W. C. BRINTON, Jr.

ELECTRIC VIBRATOR.

APPLICATION FILED OCT. 24, 1916.

1,254,880. Patented Jan. 29, 1918.

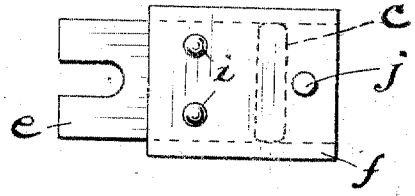

FIG. 1.

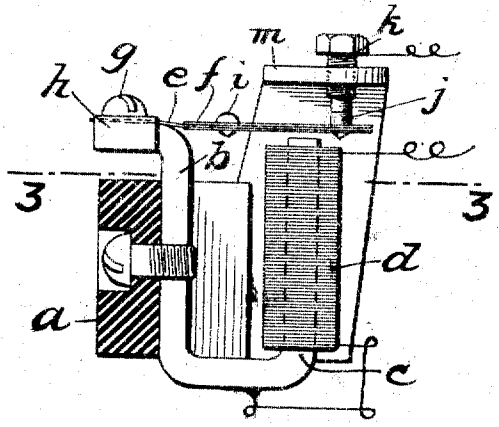

FIG. 2.

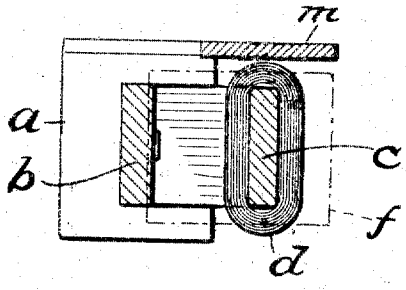

FIG. 3.

WITNESS:

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ELECTRIC VIBRATOR.

1,254,880. Specification of Letters Patent. Patented Jan. 29, 1918.

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To all whom it may concern:

Be it known that I, WILLIAM C. BRINTON, Jr., a citizen of the United States, residing at Kennett Square, county of Chester, and State of Pennsylvania, have invented a new and useful Improvement in Electric Vibrators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

As is well known, in an ordinary vibrator, composed of a fixed contact pin, an electromagnet comprising a core and winding, and an armature vibratable between the core and the contact pin, it is essential that the distance traversed by the armature should be substantially fixed, as otherwise the current consumption will vary within wide limits. The contact pin is, therefore, initially adjusted so that its contact surface will be a fixed distance from the contact face of the core. It is also well known that the contact surfaces are subjected to considerable wear, thereby gradually increasing the distance between contact surfaces and increasing the range of movement of the armature. This results in a pronounced variation in current consumption. To compensate for this and restore the initial conditions, the contact pin is made adjustable.

By more or less frequent adjustments of the contact pin, the desired current consumption may be in a measure restored to normal; but it is obvious that with many forms of machines in which vibrators are employed, the operator is not aware of the necessity of adjusting the contact pin or carelessly fails to do so, with the result that the variation in current consumption becomes serious, resulting in a greatly decreased efficiency in the operation of the machine of which the vibrator is a governing part.

Even where with careful supervision the contact member is frequently adjusted, the differential wear to which the fixed contact and the movable contact are subjected affects the alinement of the two contacts so as to make impossible a restoration of the original conditions.

The object of my invention is to provide a vibrator wherein a substantial variation in the range of movement of the armature will not affect the current consumption or will affect it only inappreciably, thereby dispensing with the necessity of adjusting the contact pin to compensate for wear. This object has been achieved without providing new parts, but by reconstructing the old parts and giving them, within clearly worked out limits, certain shapes and absolute and relative proportions which will be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the vibrating armature, with the core of the magnet in dotted lines. Fig. 2 is an elevation of the complete vibrator. Fig. 3 is a section on the line 3—3 of Fig. 2.

