May 25, 1926. 1,585,811

C. E. WILSON ET AL

IGNITION COIL

Filed Dec. 4, 1920 3 Sheets-Sheet 1

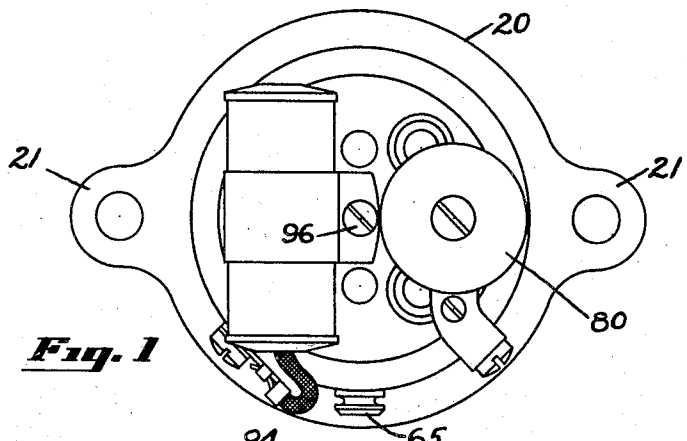


Fig. 1

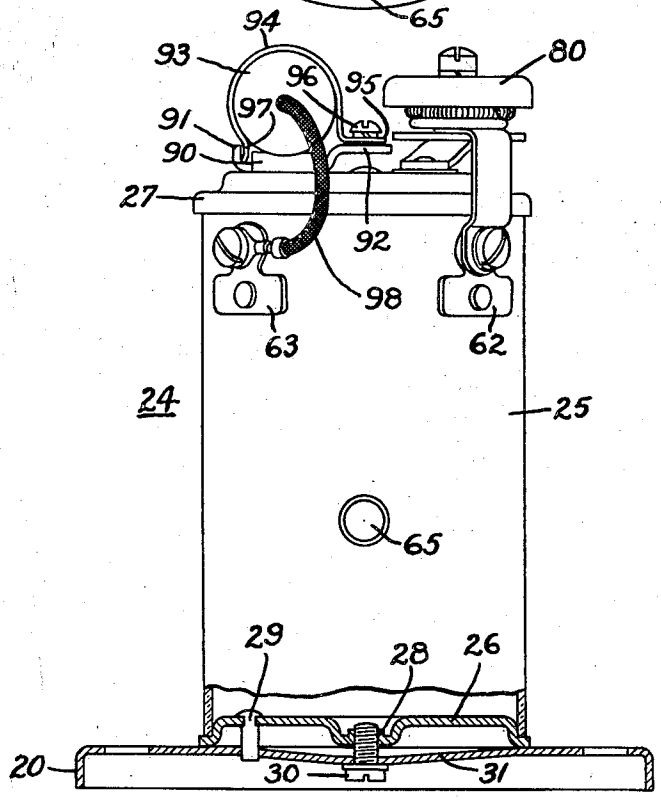


Fig. 2

Witnesses
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IGNITION COIL

Filed Dec. 4, 1920 3 Sheets-Sheet 2

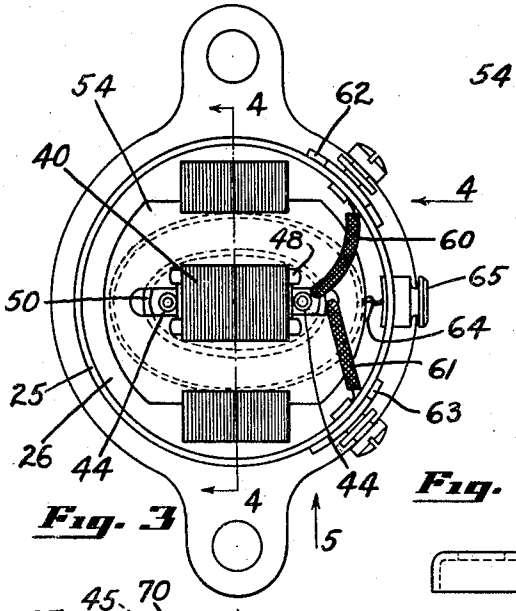


Fig. 3

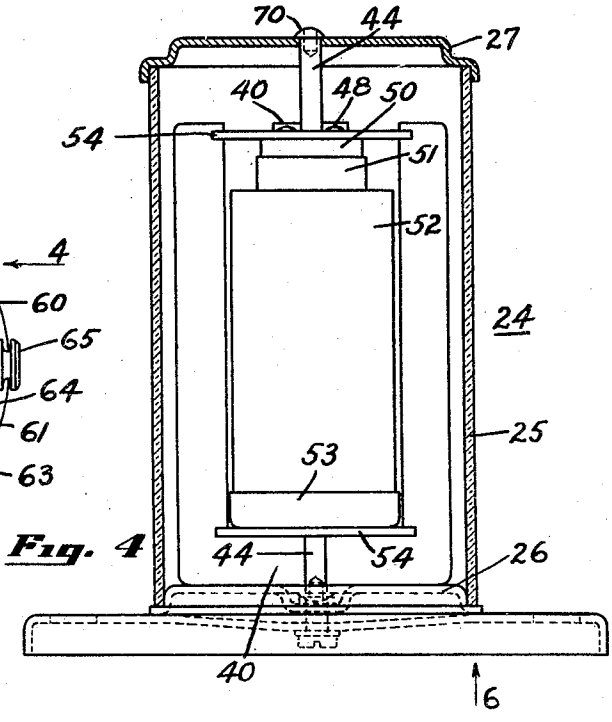


Fig. 4

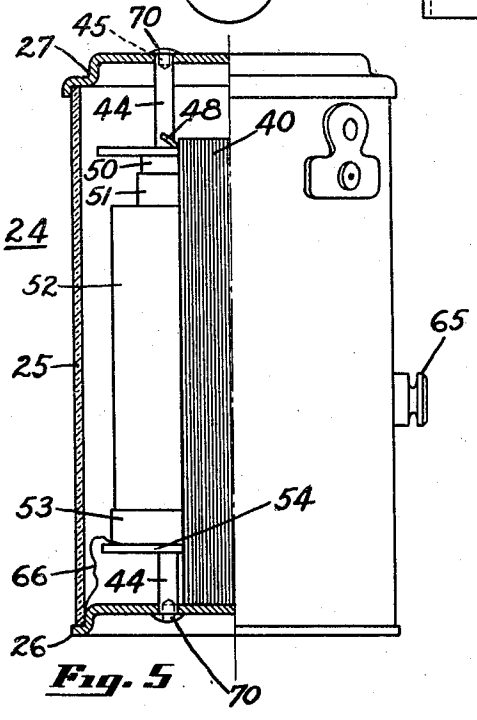


Fig. 5

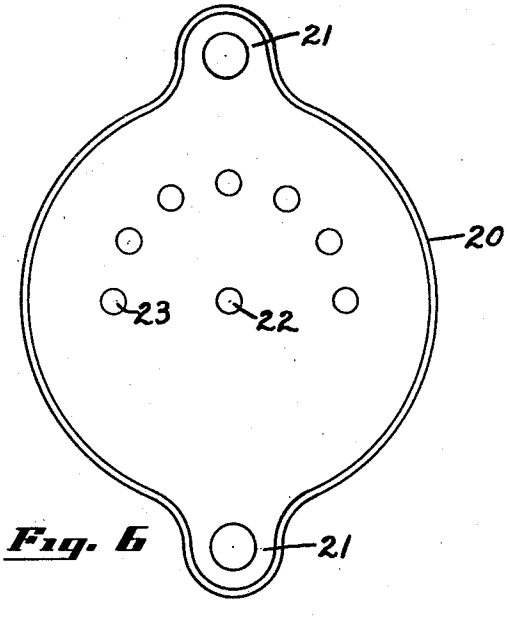


Fig. 6

Witnesses
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IGNITION COIL

