To all whom it may concern:

Be it known that I, Morris Fulton, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spark-Coil Vibrators, of which the following is a specification.

This invention relates to vibrators for spark coils such as those used for igniting gas engines, but is adapted to spark coils of all kinds, regardless of the purpose for which they are to be used.

The invention consists substantially in the combination and arrangements hereinafter described and illustrated in the accompanying drawings and more particularly set forth in the appended claims.

In the drawing, Figure 1 is a plan view of one end of a spark coil casing with this invention applied thereto; Fig. 2 is an elevation of one end of a spark coil casing with parts in section, showing this invention applied thereto, and Figs. 3, 4 and 5 are perspective views of details of the invention.

In the drawing, the numeral 1 represents a casing of ordinary form used for enclosing the windings of a spark coil. 2 and 3 are binding posts for the primary winding. The binding post for the secondary winding is not shown. Secured to the casing by screws 4 and 5 is a strip of metal 6 bent upwardly at the central portion thereof and carrying a fixed contact member 7. The metal strip 6 forms a part of the primary circuit of the spark coil. The other contact member 8 of the make and break device is carried by a vibrator 9 shown in detail in Fig. 5. This vibrator includes a strip of resilient metal 10 having a curved slot 11 cut therein between its ends. This slot forms a projection or tongue 12 through which there is an opening 13. Secured to one end of the vibrator 9 is a piece 14 of magnetic material such as soft iron. The member 13 is offset downwardly from the vibrator 9 and a projection 15 extends over the member 13 in spaced relation therefrom, as shown more clearly in Fig. 2. This member 15 carries the contact member 8 and forms a resilient support therefor. A tongue 16 is struck up from the member 14 and overhangs the projection 15 to hold the parts 14 and 15 in proper position relative to one another. The other end of the member 9 has an opening or slot 17 cut therein for a purpose which will later appear. The vibrator 9 is secured to the casing 1 by means of a screw 18 passing through the opening 13 in the tongue 12. The vibrator is spaced from the casing by means of a washer 19 and a spring 20 (Figs. 2 and 4) is held in position beneath the washer 19 by means of the screw 18 which passes through the opening 21. The slot 17 in the member 9 forms bifurcations 22 and 23 which extend on opposite sides of the screw 24 which is secured to the casing 1, and a strip of metal 25 is secured to the casing by screws 26 and 27 and extends over the bifurcations 22 and 23 of the vibrator 9. The spring 20 tends to resiliently force the bifurcations 22 and 23 upwardly against the strip 25 which thus serves as a stop to limit the upward movement of the bifurcations 22 and 23. A movable stop or pressure member 29 has an opening 30 therein (Fig. 3) through which the screw 24 passes. The plate 29 has an angular extension 31 projecting past the edge of the stop 29 into contact with the ends of the bifurcations 22 and 23. A thumb nut 32 is threaded on to the upper end of the screw 24 and is adapted to contact with the movable stop 29 to force it downwardly and cause the angular extension 31 to exert a pressure upon the bifurcations 22 and 23. Carried by the stop 29 is a lug or projection 33 which cooperates with notches 34 in the thumb nut 32 to prevent accidental rotation of the nut.

It will be apparent that when the tongue 9 of the vibrator 9 is rigidly clamped between the screw 18 and the washer 19 the vibrator will be held resiliently in such a position that the contact members 7 and 8 will press against one another with a light pressure. The spring 20 normally presses the bifurcations 22 and 23 upwardly to hold the vibrator 9 in this position. If, now, the thumb nut 32 is rotated to screw it on to the screw 24 it will press the plate 29 inwardly and cause the angular extension 31 to press the bifurcations 22 and 23 inwardly. This will have the effect to force the other end of the vibrator 9 outwardly into contact with the member 7, due to the fact that the resiliency of the member 9 tends to keep it straight. The tongue 12 at its base will be bent to some extent to permit the member 9
to change or tend to change its angular position. It will be seen that the tongue 10 formed by the slot 11 constitutes what may be called a resilient pivotal support for the vibrator, the slot 11 permitting the portion of the vibrator at the right in Fig. 2 to tend to move outwardly when the bifurcations 22 and 23 are forced inwardly. Outward movement, of course, is prevented by the contact member 7 and the effect of the pressure upon the bifurcations 22 and 23 is therefore merely to exert greater pressure between the contact members 7 and 8. It will thus be seen that the pressure between these contact members and the amount of force necessary, therefore, to separate them may be delicately regulated by the rotation of the thumb nut 32. This regulation is accomplished without changing the position of the contact 20 members and without varying the space available for the vibration of the member 9 and also without forcing the member 14 any nearer to the magnetic core 33. The screw 24 may be bored, as at 36, to prevent loss of the thumb nut 32. It will be apparent that with this vibrator very delicate regulation of the pressure between the contact members may be secured and that it is impossible to over-regulate this pressure in either direction. If the thumb nut 32 is moved to its extreme position to decrease the pressure between the contact points they cannot be entirely separated from one another, and, on the other hand, if the nut is moved to its 35 extreme position to increase the pressure between the members they cannot be jammed together to such an extent that they will not vibrate.

