

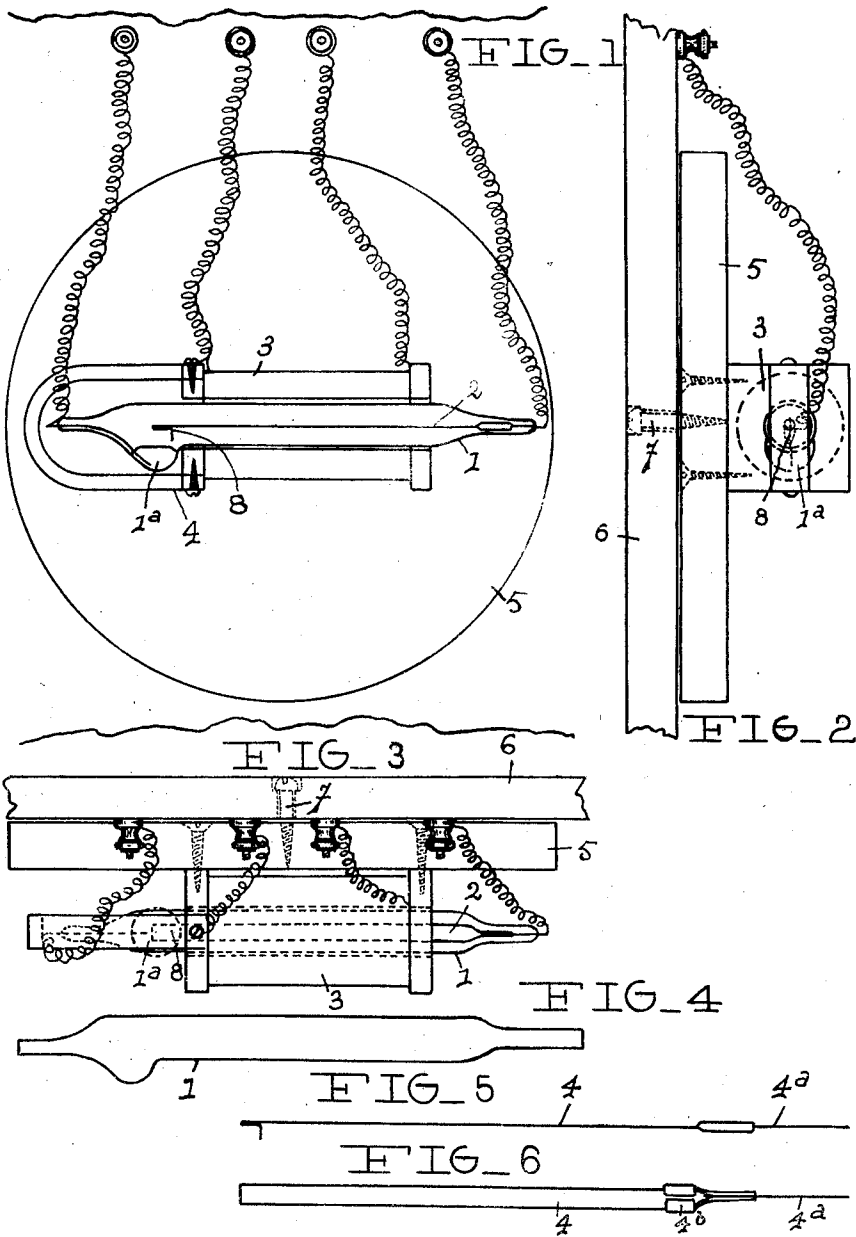
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VIBRATING BLADE RECTIFIER

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VIBRATING BLADE RECTIFIER

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3 Claims. (Cl. 200—91)

The present invention relates to rectifiers and has for its main object to provide a rectifier which will be silent in operation due to the elimination of noise generally occasioned in known rectifiers by the impact of the moving member on the fixed member; a rectifier wherein perfect contact is assured, which will practically never get out of order, and wherein positive disconnection is possible should the current be interrupted due to the almost impossible sticking of the contact.

The apparatus essentially comprises a glass tube or vessel, filled with an inert gas and containing a vibrating soft iron blade, provided with a point forming a moving contact, and a drop of mercury forming the stationary contact, this drop of mercury being contained in an enlargement of the tube. The current is conducted to the mercury by means of a platinite wire. The tube containing the vibrating blade is placed within a coil and a permanent magnet ensures the flux necessary to the movement of the blade. The whole is screwed on to a panel capable of pivoting about a central axis in such manner that the distance between the moving point and the mercury may be varied.

In the accompanying drawing, showing one of the constructional forms of the invention.

Fig. 1 is a front elevation of the whole apparatus,

Fig. 2 is a side elevation thereof,

Fig. 3 is a plan view of the same,

Fig. 4 shows a glass tube without fittings, and Figs. 5 and 6 show two methods of mounting the platinite current-conducting wire on the vibrating blade.