Filed Dec. 4, 1920 3 Sheets-Sheet 3

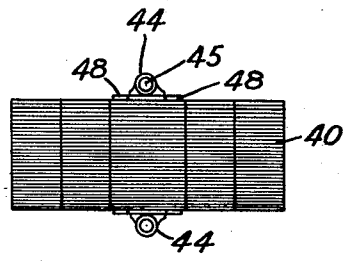


Fig. 7

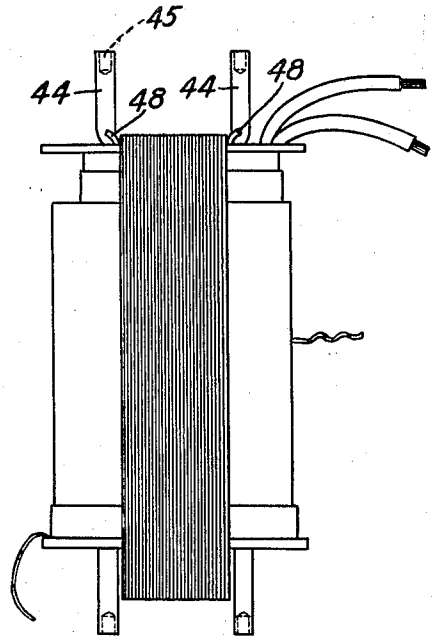


Fig. 10

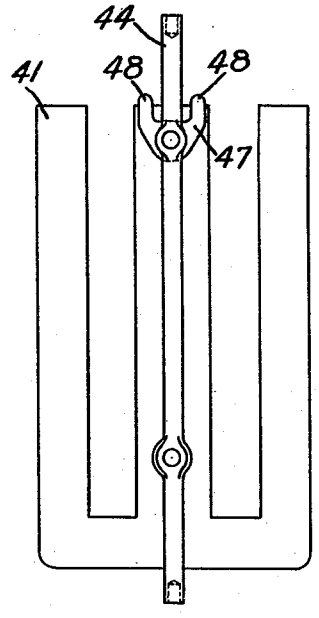


Fig. 8

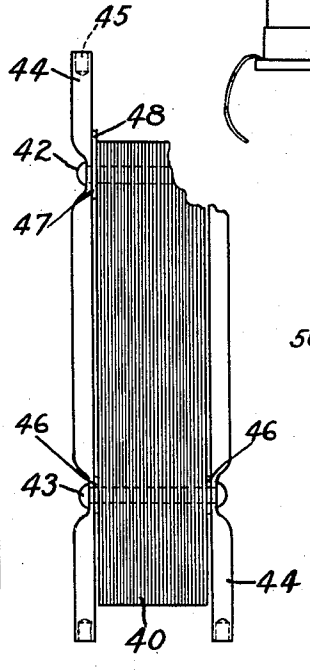


Fig. 9

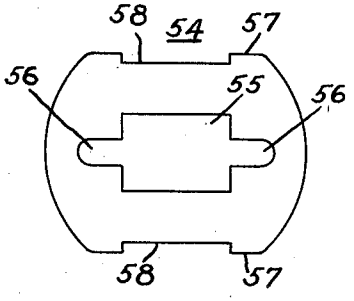


Fig. 11

Witnesses
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Patented May 25, 1926. 1,585,811

UNITED STATES PATENT OFFICE.

CHARLES E. WILSON AND HARRY E. NORVIEL, OF ANDERSON, INDIANA, ASSIGNORS, BY MESNE ASSIGNMENTS, TO GENERAL MOTORS CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE.

IGNITION COIL.

Application filed December 4, 1920. Serial No. 428,389.

This invention relates to ignition coils and particularly to coils that are used to supply ignition for the engines of automotive vehicles, and which are therefore subjected to severe vibration.

The practice of supporting the core and the windings of the ignition coil within a casing by filling up the casing with pitch or the like is well known. But the present invention has among its objects the supporting of the core and coil within the casing in such a rigid and substantial manner that the use of pitch will be unnecessary.