What I claim is:

1. In a make and break device for spark coil, a vibrator, a resilient pivotal support for said vibrator between the ends thereof; a contact member carried by one end of said vibrator, and a movable stop and a spring operating in opposition to one another on the opposite end of said vibrator to regulate the tension in said vibrator and said resilient support.

2. In a make and break device for spark coil, a vibrator consisting of a strip of resilient material, a resilient pivotal support for said vibrator between the ends thereof, a contact member carried by one end of said vibrator, a fixed stop for limiting the movement of the other end of said vibrator, and a second resilient member and a movable contact member acting in opposition to one another on said second mentioned end of said vibrator.

3. In a make and break device for spark coil, a resilient vibrator, a resilient pivotal support for said vibrator between the ends thereof, a fixed stop for limiting the movement of one end of said vibrator; a movable stop arranged to bear on said end of said vibrator, a member threaded to said fixed stop and adapted to bear on said movable stop to move said vibrator, and a connection between said threaded member and said movable stop to prevent accidental movement of said threaded member.

4. In a make and break device for a spark coil, a vibrator, a fixed stop for limiting the movement of said vibrator, means for resiliently forcing said vibrator toward said 75 stop, a movable stop consisting of a plate having an offset adapted to bear on said vibrator and operate in opposition to said means for resiliently forcing said vibrator toward said fixed stop, and a threaded member carried by said fixed stop and adapted to exert pressure on said movable stop.

5. In a device of the character described, a vibrator, resilient pivotal support for said vibrator between the ends thereof, means secured to one end of said vibrator for forming an electrical contact, means for exerting pressure on the other end of said vibrator for regulating the pressure of said electrical contact, and a spring member adapted to exert a force in opposition to the force exerted by said pressure member.

6. In a make and break device for a spark coil, a vibrator, a resilient pivotal support for said vibrator between the ends thereof, a fixed stop for limiting the movement of one end of said vibrator in one direction, a spring separate from said vibrator adapted to resiliently force said vibrator against said stop, a movable stop adapted to oppose the pressure of said spring, and means for regulating the position of said movable stop.

7. In a make and break device for a spark coil, a vibrator, means for pivotally supporting said vibrator upon the casing of said spark coil, a fixed stop adapted to limit the movement of one end of said vibrator away from said casing, a spring for forcing said vibrator toward said stop, a movable stop adapted to force said vibrator away from said fixed stop, a threaded member for regulating the position of said movable stop, and a lug on said movable stop adapted to cooperate with notches in said threaded member to prevent accidental movement of said threaded member.

8. In a make and break device for a spark coil, a vibrator, means for pivotally supporting said vibrator between the ends thereof upon the casing of said spark coil, a contact member upon one end of said vibrator, a fixed contact member secured to the casing of said spark coil adapted to cooperate with said first named contact member, means for exerting pressure on the opposite end of said vibrator to regulate the pressure between said contact members, said pressure exerting means including a movable stop, a threaded member separate from said movable stop adapted to cooperate with said stop to regulate
late the pressure on said vibrator, and means for preventing accidental movement of said threaded member.

9. In a make and break device for a spark coil, a vibrator comprising a strip of resilient metal having a curved slot cut therein between the ends thereof to form a tongue, means for securing said tongue to the casing of said spark coil in spaced relation therefrom, a fixed contact member carried by said casing, a movable contact member carried by one end of said vibrator and adapted to cooperate with said fixed contact member, a member composed of magnetic material carried by the same end of said vibrator, a magnetic core in position to attract said member, a fixed stop carried by said casing and adapted to limit the movement of the other end of said vibrator away from said casing, a spring secured to said casing adapted to force said vibrator toward said

fixed stop, a screw passing through said fixed stop, a plate positioned on the side of said stop opposite said vibrator, an angular projection carried by said plate and adapted to cooperate with said vibrator, a nut carried by said screw and adapted to bear against said plate to cause it to exert pressure on said vibrator to regulate the pressure between said contact members, and a projection carried by said plate and adapted to cooperate with notches in said nut to prevent accidental movement of said nut.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 3rd day of March, A. D. 1915.

MORRIS FULTON.

Witnesses:

JOHN A. BERMAN,
WM. C. SAMUEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."