

C. R. UNDERHILL.  
 SPARK COIL.  
 APPLICATION FILED FEB. 10, 1911.

1,095,437.

Patented May 5, 1914.

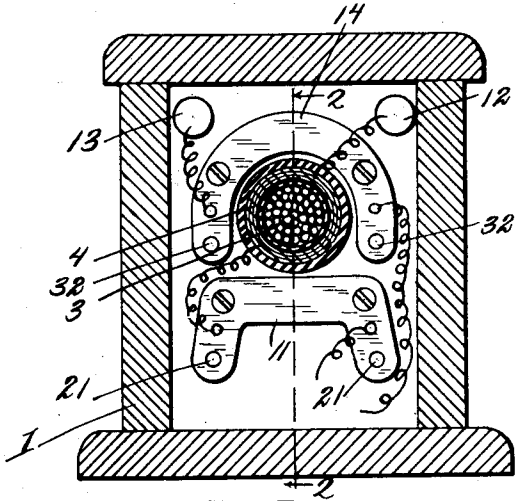


Fig. I.

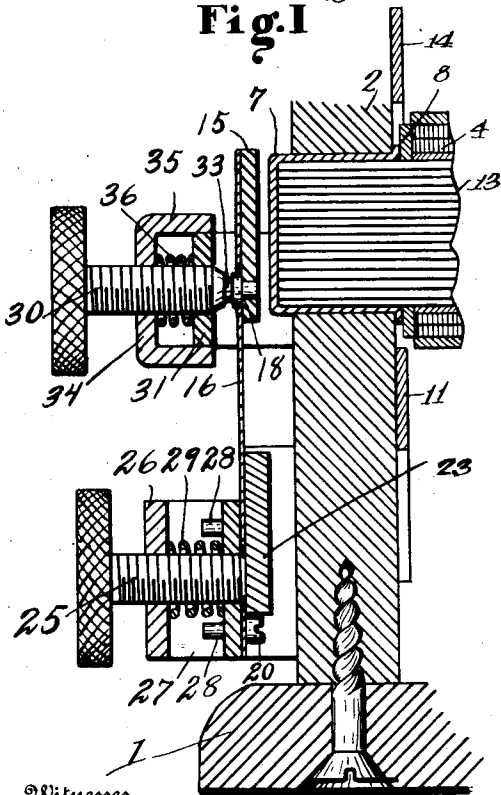


Fig. II.

Witnesses

Luella Greenfield  
 M. P. Woodruff

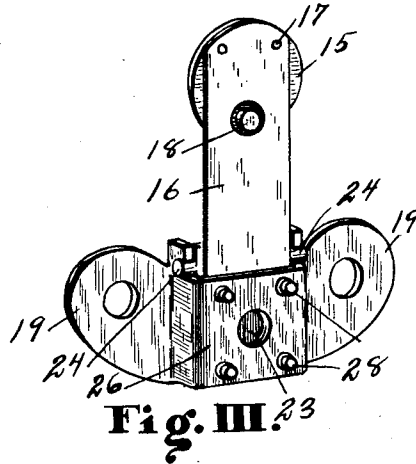


Fig. III.

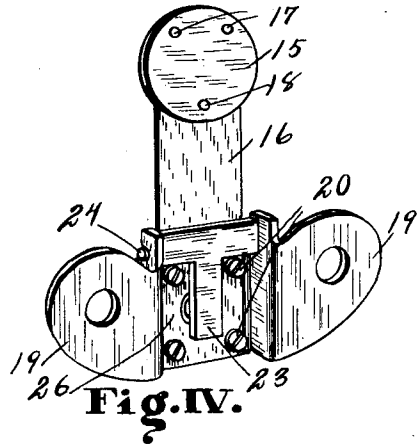


Fig. IV.

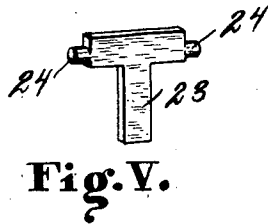


Fig. V.

Inventor

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# UNITED STATES PATENT OFFICE.

CHARLES R. UNDERHILL, OF MUSKEGON, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DETROIT COIL COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

## SPARK-COIL.

1,095,437.

Specification of Letters Patent.

Patented May 5, 1914.

Application filed February 10, 1911. Serial No. 607,839.

