May 29, 1934. A. D. SILVA 1,960,599

MECHANICAL RECTIFIER

Filed June 21, 1933

Fig. 1.

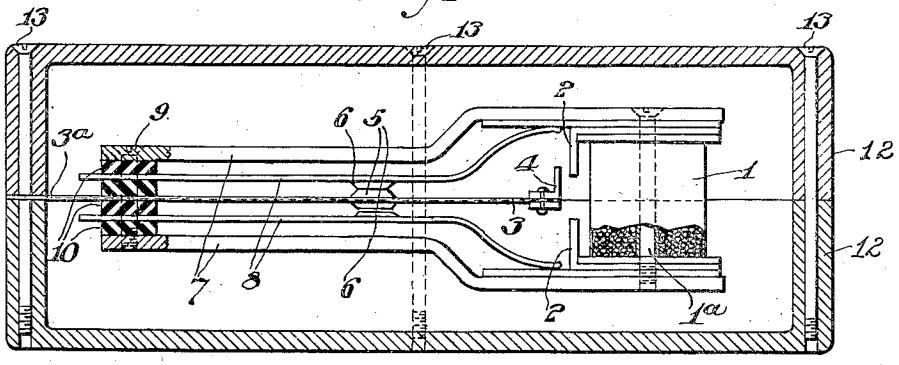


Fig. 2.

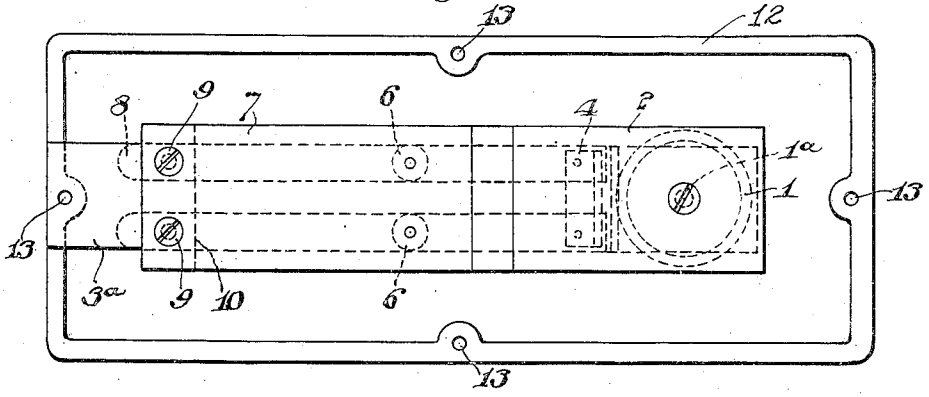
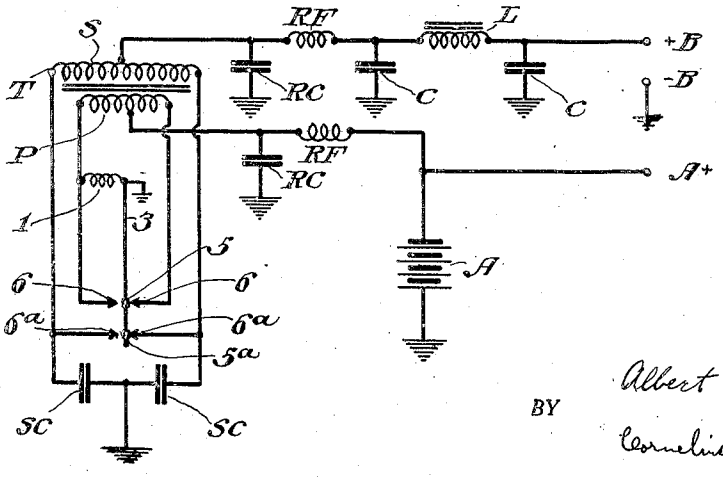


Fig. 3.



INVENTOR.

Albert D. Silva

BY

Cornelius D. Chet

ATTORNEY.

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1,960,599

MECHANICAL RECTIFIER

Albert D. Silva, Philadelphia, Pa., assignor to Atwater Kent Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

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6 Claims. (Cl. 175—365)

My invention relates to rectifiers of the vibrating reed type and particularly to methods of and means for mounting them to avoid or minimize disturbance to radio reception.

In accordance with my invention, the rectifier unit comprising the vibratory reed, its coil and contact system are supported at or adjacent the nodal point of the unit.

My invention also resides in the features of construction and arrangement hereinafter described and claimed.

Figs. 1 and 2 are side elevational and top plan views, respectively, of a rectifier embodying my invention.

Fig. 3 is a circuit diagram.

Rectifiers of the vibrating reed type are well known and have been used to supply the anode current of tubes of radio receivers. However, in many instances as where the rectifier is used in a self-contained receiver, particularly a metal-encased receiver such as used on automobiles, the mechanical vibrations of the rectifier have proved to be a serious disadvantage. The sound of the vibration is so loud as to interfere with radio reception and very often the mechanical vibration sets up vibration of some of the elements of the receiver, as for example the tube elements, plates of tuning condensers, etc., causing electrical effects which are amplified and reproduced by the loud speaker.

