J. J. WOOD.

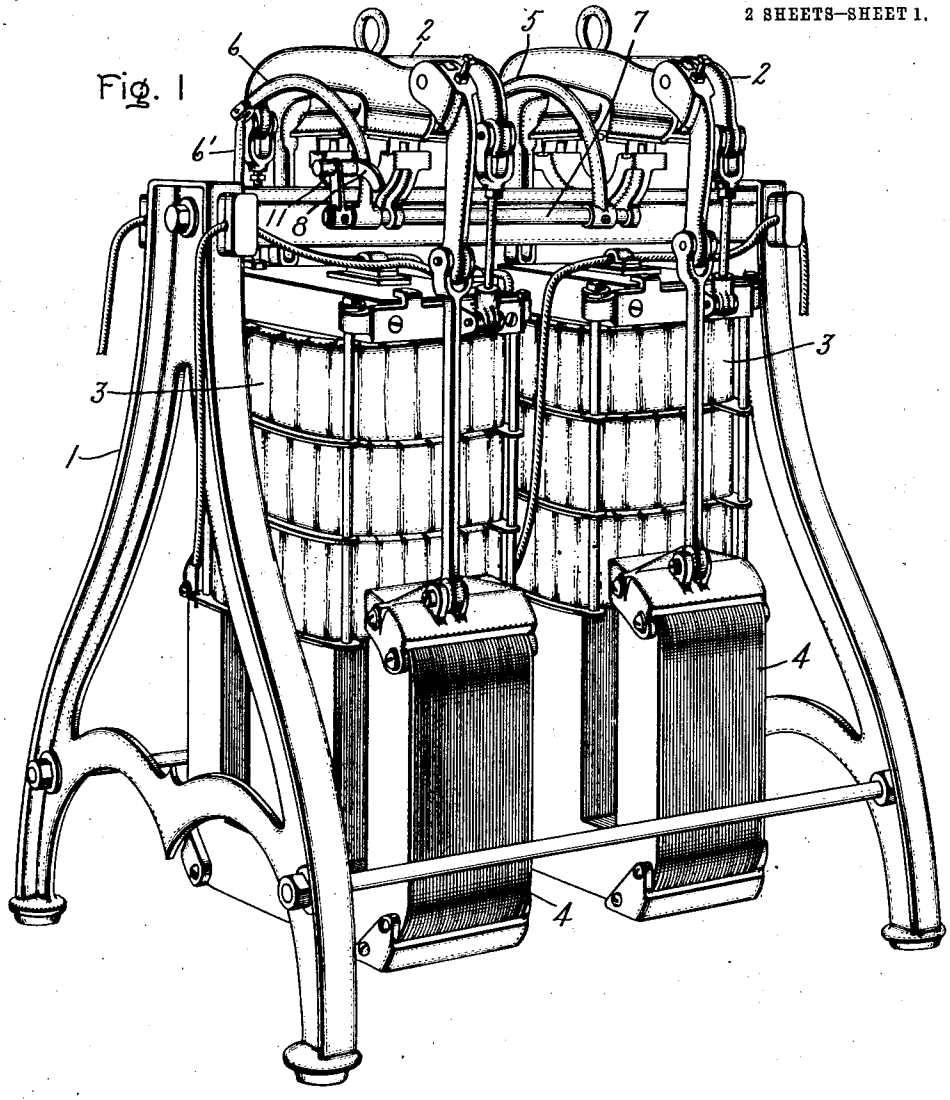
ALTERNATING CURRENT REGULATOR.

APPLICATION FILED FEB. 24, 1910.

1,070,651. Patented Aug. 19, 1913.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:

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J. Ellis Glen

Inventor:

James J. Wood,

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His Attorney.

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1,070,651.

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2 SHEETS—SHEET 2.

Fig. 3.