*To all whom it may concern:*

Be it known that I, CHARLES R. UNDERHILL, a citizen of the United States, residing at the city of Muskegon, State of Michigan, have invented certain new and useful Improvements in Spark-Coils, of which the following is a specification.

This invention relates to improvements in spark coils.

The main objects of this invention are, first, to provide in a spark coil an improved vibrator. Second, to provide in a spark coil an improved vibrator having a double adjustment, namely an adjustment for varying the tension of the armature spring and for adjusting the armature. Third, to provide in a spark coil an improved vibrator which is efficient at high and low speeds and on batteries of different strength. Fourth, to provide in a spark coil an improved vibrator which is very easily and quickly adjusted. Fifth, to provide a structure of the class described, which can be readily disassembled for the purpose of cleaning or renewal of the parts and readily reassembled. Sixth, to provide an improved structure of the class described in which the parts are simple and economical to produce and are easily assembled.

Further objects and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing, forming a part of this invention, in which:

Figure I is a transverse section of a structure embodying the features of my invention, certain parts being shown in full lines for convenience in illustration. Fig. II is a longitudinal section taken on a line corresponding to line 2—2 of Fig. I. Fig. III is a perspective view of the armature, its supporting spring and bracket. Fig. IV is an inside perspective view of the parts shown in Fig. III. Fig. V is a perspective view of the adjusting member 23.

In the drawings, similar reference characters refer to similar parts throughout the several views, and the sectional views are

taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, the casing 1 for the coil is in the form of a box, the vibrator mechanism being mounted on the end wall 2 thereof. The coil in the structure illustrated, consists of the core 3, the primary winding 4 and the secondary winding 5. These parts are shown in conventional form. The condenser 6 is also arranged in the casing. The core 3 of the coil projects at one end beyond the winding and is provided with a cap 7, the cap being arranged in an opening provided therefor in the wall 2, as clearly appears in Fig. I and Fig. II. The cap 7 has a flange 8 at its inner end which retains it in position. The secondary winding is connected to the terminals not shown. The condenser 6 is connected to the plates 11 and 14. These plates are mounted on the inside of the support 2. The primary winding is connected to the terminal 12 and the plate 11, while the terminal 13 is connected to the plate 14. See Figs. I and II. The armature 15 is carried by the spring 16, the armature being secured to the spring at its upper edge only, as by means of the rivets 17. The contact point 18 is mounted on the unsecured edge of the armature. The spring 16 is rigidly secured to the bridge-like bracket 19 by means of the screws 20. The bracket 19 is supported by means of the screws 21 arranged through the support 2 to engage the plate 11 on the inside thereof. The spring 16 is arranged in the inner side of the raised portion 22 of the bracket. The tension of the spring is regulated by means of the T-shaped lever member 23, which is provided with journals 24 on its arms arranged in bearings provided therefor on the bracket member 19 as clearly appears in Figs. III and IV, with the end of the member 23 engaging the inner side of the lever so that when pressure is applied thereto, as by means of the screw 25, the spring is forced outwardly. The screw 25 is threaded through the bracket 19 to engage the stem portion of the member 23. To retain the screw in its adjusted positions I provide a lock nut 26 having flange-like arms 27 which engage the projecting ends 28 of the screws 12 to prevent the nut from turning. The spring 29 holds the nut under suitable tension, the spring being arranged between the bracket and the nut. The ad-

justing screw 30 for the armature is threaded into the bridge like bracket 31, which is arranged to embrace the armature. This bracket is supported by means of the screws 32 which engage the plate 14 on the inner side of the support 2. The contact point 33 is set into the end of the screw 30. The screw 30 is held in its adjusted position by means of a lock nut 34 having flange-like arms 35 which engage the edges of the bracket 31. The spring 36 is arranged between the nut and the bracket to apply tension to the nut. By this arranging of the parts a double adjustment is provided, that is the varying of the tension of the spring as described and the varying of the space between the armature and the core. The latter adjustment is to compensate for changes in the batteries and the former to synchronize the vibration of the spring with the contact periods of the timer, in connection with which the coil is used. By mounting the armature on the spring as described, a lagging action of the armature is permitted but when it rebounds or is attracted to the core the break is very quick.

The parts are very simple and economical in structure and are easily assembled. By mounting the brackets as described they can be removed at any time to clean the contacts, or for other purposes.