A further object of the invention is to provide means for securing an ignition coil casing upon a mounting base in various positions of adjustment so that the ignition coil terminals may be placed in the most convenient position with respect to the mounting base or bracket.

Other and further objects of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a top plan view of the ignition coil embodying the present invention;

Fig. 2 is a side elevation of the ignition coil, certain parts being shown in section to show the adjustable mounting of the coil casing upon the supporting base;

Fig. 3 is a plan view of the ignition coil with the top cover removed;

Fig. 4 is a side view looking in the direction of arrow 4 of Fig. 3, the casing shell being shown in section, the section being taken on the line 4—4 of Fig. 3;

Fig. 5 is an elevational view looking in the direction of arrow 5 of Fig. 3, a portion of the casing shell being broken away;

Fig. 6 is a bottom plan view of the mounting base looking in the direction of arrow 6 in Fig. 4;

Fig. 7 is a top plan view of the core assembly;

Fig. 8 is a side elevation thereof;

Fig. 9 is a fragmentary elevation thereof;

Fig. 10 is an end elevation of the core and coil assembly ready for mounting within the casing; and

Fig. 11 is a plan view of one of the coil assembly mounting washers.

Referring to the drawings, the mounting base or bracket 20 is provided with apertured ears 21 through which screws may pass for securing the base to any suitable support. Base 20 is provided with a centrally disposed hole 22 and an arcuate row of holes 23 disposed around the center hole 22. The coil housing designated as a whole by 24 includes a shell 25 and bottom end plate 26 and a top end plate 27. Plate 26 is provided with a centrally disposed threaded hole 28 and with a locating stud 29. A screw 30 passes through hole 22 in base 20 and through the threaded hole 28 as shown in Fig. 2. The stud 29 cooperates with one of the holes 23 to prevent rotation of the casing 24 with respect to the base 20. When a different location of the coil is desired with respect to its base the screw 30 is loosened to an extent that the casing 24 may be lifted from the base 20 so that the stud 29 will no longer project into one of the holes 23. Then the casing 24 may be turned until the stud 29 is brought opposite a different hole 23 whereupon the casing may be lowered into position and the screw 30 can be tightened to rigidly attach the casing 24 to the base. It will be noticed that the base 20 is dished as indicated at 31. As the screw is tightened this dished portion 31 will be drawn upwardly to assist in preventing the screw 30 from turning and becoming loosened.

Referring particularly to Figs. 7, 8 and 9, the core 40 comprises a series of W-shaped laminæ 41 bound together by means of rivets 42 and 43 by means of which are attached supporting posts 44 having counterbored ends as indicated at 45. The posts 44 are spaced slightly from the core 40 by means of washers 46 and by means of clips 47 which have upwardly projecting ears 48 for a purpose to be described.

The coil winding assembly includes an elliptical non-conducting tube 50 around which the primary and secondary windings 51 and 52 are placed. The primary winding 51 is preferably wound directly on the tube 50 while the secondary winding 52 is wound in true cylindrical fashion and then flattened out slightly to fit over the elliptically formed primary winding 51. The windings 51 and 52 fit down into an elliptical cup-shaped washer 53 while the lower end of the tube 50 projects through an elliptical hole

provided in washer 53 and terminates flush with the under surface of said washer 53.

To assist in mounting the coil assembly rigidly in position surrounding a central branch or stem of the core 40, two coil assembly mounting washers 54 are provided, see Fig. 11. Each washer is provided with a rectangular central orifice 55 having extensions 56, and the opposite parallel side edges 57 of washer 54 are provided with notches 58.

