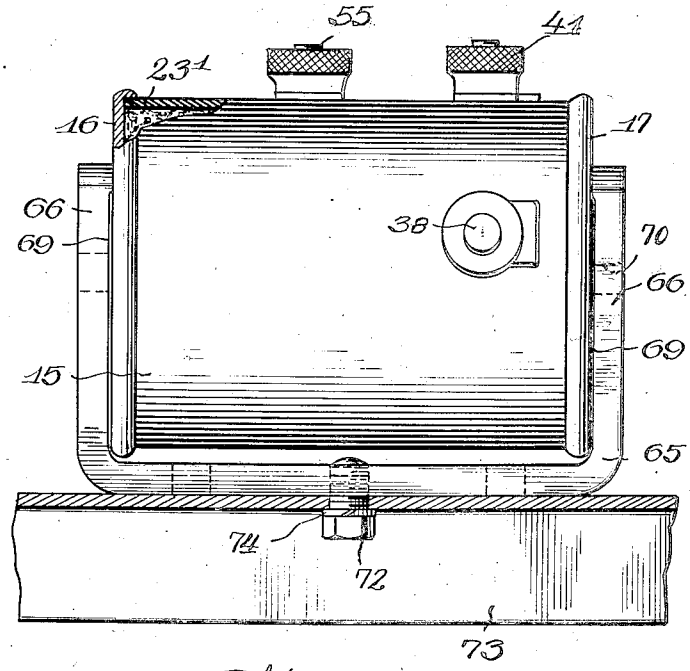
May 17, 1927. 1,629,132

C. H. THORDARSON

ELECTRIC JUMP SPARK COIL

Filed Feb. 27, 1925 2 Sheets-Sheet 1

Fig. 1



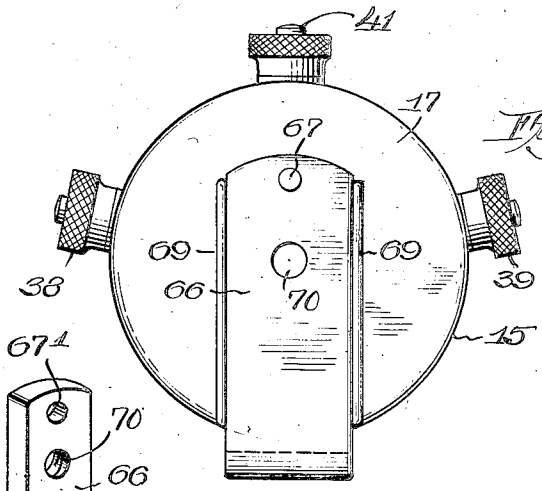


Fig. 2

Fig. 3

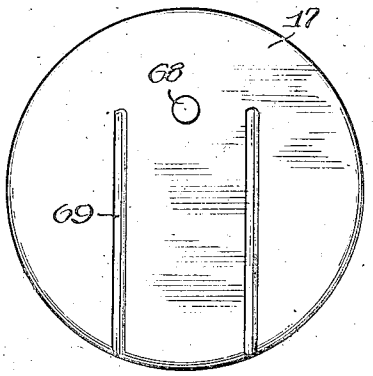
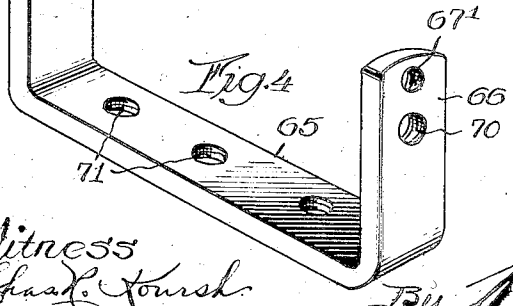


Fig. 4



Witness
Frank L. Kourek

Inventor
Chester H. Thordarson
By William L. Chace Atty.

