M. K. GOLDEN.

VIBRATOR.

APPLICATION FILED MAR. 28, 1908.

923,508. Patented June 1, 1909.

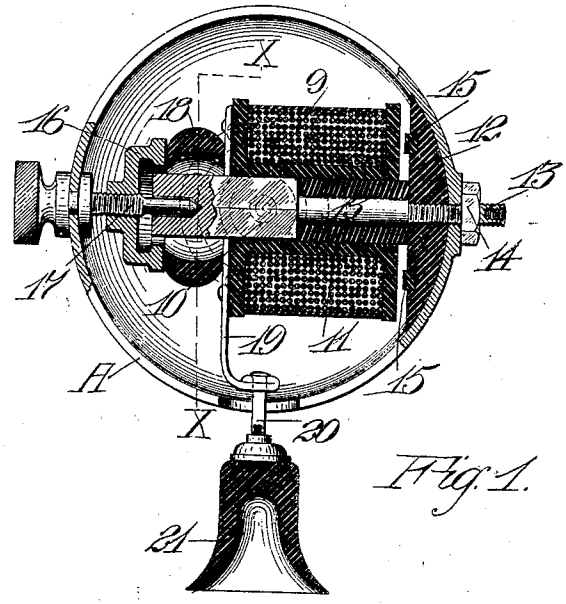


Fig. 1.

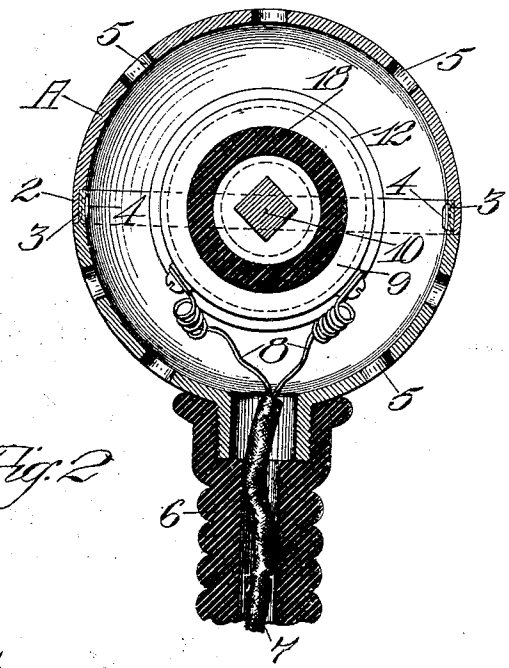


Fig. 2

Witnesses.
P. Bastberg
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Inventor.
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UNITED STATES PATENT OFFICE.

MAXIMILIAN K. GOLDEN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO JAMES JEROME, OF SAN FRANCISCO, CALIFORNIA.

VIBRATOR.

No. 923,508. Specification of Letters Patent. Patented June 1, 1909.

Application filed March 28, 1908. Serial No. 423,865.

To all whom it may concern:

Be it known that I, MAXIMILIAN K. GOLDEN, citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Vibrators, of which the following is a specification.

My invention relates to an apparatus for producing rapid vibrations and hammer-like blows.

It consists in the combination of parts, and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a horizontal section. Fig. 2 is a vertical section on line *x*—*x* of Fig. 1.

This apparatus is especially designed to provide a rapid vibrating action of a solenoid with relation to a fixed core, and to produce either transverse vibrating movements or hammer-like blows.

The outer case A is preferably made of an approximately globular form, and in two halves, one of which has a flange 2 fitting over the corresponding edge of the other. It is difficult to secure these parts together on account of the jar of vibration, which will soon loosen nuts or similar fixtures. I have therefore shown one of the overlapping flanges provided with projections 3, and the other is formed with corresponding indentations 4; these projections and indentations being of such a character that when the thin metal flanges of the shell are forced together, the projections will spring into the indentations, and thus form a lock to hold the parts firmly together.

