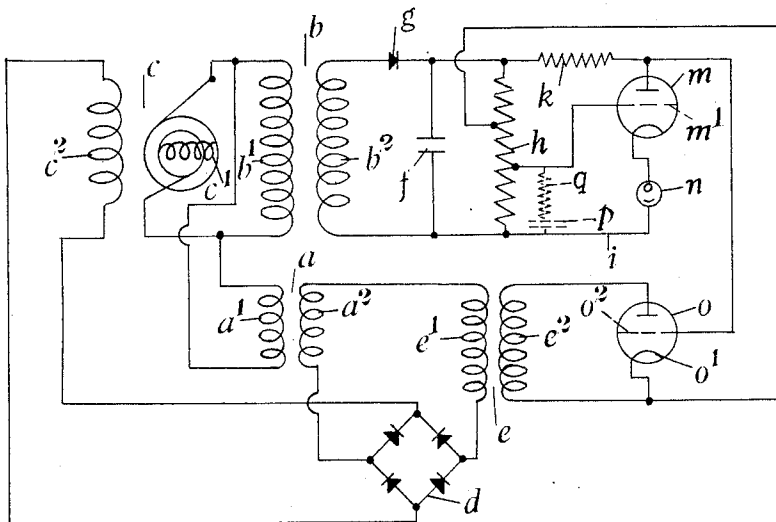


March 27, 1951

J. A. LAIRD ET AL
REGULATING MEANS FOR ALTERNATING
ELECTRIC CURRENT GENERATORS
Filed July 26, 1946

2,546,549



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UNITED STATES PATENT OFFICE

2,546,549

REGULATING MEANS FOR ALTERNATING
ELECTRIC CURRENT GENERATORSJohn Andrew Laird and John William Reid-
Jones, Birmingham, England, assignors to Jo-
seph Lucas Limited, Birmingham, EnglandApplication July 26, 1946, Serial No. 686,267
In Great Britain May 14, 1945Section 1, Public Law 690, August 8, 1946
Patent expires May 14, 1965

1 Claim. (Cl. 321—23)

1

This invention has for its object to provide improved regulating means for maintaining a substantially uniform voltage over widely varying conditions of load and power factors in alternating electric current generators.

The accompanying diagram illustrates one mode of carrying the invention into effect.

Referring to the diagram, we employ a pair of suitably designed transformers *a*, *b*, having primary windings *a*¹, *b*¹ and secondary windings *a*², *b*², the primary windings being each adapted to be connected in parallel with the generating windings as *c*¹ of the alternating current generator *c*. The transformer *a* is of the step-down kind and is adapted to supply the required current to the exciting windings as *c*² of the generator *c* through any convenient full-wave rectifier *d*, the latter being arranged between and connected to the secondary winding *a*² and the exciting windings. Arranged in series with the secondary winding *a*² and between one end of the latter and the rectifier *d* is an impedance winding *e*¹, the purpose of which is to enable the current supplied to the exciting windings as *c*² to be varied.

The other transformer *b* is designed to impose the required voltage on the parts associated with it. These parts are as follows: In parallel with the ends of the secondary winding *b*² of the transformer *b* is arranged a condenser *f*, and between one end of this secondary winding and one side of the condenser is arranged any convenient rectifier *g*. The two sides of the condenser *f* are interconnected by a resistance *h*, and in parallel with the resistance is arranged a branch circuit *i* containing (in series) a resistance *k*, a thermionic vacuum valve *m* and a constant voltage gas discharge tube *n* which may be a known type of neon bulb, the grid *m*¹ of the valve being connected to an intermediate point on the first mentioned resistance *h*. The purpose of the neon bulb *n* is to serve as a voltage standard. Also we employ a thyatron *o*, the cathode *o*¹ of which is connected to a suitable point on the first mentioned resistance *h*, the grid *o*² of the thyatron being connected to a point in the branch circuit *i* between the valve *m* and the associated resistance *k*. Further the thyatron *o* is connected to a winding *e*² associated with the above mentioned impedance winding *e*¹, these two windings forming parts of a third transformer *e*, and the arrangement being such that the effective impedance of the said impedance winding can be varied by the thyatron current flowing through the associated winding.

The cathodes of the thermionic valve *m* and the thyatron *o* are heated in any convenient manner.

If desired a condenser *p* and resistance *q* may be arranged in series with each other between

2

the grid *m*¹ of the thermionic valve *m*, and the neon bulb *n* to improve stability and prevent hunting.

It will be understood, that the purpose of the second transformer *b*, and its associated parts is to cause the thyatron current to vary in response to variable thyatron current is to regulate the current supplied to the exciting windings as *c*² of the generator *c* in such a manner as will maintain a substantially uniform generator voltage independently of variations of load or power factor.

If the generator *c* is a low voltage generator the transformer *a* may be dispensed with. On the other hand, if the generator *c* is a high voltage generator the transformer *b* may be dispensed with.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

Voltage regulating means comprising in combination a rectifier, an impedance winding for varying current flow through the rectifier, a thyatron, means for imposing a controlling voltage on the thyatron, and another winding through which the thyatron current can flow and which is arranged to vary the effective impedance of the impedance winding, so that variation in the voltage imposed on the thyatron is accompanied by variation of the current flow through the rectifier, the means for imposing a controlling voltage on the thyatron comprising a source of alternating current, a condenser connected across the alternating current source, a rectifier through which the condenser is intermittently charged by said source, a resistance connected in parallel with the condenser, a second resistance, a thermionic valve, and a constant voltage discharge tube, the valve and tube being connected in series with each other and with the second resistance across the first mentioned resistance which is connected at different points to the grid of the valve and the cathode of the thyatron.

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JOHN WILLIAM REID-JONES.

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