casing therefor.

7. A vibrating regulator having an operating coil and a vibrating armature controlled thereby composed of laminæ, one of which is of brass and another of steel.

8. An armature for vibrating regulators having resilient laminæ of dissimilar materials.

9. An electric regulator having a resilient vibratory armature controlled by an electromagnetic winding and means for increasing the accuracy of said regulator, said means including temperature affected means for varying the resiliency of said armature to compensate for temperature rise in said electromagnetic winding.

10. An electric regulator having a resilient vibratory armature controlled by an electromagnetic winding and means for increasing the accuracy of said regulator, said means including temperature affected means for varying the resiliency of said armature to compensate for temperature rise in said electromagnetic winding, and means for confining the heat generated in said winding so that it may affect said temperature affected means.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM L. BLISS.

Witnesses:
E. J. HANNIG,
C. H. WILMER.