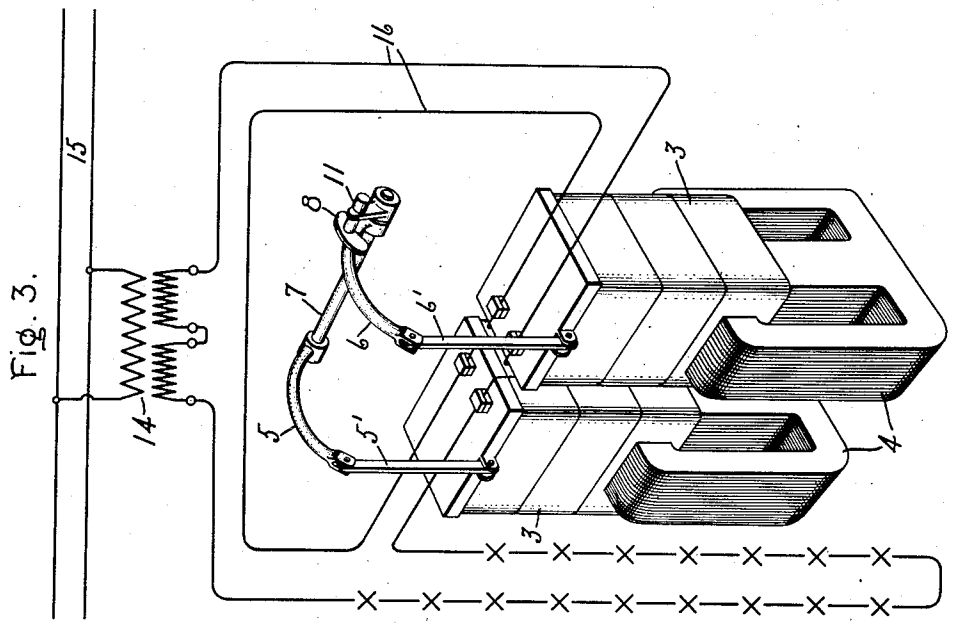
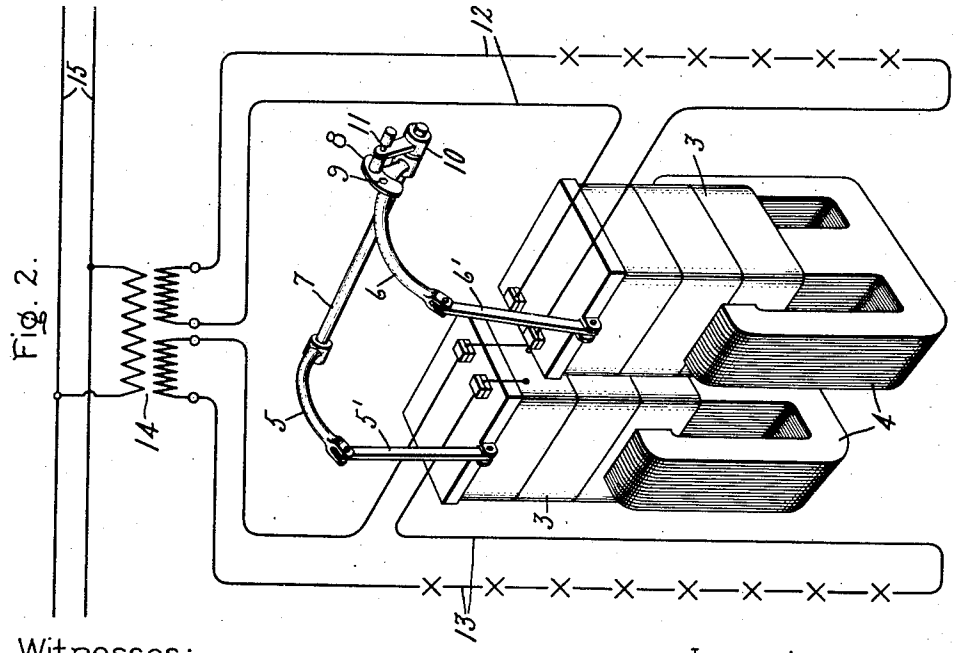


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ALTERNATING-CURRENT REGULATOR.

1,070,651. Specification of Letters Patent. Patented Aug. 19, 1913.

Application filed February 24, 1910. Serial No. 545,693.

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, county of Allen, State of Indiana, have invented certain new and useful Improvements in Alternating-Current Regulators, of which the following is a specification.

My invention relates to alternating current regulators and has for its object an improvement in such devices.

More specifically my invention relates to alternating current regulators of the kind described in Patents Nos. 720,305 and 765,948 granted to me Feb. 10, 1903, and July 26, 1904, respectively, and has for its object an improved construction for such regulators when they may be connected in series for regulating a circuit of a capacity greater than that of a single regulator, so as to equalize the load on each regulator.

I accomplish the object of my invention by mounting two or more regulators upon a frame and fastening to the coil portion of each regulator an arm and providing means whereby these arms may be rigidly connected together so that the core and coils will have the same relative amount of movement and thus each regulator will carry substantially an equal load and will heat a substantially equal amount.

For a further understanding of my invention reference may be had to the accompanying drawings where—

Figure 1 shows in perspective two regulators provided with my invention; and Figs. 2 and 3 show diagrammatically the connections for the regulators, Fig. 2 showing the regulators connected for independent operation and Fig. 3 showing the regulators connected in series for operation with a single circuit.

Referring first to Fig. 1, 1 is a frame which supports the lever systems 2 to which are connected the movable coils 3 and cores 4. These may be made similar to the constructions shown in Patents Nos. 720,305 and 765,948 and do not form a part of my invention.

Referring to Figs. 1 and 2, to the coil portion of the regulators are connected equalizer arms 5 and 6 by links 5′, 6′. Arm 5 is rigidly attached at one end to the shaft 7 which is supported by frame 1. Arm 6 is loosely mounted on the shaft at the end not attached to link 6′ and has formed at this end a quadrant device 8 containing a hole 9. Rigidly attached to shaft 7 is an arm 10 having a pin 11 formed so that it may be made to engage with hole 9 when the hole and pin are in line with each other. In the position shown in Fig. 2, pin 11 does not engage hole 9 so that arm 6 is not rigidly connected to shaft 7 and hence to arm 5, and thus it is obvious that the coil of each regulator may be moved independently with reference to the other.

