E. C. BALLMAN.

RECTIFIER FOR ALTERNATING CURRENTS.

APPLICATION FILED JUNE 25, 1917.

1,357,942. Patented Nov. 9, 1920.

Fig. 1.

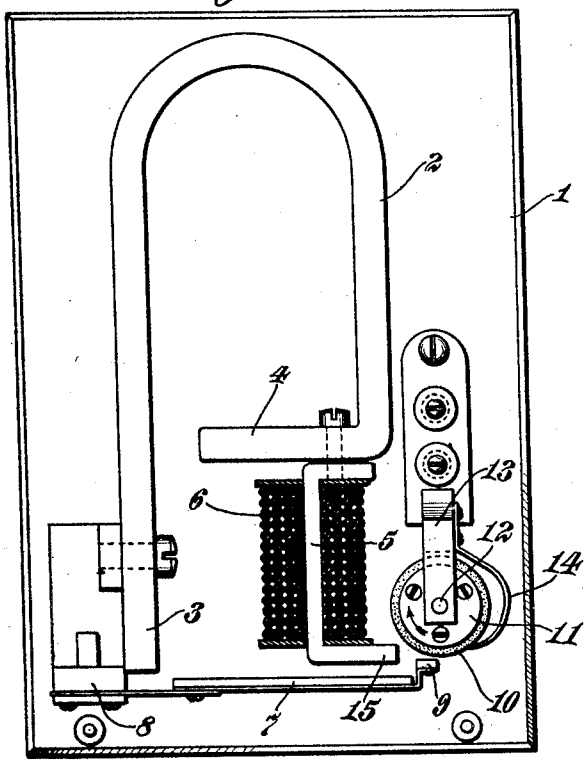
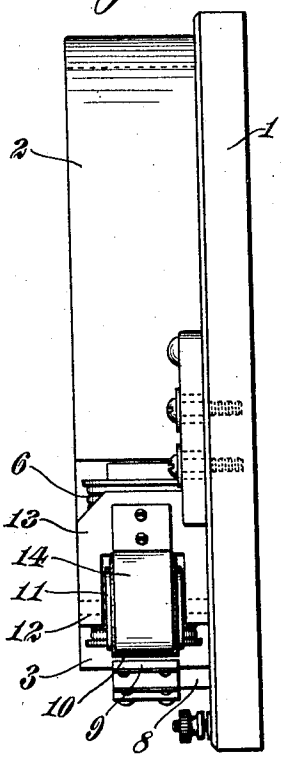


Fig. 2.



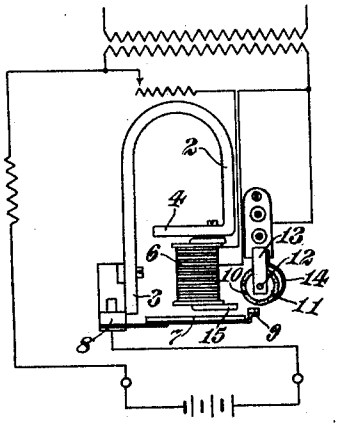


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWIN C. BALLMAN, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO VALLEY ELECTRIC COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

RECTIFIER FOR ALTERNATING CURRENTS.

1,357,942. Specification of Letters Patent. Patented Nov. 9, 1920.

Application filed June 25, 1917. Serial No. 176,906.

To all whom it may concern:

Be it known that I, EDWIN C. BALLMAN, a citizen of the United States, and residing at St. Louis, Missouri, have invented the new and useful Improvement in Rectifiers for Alternating Currents, of which the following is a specification.

This invention relates to rectifiers for alternating currents, and more particularly to rectifiers of the vibrating type.

Vibrating rectifiers as now constructed utilize metallic contacts which are subject to corrosion and erosion. It is, therefore, necessary to utilize some expensive non-corrodible metal as platinum. Since the same contact faces are always presented to the action of the spark, the corrosion and erosion, being necessarily limited to a given area, will be rapid.