The U-shaped member *bc* is secured to an insulated base *a*. One upright arm *c* of said member forms the core of the magnet. *d* is the winding for the core. To the outturned end of the other arm *b* of said member is secured the armature. In the bracket *m* is screw-threaded a contact pin *k* arranged opposite a contact pin *j* secured to the free end of the armature. The armature comprises a thin metal plate *e* secured to the arm *b* by being clamped, by means of a screw *g*, between the arm *b* and a transversely extending channel-shaped strip *h*; and two thin metal plates *f* arranged on opposite sides of the plate *e* and secured thereto by means of rivets *i*.

The core of the magnet has the following essential characteristic: it is of approximately a pronouncedly oblong shape in cross-section, its width being several times greater than its thickness, the preferred ratio being about 4 to 1. By so shaping the core, it is possible to supersaturate the magnet, which is of importance.

The plate *e* of the armature is very thin, but is of spring metal so that its inherent elasticity maintains the armature normally in mechanical and electrical connection with the contact *k*. The employment of an inelastic armature operated by a separate spring should be avoided. The plates *f* of the armature preferably overlap the side edges of the plate *e*, but in any event the width of the armature should not be less than approximately the width of the core of the magnet. The provision of a relatively wide core and a correspondingly wide armature is an essential feature of the invention. Another important feature of the

armature is that it should be of relatively short length. It has been found that if the length of the armature (measuring from the axis of screw *g* to the center of the pin *j*) substantially exceeds twice the width of the armature, the desired results are not secured. The preferred ratio of length to width is about 7 to 5.

It has been found that by adjusting the contact pin *k* so as to vary the space traversed by the contact pin of the armature approximately from a minimum of .015 of an inch to a maximum of .050 of an inch, there is no appreciable variation in the current consumption or the variations is so slight as to be negligible.

The substantial uniformity of current consumption with a range of movement of the armature exceeding that produced by ordinary wear after long usage achieves the new result of dispensing with the necessity of adjusting the fixed contact and, therefore, accomplishes a result which is new in kind and not merely an improvement in degree.

While a condenser is employed, in the well known way, in connection with the vibrator, the same forms no part of my invention and is, therefore, not illustrated.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:—

1. In a vibrator, the combination with a magnet the width of the core of which is several times its thickness, of an inherently elastic vibratable armature plate in proximity to one end of the core and whose lengthwise extension is transverse to the width of the core, a contact member carried by the armature plate, and a second contact member against which the first contact member is held by the inherent resiliency of the armature plate when the magnet is deënergized, the width of the armature plate being not less than approximately the width of the core.

2. In a vibrator, the combination with a magnet the width of the core of which is several times its thickness, of a support electrically connected with the core, an armature composed of an inherently elastic flat plate extending in proximity to one end of the core, means confining one end of the plate flat against its support, a contact member carried by the plate, and a second contact member against which the first contact member is held by the inherent resiliency of the armature plate when the magnet is deënergized, the width of the armature plate being not less than approximately the width of the core.

3. In a vibrator, the combination with a magnet the width of the core of which is several times its thickness, of an inherently elastic vibratable armature plate in proximity to one end of the core and whose lengthwise extension is transverse to the width of the core, a contact member carried by the armature plate, and a second contact member against which the first contact member is held by the inherent resiliency of the armature plate when the magnet is deënergized, the width of the armature plate being not less than approximately the width of the core and the length of the armature plate between its fixed support and its contact member not substantially exceeding twice its width.

4. In a vibrator, the combination with a magnet the width of the core of which is several times its thickness, of an armature support electrically connected with the core, a thin inherently elastic flat strip secured flat against its support, flat thin strips secured to opposite sides of the first strip beyond the latter's support, the armature thus formed extending in proximity to the core of the magnet, and two contacts one of which is carried by the armature and is held against the other contact by the inherent resiliency of the inner strip when the magnet is deënergized.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, Penna., on this 13th day of October, 1916.

WILLIAM C. BRINTON, JR.