In the arrangement shown in Fig. 3, pin 11 engages with hole 9 and it will be obvious that this rigidly connects arm 6 to arm 5, thus causing both coil portions of the regulators to have an equal and simultaneous movement. In Fig. 2 the regulators are shown as independently connected to circuits 12 and 13 which are fed by the divided secondary of transformer 14, whose primary is fed by conductors 15. In Fig. 3, the two regulators are shown as interlocked by the equalizer arms and shaft and connected in series to the circuit 16 which is fed by the secondary of the transformer 14 which now has its two windings connected in series.

The method of operation of my device will be as follows: If it be desired to regulate two circuits of a capacity equivalent each to that of one of the regulators, by which I mean that each regulator can regulate such a circuit without undue heating of the regulator, the connections may be made as shown in Fig. 2. Pin 11 will be placed so that it does not engage in hole 9 and thus there will be no rigid connection between the arms 5 and 6 and hence between the moving core portions of the regulators and each regulator may have an independent relative movement of its cores and coils and thus regulate independently of the other. If it be desired to regulate a circuit of a greater capacity than that of a single regulator, the regulators may be connected in series and pin 11 made to engage hole 9, in which case the two arms will be rigidly mechanically interconnected and hence the two cores and coil portions will have an equal and simultaneous movement and there will be a substantially equal division of the load between the regulators

and a substantially similar heating in each regulator.

I am aware that regulators of this general character have been used in the past connected in series to each other, but I am not aware that they have ever been mechanically interconnected so that they shall each carry a substantially equal division of the load. The advantage of my invention is that, with my invention applied to two or more regulators, each will regulate an equal amount and thus there will be a substantially similar heating in each, and one regulator will not do the greater portion of the regulating with the resultant increase of its losses and heating, while the other regulator is running in a position where its losses are low. Another advantage is that it is possible to start up the two regulators separately, each connected to a separate circuit as shown in Fig. 2, and later, if it is desired to combine the two circuits into one, they may be connected together as shown in Fig. 3 and by loosening the equalizer pin the regulators may be allowed to slide together so that the equalizer arms can be locked together without disturbing the circuits. Another advantage of my invention is that it reduces the insulation strain on the circuit.

While I have described a particular embodiment of my invention, I do not limit myself to this embodiment but seek in the appended claims to cover all embodiments which will be obvious to those skilled in the art and will be within the scope of my invention.

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

1. In combination, a loaded electric circuit, a plurality of regulators in series therewith, each regulator having a coil and a core relatively movable and being complete in itself, and means connecting the regulators for causing substantially equal division of the load among the regulators.

2. In combination, a loaded electric circuit, a plurality of regulators, each including a core and a coil relatively movable and being complete in itself, the coils being connected in series with the circuit, and means connecting the regulators for causing substantially equal division of the load among the regulators.

3. A plurality of electric regulators, each including a core and a coil relatively movable and being complete in itself, and means connecting the regulators for causing substantially equal movement among the coils and cores of the regulators.

4. A plurality of electric regulators, each including a core and a coil relatively movable and being complete in itself, and a plurality of arms connected to said coils causing substantially equal movement between the cores and the coils of the regulators.

5. A plurality of electric regulators each being complete in itself and including a core and a coil relatively movable, and interconnected by a series of levers, and a plurality of arms connected to said coils causing substantially equal movement between the cores and the coils of the regulators.

6. A plurality of electric regulators, each including a core and a coil relatively movable and being complete in itself, an arm connected to each core, and means for rigidly connecting together said arms.

7. In combination, a frame, electric regulators each having a core and a coil relatively movable and being complete in itself mounted thereon, an arm connected to each core and means for rigidly connecting together said arms to cause equal movement of the coils relative to their respective cores.

8. In combination, a frame, two electric regulators having movable cores and coils mounted thereon, a movable shaft supported by the frame, an arm rigidly attached at one end to the shaft, and connected at the other end to the coil portion of one of the regulators, a second arm loosely mounted on the shaft at one end and connected at the other end to the coil portion of the second regulator, and means for rigidly connecting the second arm to the shaft.

9. In combination, a frame, two electric regulators having movable coils and three-legged movable cores, a system of levers mounted on the frame interconnecting the coils and cores of the regulators, a movable shaft supported by the frame, an arm rigidly attached at one end to the shaft and connected at the other end to the coil portion of one of the regulators, a second arm loosely mounted on the shaft at one end and connected at the other end to the coil portion of the second regulator, and a latch and quadrant device for rigidly attaching the second arm to the shaft.

In witness whereof, I have hereunto set my hand this 21st day of February, 1910.

JAMES J. WOOD.

Witnesses:
A. L. HADLEY,
L. S. NOLD.