In practice the casing or box is filled with an insulating compound as is customary. This is not illustrated in the accompanying drawings.

I have illustrated and described my improvements in the form in which I have embodied them in practice. I am aware, however, that considerable modification in structural details are possible without departing from my invention but as such modification will no doubt be readily understood by those skilled in the art to which this invention relates, I have not attempted to illustrate or describe the same herein.

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

1. In a structure of the class described, the combination of an armature; a supporting spring for said armature; a bridge-like supporting bracket for said spring, said spring being rigidly secured within the raised portion of said bracket; and means for adjusting tension of said spring, comprising a T shaped lever member, and having journals on its arms arranged in bearings provided therefor on said bracket to engage said spring; and an adjusting screw arranged in said bracket to engage the stem of said lever member.

2. In a structure of the class described, the combination of an armature; an armature supporting spring; an adjusting screw for said armature; a supporting bracket to

which said armature supporting spring is rigidly secured; means for adjusting the tension of said spring comprising a T-shaped lever member having journals on its arms arranged in bearings on said bracket to engage the said spring; and an adjusting screw threaded into said bracket to engage the stem of said lever member.

3. In a structure of the class described, the combination of an armature; an armature supporting spring; a supporting bracket to which said armature supporting spring is rigidly secured; means for adjusting the tension of said spring comprising a T-shaped lever member having journals on its arms arranged in bearings on said bracket to engage the said spring; and an adjusting screw threaded into said bracket to engage the stem of said lever member.

4. In a structure of the class described, the combination with a magnet, of an armature; a supporting spring for said armature, said armature being arranged between the spring and magnet and being secured to the spring at one edge only; a contact arranged on said armature at its unsecured edge; a supporting bracket to which said armature supporting spring is rigidly secured; and means for regulating the tension of said spring.

5. In a structure of the class described, the combination with a magnet, of an armature; a supporting spring for said armature, said armature being arranged between the spring and magnet and being secured to the spring at one edge only; a contact arranged on said armature at its unsecured edge; an adjusting screw for said armature; and means for regulating the tension of said spring.

6. In a structure of the class described, the combination with a magnet, of an armature; a supporting spring for said armature, said armature being arranged between the spring and magnet and being secured to the spring at one edge only; a contact arranged on said armature at its unsecured edge; and means for regulating the tension of said spring.

7. In a structure of the class described, the combination with a magnet of an armature; a supporting spring for said armature, said armature being arranged between the spring and magnet and being secured to the spring at one edge only; a contact on said armature at its unsecured edge to project through said spring; and a coacting adjustable contact arranged on the outer side of said spring.

8. The combination with a support, of a coil; a pair of plates arranged within said support; an armature; an armature supporting spring; an adjusting screw for said armature; a supporting bracket for said adjusting screw supported by screws arranged through said support to engage one of said

plates; and a supporting bracket for said spring supported by screws engaging the other of said plates.

9. The combination with a support; of a coil; a plate arranged within said support; an armature; an armature supporting spring; and a bridge like supporting bracket for said spring supported by screws engaging the said plate.

10. The combination with a support having an opening therethrough; a coil having a core projecting at one end beyond the winding arranged through said opening; a cap for the end of said core arranged in said opening, the cap having a support engaging flange at its inner end; and an armature coacting therewith.

11. In a structure of the class described, the combination of an armature; a supporting spring for said armature; an adjusting screw for said armature; a bridge-like supporting bracket for said screw embracing said spring; a tension nut on said screw having arms engaging the edges of said bracket; and a spring arranged on said screw between said bracket and nut.

12. In a structure of the class described, the combination of an armature; a supporting spring for said armature; a support-

ing bracket for said screw; a tension nut on said screw, said nut and bracket having coacting engaging portions whereby turning of the nut is prevented; and a spring arranged on said screw between said bracket and nut.

13. A structure of the class described comprising an armature; a supporting spring therefor; a bridge-like bracket to which said spring is rigidly secured by screws arranged through said bracket to project therefrom and means for regulating the tension of said spring comprising a lever member mounted on said bracket to engage said spring; an adjusting screw threaded through said bracket to engage said lever member; a lock nut having opposed arms thereon, engaging the said projecting spring securing screws; and a spring arranged on said screw between said nut and bracket.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

CHARLES R. UNDERHILL. [I. s.]

Witnesses:

F. D. KOELBEL,  
OSCAR WARREN.