To mount the coil assembly upon the core 40, one of these washers 54 is first assembled in the position shown in Figs. 4 and 5 with the lower face thereof resting upon the yoke portion of the core 40. The coil assembly including members 50, 51, 52 and 53 is next placed over the center branch of core 40. Then a second mounting washer is placed upon the upper end of the tube 50. Referring to Fig. 3, it will be noted that the upper end of the center portion of core 40 and the ears 48 of clips 47 all project through the center aperture 55 of the washer 54 while the outside branches of the core 40 are located in the notches 58. With the parts thus assembled the ears 48 are bent over as shown in Figs. 3, 4, 5 and 10. It will be noticed that the recesses 56 provided in the washers 54 permit the projection therethrough of posts 44 and the primary winding terminal wires 60 and 61. Wires 60 and 61 are secured to terminal clips 62 and 63. respectively, mounted upon the shell 25 which is constructed of non-conducting material. The outside high tension terminal wire 64 is attached to the high tension terminal 65 mounted upon shell 25, and the inside terminal 66 of the high tension winding is grounded by soldering the same to the lower end cover 26. The lower ends of posts 44 extend through suitably spaced holes in the lower end cover 26 while the upper ends of posts 44 extend through suitably spaced holes in the upper end cover 27. Both ends of these posts 44 are riveted over as indicated by numeral 70 in Figs. 4 and 5. This operation secures the core and coil assembly permanently upon the lower end cover 26 and also ties the members 25, 26 and 27 of the casing assembly 24 permanently together.

A resistance element 80 which is included in and secured between a current source and the coil terminal 62, is mounted upon the end cover 27.

The end cover 27 carries a clip 90 having an upstanding projection 91 and a horizontally arranged projection 92. This clip 90 supports a cylindrical condenser 93 having attached thereto a clip 94 having an apertured portion 95 through which a screw 96 passes to secure the condenser clip 94 to the portion 92 of the clip 90. The clip 94 terminates in a projection 97 which engages the portion 91 of the clip 90 in order to prevent rotation of the condenser about the screw 96. A condenser terminal wire 98 is attached to the primary terminal 63 to which the timer of the ignition system may be directly attached. This condenser and its mounting do not form a part of the present invention but are described and claimed in our copending application, Serial No. 429,271 filed December 8, 1920.

It is apparent from the foregoing that there has been provided an ignition coil including a casing within which the core and coil assemblies are so rigidly supported that the filling of the casing with pitch or the like is unnecessary to protect the coil against severe vibration. It is apparent that the posts 44 which attach the core and coil assemblies to one end of the casing serve also to tie the various elements of the casing together. By this means the construction of the ignition coil is simplified.

The manner of mounting an ignition coil upon some part of an automobile is dependent to some extent upon the location of the coil terminals. Since the coil casing is made adjustable with respect to its supporting subbase or bracket, it is apparent that the casing may be placed in such a position that the coil terminals 62 and 63 will be most conveniently located for connection with the battery and timer wires of the ignition system.

While the form of mechanism herein shown and described constitutes a preferred form of embodiment of the invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What we claim is as follows:

1. In an ignition coil, the combination with a core comprising sheet laminations having a base portion and branches, and separately formed windings; of a casing including a shell and end covers; means for securing the laminations together; means extending through said casing and rigidly attached to said core, for securing said base portion of the core upon one of said end covers, and for securing both end covers upon the shell; and means for rigidly clamping the windings upon the core.

2. In an ignition coil, the combination with a laminated core and separately formed windings; of a casing including end members; means for securing the laminations together; posts riveted to the core and extending through the casing for securing the end members of said casing in position; and means for rigidly securing the windings upon the core.

3. In an ignition coil, the combination with a laminated core and separately formed windings; of a casing including end members; posts extending through the casing for

securing the end members in position; common means for securing said posts and the individual core laminations rigidly together; and means for securing the windings rigidly upon the core.

4. In an ignition coil, the combination with a core comprising a plurality of flat laminations; of a separately formed ignition coil winding surrounding a portion of said core; and flexible metal clips riveted to said core, for clamping the said winding rigidly upon said core.

5. In an ignition coil, the combination with a core comprising laminæ; of a separately formed winding surrounding a portion of said core; a casing including end members; posts for holding the core and end members of the casing in position; clips for clamping the winding rigidly in position on the core; and common means for securing the laminæ, posts and clips together.

In testimony whereof we hereto affix our signatures.

CHARLES E. WILSON.
HARRY E. NORVIEL.