One of the objects of this invention, therefore, is to provide a novel form of rectifier in which the contacts are so constructed that new surfaces are constantly presented to the action of the spark, so that corrosion and erosion are slow in their action.

Further objects will appear from the detail description taken in connection with the accompanying drawing, in which:

Figure 1 is a front elevation of a rectifier embodying this invention;

Fig. 2 is a side elevation;

Fig. 3 is a diagram showing the application of the rectifier.

Referring to the accompanying drawing, the rectifier is shown as of the type described in Patent No. 1,239,249, September 4, 1917, but it will be understood that this invention may be applied to other types of rectifiers. In the drawing, 1 designates a base, upon which is mounted a permanent magnet 2 having a leg 3 and a laterally turned leg 4, which latter has mounted thereon a soft iron core 5 containing an alternating current winding 6. The vibrator or armature 7 is mounted on a bracket 8, and this armature is provided at its end with a contact 9 engaging a coöperating contact 10. This coöperating contact comprises a carbon or graphite roll or disk mounted between two metal disks 11, and journaled at 12 in a bracket 13. A resilient spring 14 of phosphor-bronze or any other suitable material is mounted on the bracket 13, and has its free end bent and slightly sharpened to engage the disk 10 with a spring pressure. The leg 15 of the core 5 extends laterally so as to be adjacent to and opposite the coöperating contacts 9 and 10 at their point of contact.

During the operation of the rectifier, the armature will, of course, vibrate into and out of engagement with the contact disk 10. Now it will be noted that the contact 10 is so positioned that the movement of a contact point on 9, *i. e.*, the line of vibration, will not be radial, but rather to the left, Fig. 1, or at an angle to the radial line from the center of the disk 10. The result, therefore, is a component tending to move the contact disk 10 in the direction of the arrow, Fig. 1. The displacement of the contact 9 from a radial line need only be slight, since the armature vibrates very rapidly. Of course, the spring 10 will prevent rearward movement of the contact disk in a direction opposite to the direction of the arrow. With this rectifier, therefore, new surfaces are continually presented at the contact points, so that the action of pitting, and the wearing down of the contacts will be practically obviated. Moreover, the continual relative movement of the carbon or graphite disk with respect to the contact 9 (which may be of copper or an alloy) operates to keep the contact 9 bright and clean. The leg 15 sets up a magnetic field which acts as a blow-out to extinguish sparks at the contacts.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention, and it is, therefore, to be understood that this invention is not to be limited to the specific details described and shown.

Having thus described the invention, what is claimed is:

1. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact element mounted for movement to shift the position of its contacting surface, and a vibratory element coöperating with said contact element and adapted by its engagement therewith to shift the same.

2. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact element, a vibratory element co-

operating therewith, one of said elements being movable to shift the position of its contacting surface, and the other element being adapted by its engagement therewith to positively shift the same.

3. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact element, a vibratory element coöperating therewith, one of said elements being movable to shift the position of its contacting surface, and the other element being adapted by its engagement therewith to deliver a blow thereto having a component in the direction of shift.

4. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact disk mounted for movement to shift the position of its contacting surface, and a vibratory element coöperating with said disk and adapted by its engagement therewith to shift the same.

5. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact disk mounted for movement to shift the position of its contacting surface, and a vibratory element coöperating with the periphery of said disk and moving at an angle to the radius of said disk at the contact point.

6. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact disk mounted for movement to shift the position of its contacting surface, a vibratory element coöperating with the periphery of said disk and moving at an angle to the radius of said disk at the contact point.

7. In a rectifier of the vibrating type, vibrating contact mechanism, comprising, a contact element, a vibratory element coöperating therewith, one of said elements being movable to shift the position of its contacting surface, and the other element being adapted by its engagement therewith to shift the same, and means for setting up a magnetic field at the contact point.

In testimony whereof I affix my signature this 8th day of Feb., 1917.

EDWIN C. BALLMAN.