A vibrating soft iron blade 2 is mounted in a glass tube or vessel 1. At 1^a is formed an enlargement or pocket containing a globule of mercury forming the stationary contact, the movable contact being formed by the point 2^a. The vessel 1 (Fig. 4) is formed from a glass tube, filled with a reducing or inert gas, such as carbon dioxide, or illuminating gas, and sealed off immediately after the platinite wire, which does not amalgamate with mercury, has been put into position.

The vibrating blades can be manufactured from a soft iron ribbon 4 (Figs. 5 and 6) to the extremity of which a platinite wire 4^a (Fig. 5) is fixed by some suitable means. This may be effected for instance, by hooking a blade 4^b of platinite on the soft iron blade, the platinite wire 4^a (Fig. 6) being fixed to the platinite blade by pressing.

The vessel is then placed within an exciting solenoid 3 (Fig. 1) provided with a permanent

magnet 4 which ensures the flux necessary to the movement of the blade. If the excitation is to be effected with 4 volts then the solenoid may consist of 5 gr. of 15/100 gauge wire.

The whole is then screwed on to a wooden disc 5 disposed vertically on a panel 6 so as to be capable of rotating around an axis 7—(Figs. 2 and 3).

The apparatus works as follows:

The solenoid 3, in shunt upon the source of current to be rectified, produced upon the vibrating blade 2 a magnetization proportional to the intensity of the exciting current. Supposing that the direction of the current is such that the free extremity of the blade is a north pole, at that moment, said extremity will be attracted by the south pole of the magnet 4 and repelled by its north pole. The current inverting itself within the solenoid, the force will likewise inverse itself and the result will be the continued vibrating movement of the blade at the frequency of the current.

It is not necessary to refer to the well known function of the exciting coil and magnet.

So that rectification may take place, it is necessary that the vibrating blade be exactly in phase with the current to be rectified, and consequently with the excitation current.

Now owing to the self induction of the exciting solenoid, the magnetic field produced always lags slightly in respect of the exciting current.

It is possible to correct this lag, however, by acting on the blade. It is obvious that when the blade is in resonance with the frequency of the current, it is in phase with the field of excitation. If the natural frequency of vibration of the blade be lower than the frequency of the current, the blade lags behind the magnetic field and if the natural frequency of the blade be greater than that of the current, the tongue has a lead with respect to the magnetic field. This latter case is made use of for compensating exactly for the self induction of the solenoid. Therefore a particular type of blade will have to be designed for each type of solenoid. This condition, however, may be readily complied with, since the vibrating blade is extremely light and consequently, does not appreciably increase the self induction of the solenoid or coil.

The regulation of the distance of the contact point 8 from the globule of mercury is effected by rotating the supporting disc around the axis 7.

It must be remarked that, to this end, the point 8 does not strike the centre of the mercury but that it strikes the mercury near one of its edges,

a rotation of the disc in the clockwise directions causes the iron point (Fig. 1) to approach nearer to the surface of the mercury.

I claim

- 5 1. A device of the character described comprising an elongated sealed vessel containing a gaseous fluid and having a pocket formed upon one end portion thereof, a drop of mercury contained in the pocket of said vessel and constituting a fixed contact, a soft iron blade enclosed within said vessel provided with a point at one extremity thereof forming a movable contact disposed to cooperate with said drop of mercury and supported at its remaining extremity on the other end portion of the vessel for vibration therein, a solenoid surrounding the major portion of said vessel, and a permanent magnet arranged about the pocketed end portion of said vessel to ensure the flux necessary to actuate the vibrating blade.
- 20 2. A device of the character described comprising an elongated sealed vessel containing a gaseous fluid and having a pocket formed upon one end portion thereof, a drop of mercury contained in the pocket of said vessel and constituting a fixed contact, a soft iron blade enclosed within said vessel and provided with a point at one extremity thereof forming a movable contact disposed to cooperate with said drop of mercury, a relatively strong conducting wire fixed to the remaining extremity of said blade extending through the other end portion of the vessel and supporting the blade for vibration within the lat-

ter, a solenoid surrounding the major portion of said vessel, and a permanent magnet arranged about the pocketed end portion of said vessel to ensure the flux necessary to actuate the vibrating blade.

3. A device of the character described comprising an elongated sealed vessel containing a gaseous fluid and normally mounted in a substantially horizontal position, one end portion of said vessel having a pocket formed thereon, a drop of mercury contained in the pocket of said vessel and constituting a fixed contact, a soft iron blade enclosed within said vessel and provided with a point at one extremity thereof forming a movable contact disposed to cooperate with said drop of mercury, a relatively strong conducting wire fixed to the remaining extremity of said blade extending through the other end portion of the vessel and supporting the blade for vibration within the latter, a solenoid surrounding the major portion of said vessel and a permanent magnet arranged about the pocketed end portion of said vessel to ensure the flux necessary to actuate the vibrating blade, and a supporting panel carrying the vessel with said solenoid and permanent magnet and mounted for pivotal movement, whereby to adjustably displace the same and regulate the distance between the mercury contact and its cooperating contact point of the vibrating blade.

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