The shell is perforated with holes, as shown at 5, and has a screw-threaded extension on one side for the reception of a handle 6, through which an insulating cable 7 may pass to carry the conducting wires 8 from an electrical source to the windings of an electro magnet 9. This magnet consists of an insulating spool having a central opening made rectangular or polygonal for the reception of a core 10, upon which it is guided and slidable. This core is fixed to extend substantially central across the shell A as shown, and the solenoid 9, movable freely upon the core, is slidable thereon. The core extends only a short distance into the solenoid, so that when the latter is energized, the tendency would be to draw the core into the solenoid, but as the core is fixed and the solenoid is movable, the latter would be drawn along the core in the effort to bring them to the relative position above stated. I have here shown a non-conducting or fiber extension 11 of the core 10, and this rests upon a non-conducting face 12 fitting against the side of the shell. By means of a bolt 13 extending from the core 10 through this base, and a nut 14 fitting upon the screw-threaded outer end of the bolt, the parts are firmly locked together.

15 are hard rubber or equivalent blocks projecting from the surface of the part 12 so that they form a point of contact for the solenoid 9 when it is moved to the end of its stroke in that direction. Surrounding the opposite end of the solenoid core is a cap 16 centrally screw-threaded, and a screw 17 fits this cap. The screw has an exterior head and flanges which clasp the sides of the shell A so that in turning the screw, it will not advance itself, but will advance the cap 16 in either direction.

Between the cap and the solenoid is fixed an elastic member 18. I prefer to make this member of rubber, since a steel or equivalent spring is liable to become crystallized and fracture by the rapid shocks to which it will be subjected. This elastic block 18 may be compressed to any desired degree against the end of the solenoid 9, and when the latter is deënergized, the opposite end will rest against the projections 15. When the solenoid is energized, it will be drawn away from the projections 15 by the effort to centralize the fixed core 10; when the solenoid is deënergized, it is immediately forced in the opposite direction by the elasticity of the block 18. Any well known current may be employed for energizing the solenoid without departing from the spirit of my invention, but the well known alternating current is preferred for my purposes.

19 is an arm fixed to and carried by the solenoid, and this arm has a shank 20 projecting through an opening in the side of the shell, and this may carry a frictional massage implement 21.

A device for transmitting the hammer-like blows of the solenoid in a direct line, may be also attached in the line of the shank 13, and thus produce what is known as the "patting movement" when used for this purpose; but it may also be used for other purposes where the hammer-like blow is desirable. This

apparatus is designed to be operated by an alternating electrical current, in which each pulsation forms what is termed "a cycle". The current thus produced alternately energizes and deënergizes at each reversal and at the point of reversal.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In an electrical vibrating apparatus, an exterior shell, a core fixed transversely across the shell, a solenoid slidably fitting the core, a striking surface in line with one end of the solenoid, an adjustable spring pressing against the opposite end whereby the solenoid is reciprocated to produce blows upon the striking surface by alternate energizing and deenergizing, and a member to which the movements of the solenoid are communicated.

2. In an apparatus of the character described, a containing shell, a non-conducting spherical segment having raised striking surfaces, a core having a screw-threaded shank extending through the segment, and means securing it in position, an elastic cushion surrounding the opposite end of the core, a solenoid slidable upon the core to move away from the striking surfaces when energized, and forced against said surfaces by the cushion, means for adjusting the tension of said cushion, and a member to which the movements of the solenoid are communicated.

3. In an apparatus of the character described, a globular shell having a non-conducting segment fixed in one side with raised striking surfaces, a rectangular core having a screw-threaded shank extending through the segment, and means for securing the parts together, a solenoid the interior spool of which is shaped to fit the core and to be guided thereon, a spring cushion inclosing the core exterior to the solenoid, a cap between which and the solenoid the cushion is retained, and means for moving said cap to vary the tension of the cushion, and a member to which the movements of the solenoid are communicated.

4. In an apparatus of the character described, a fixed polygonal core, a solenoid having a central opening fitting and guided thereon, striking surfaces for one end of the solenoid, a spring acting against the opposite end of the solenoid whereby the latter is caused to vibrate with relation to the striking surfaces by being alternately energized and deënergized, and a member to which the movements of the solenoid are communicated.

5. In an apparatus of the character described, spherical segments having overlapping flanges at their meeting edges, and interlocking projections and indentations upon said flanges, a core having its ends fixed to the segments, a solenoid guided and slidable upon the core, striking surfaces at one end of the solenoid, and an elastic member pressing against the opposite end of said solenoid, and a member to which the movements of the solenoid are communicated.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MAXIMILIAN K. GOLDEN.

Witnesses:
GEO. H. STRONG,
CHARLES EDELMAN.