Numerous attempts have been made to alleviate the disturbing effect of the vibration essential to operation of this type of rectifier. Usually it has been sought to damp out the vibrations by use of soft rubber mountings and by enclosure of the rubber mounted unit by felt, sponge rubber, or the like. However, these expedients have not been satisfactory.

I have found that by mounting the vibrator unit at or near its nodal point substantially none of the vibration is transmitted, and the layers of felt or other dampening material may be dispensed with.

Referring to Figs. 1 and 2, the coil 1 and its pole pieces 2 are secured by bolt 1*a*, or equivalent, between the frame members 7. Between the other ends of the frame members 7 are clamped, as by bolts 9, the ends of the contact springs 8, 8 and one end of reed 3 whose free end carries the armature 4. The spacers 10 may be of bakelite, or the like, for insulating the reed and springs from each other.

By experiment, the nodal point of the unit comprising the coil, reed, contact springs and frame members 7, 7 was found to be near the bolt 9, and the anti-node near the opposite end of the unit. The ideal point for supporting the unit is, therefore, at bolts 9. However, for convenience, the unit is supported by clamping a short extension 3*a* of the reed 3 between the upper and lower halves of the housing 12 which is held together as by bolts 13. The housing may be of metal. The extension is the sole supporting means for the rectifier unit, and supports it sufficiently near the nodal point so that there is insubstantial transmission of vibrations to the casing. The interior of the casing is sufficiently large to avoid any contact between the casing and all parts of the vibrator unit.

In Fig. 2, the top half of the casing is omitted for clarity.

The housing may be directly mounted on the receiver chassis, or may be a separate unit for mounting, in the case of an automobile installation, on some part of the automobile body more or less adjacent the receiver. In either case, the nodal mounting is so effective that radio reception is not interfered with either by sound from the rectifier or by the effect of its vibration upon other components of the receiver.

The circuit arrangement which is shown in Fig. 3 is quite conventional and requires only brief description. The battery A, which may be the usual storage battery for lighting and starting the automobile, supplies current to the vibrator coil 1 and to the primary P of the step-up transformer T. The contact 5 carried by the reed 3 alternately engages the contacts 6, 6 carried by springs 8, 8 at a frequency determined by its natural period of vibration to maintain the reed in vibration by energization and deenergization of coil 1, and the same contacts serve as a reversing switch between battery A and the primary P so that an alternating current of substantially higher voltage than the direct current voltage of battery A is induced in the secondary S of the transformer. The contact 5*a* carried by the reed 3 alternately engages the contacts 6*a*, 6*a*, connected to the secondary terminals to rectify the high-voltage alternating current. A filter comprising inductance L and condensers C, C smooths the ripples of the rectified current so that it is suitable for energizing the anode circuits of the receiver tubes. The use of the radio-frequency chokes RF, RF and the radio-frequency by-pass condensers RC, RC is usually advisable. The principal purpose

of condensers SC, SC is to prevent undue sparking at the rectifier contacts 5*a*, 6*a*, 6*a*.

While I have illustrated a preferred form, it is to be understood that my invention is not limited thereto, but is co-extensive in scope with the appended claims.

What I claim is:

1. The method of preventing disturbance to radio reception by the mechanical vibration of a rectifier unit of the vibrating reed type which comprises determining the nodal point of the unit, and mounting the unit for support substantially solely at or adjacent its nodal point.

2. Rectifying apparatus for supplying current to the tubes of radio apparatus comprising a vibratile reed, an electromagnetic device, contacts actuated by said reed to control the energization of said device to maintain the reed in vibration, structure for mounting said reed, said device and said contacts as a unit, and means for supporting said unit at or adjacent its nodal point.

3. Rectifying apparatus for supplying current to the tubes of radio apparatus comprising a vibratile reed, an electromagnetic device, contacts actuated by said reed to control the energization of said device to maintain the reed in vibration, structure for mounting said reed, said device and said contacts as a unit, a housing for enclosing said unit, and means within said housing supporting said unit substantially solely at or adjacent its nodal point and within clearance to avoid contact between said unit and said housing.

4. Rectifying apparatus for supplying current to the tubes of radio apparatus comprising a vibratile reed, an electromagnetic device, contacts actuated by said reed to control the energization of said device to maintain the reed in vibration, structure for mounting said reed, said device and said contacts as a unit, and means for supporting said unit substantially solely at its nodal point comprising an extension of said reed.

5. Rectifying apparatus for supplying current to adjacent radio apparatus comprising a vibratile unit including a member mounted for vibration, an electromagnetic device, and contacts actuated by said member and controlling energization of said device to maintain said member in vibration, and means for preventing transmission of vibration of said unit to said radio apparatus comprising means for supporting said unit adjacent the nodal point of said unit.

6. Apparatus for supplying rectified current to adjacent radio apparatus comprising a vibratile unit including a member mounted for vibration, an electromagnetic device, and contacts actuated by said member and controlling energization of said device to maintain said member in vibration, and means for supporting said unit adjacent the nodal point of said unit at a distance from the point at which said vibratory member is mounted.

ALBERT D. SILVA.