May 17, 1927. 1,629,132

C. H. THORDARSON

ELECTRIC JUMP SPARK COIL

Filed Feb. 27, 1925 2 Sheets-Sheet 2

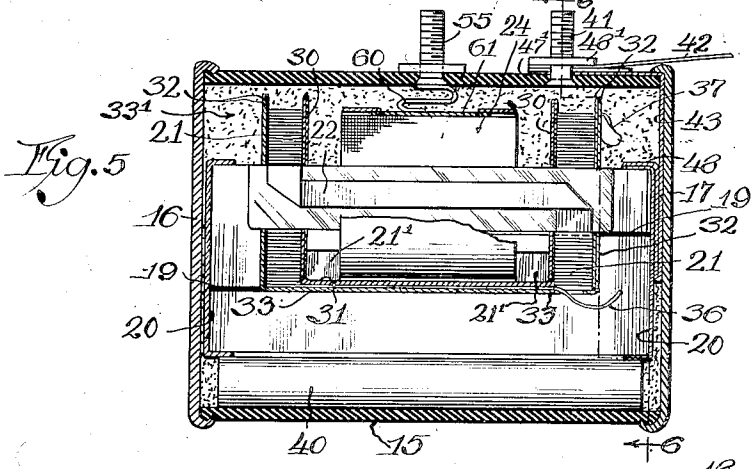


Fig. 5

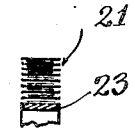


Fig. 7

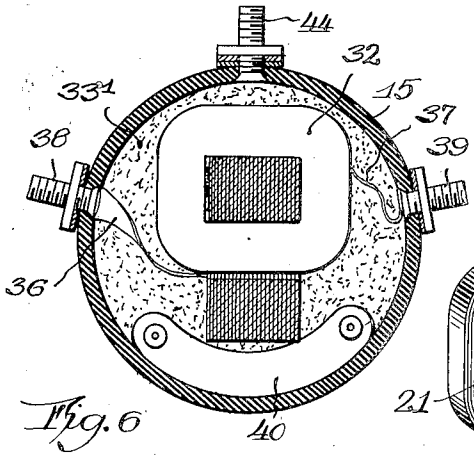


Fig. 6

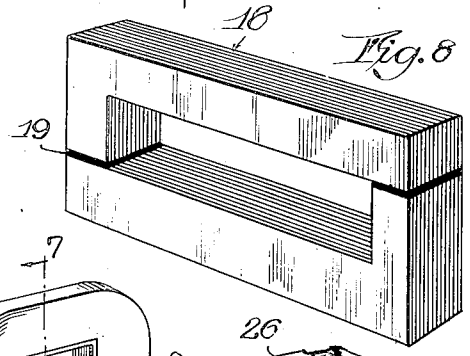


Fig. 8

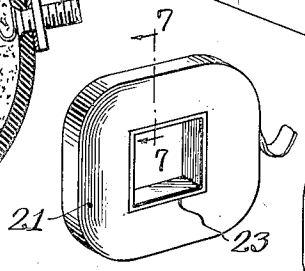


Fig. 9

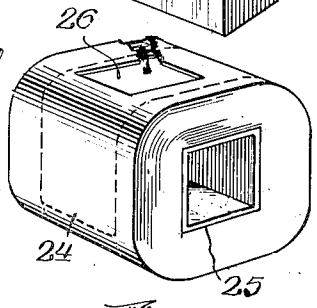


Fig. 10

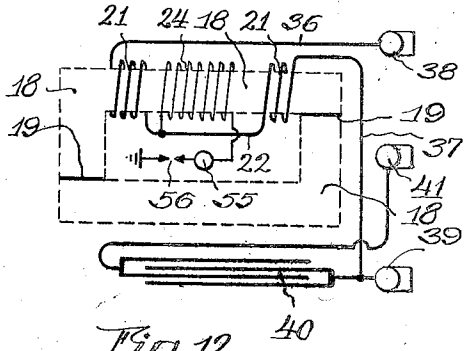


Fig. 12

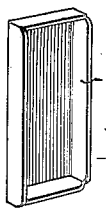


Fig. 11

Witness:
Chas. K. Kousha

By

Inventor
Chester H. Thordarson,
William V. Hale, Atty.

Patented May 17, 1927. 1,629,132

UNITED STATES PATENT OFFICE.

CHESTER H. THORDARSON, OF CHICAGO, ILLINOIS.

ELECTRIC JUMP-SPARK COIL.

Application filed February 27, 1925. Serial No. 12,046.

This invention relates to improvements in jump spark coils for the ignition systems of explosion engines.

Among the objects of the invention are to so dispose the primary and secondary windings on the core as to avoid overheating of the primary winding or windings, and to thereby avoid tendency of breakdown of the insulation in the windings and consequent short circuiting of the windings; to decrease the potential difference between the turns of the secondary winding; to efficiently insulate the primary winding from the secondary winding within compact space; to decrease the length of the turns of the secondary winding, while at the same time making it possible, in a compact structure, to use heavier insulation between the turns of the secondary winding, and to otherwise improve and simplify coils of this character, as well also the attachment of the coil to a support.

The invention consists in the elements and combination of elements shown in the drawings and described in the specification, directed to one embodiment of the invention, and the invention is pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevation of a jump spark coil embodying my invention, showing it attached to a support, as the body frame member of an automobile.

Figure 2 is an end view thereof.

Figure 3 is a face view of one of the end caps of the shell which encloses the coil structure.

Figure 4 is a perspective view of an adapter bracket for attaching the coil to a support.

Figure 5 is an axial section of the coil structure, showing the terminals of the duo primary coil brought out at one end of the coil.

Figure 6 is a transverse section on the line 6—6 of Figure 5.

Figure 7 is a cross section of one of the primary windings on the line 7—7 of Figure 9.

Figure 8 is a perspective view of the almost closed magnetic circuit or core.

Figures 9 and 10 are perspective views, respectively, of a primary and secondary coil.

Figure 11 is a perspective view of the clasp by which the parts of the laminated circuit are held together.

Figure 12 is a simple diagram of the coil circuit.

As shown in the drawings:

15 designates a casing in which the coil structure is enclosed. It can be made of any suitable insulating material and as herein shown is of cylindric cross section. It has end closing caps 16, 17 of a material that is a good conductor and preferably non-magnetic, such as brass. 18 designates, as a whole, a core type magnetic circuit. It is laminated, the groups of laminæ being of L shape and symmetrical with the short end of one group, disposed toward but spaced from the inner face of the other group and spaced by air gaps 19, produced preferably of quite thin insulation. The members of the core are held together by clasps 20 flanged over the outer ends of the core thus made. The core may have a single air gap, but for structural reasons and symmetrical grouping, two are shown.

There are two primary windings 21, connected at their inner turns by a conductor 22. Said primary windings are preferably made of ribbon wire, being wound on a hollow insulating tube 23 which fits closely on one leg of the core and by which it is insulated from said core. The turns can be insulated from each other by enamel, or by intercoiled thin strips, or otherwise.

24 designates the secondary winding. It is herein shown and is preferably made of light enamel, or otherwise insulated, wire that is wound on a hollow, rectangular tube 25 which fits closely on a leg of the core, and by which said secondary winding is insulated from said core. The secondary winding is enclosed by a suitable sheath 24.

Disposed about said secondary winding is a wide distributing plate or shield 26 of light gauge conducting metal to which the outer turn of the secondary winding is connected, as shown in Figure 10.

By inspection of Figure 5, it will be noted that the two primary windings, connected by the conductor 22, are mounted on the same leg of the core as is the secondary winding 24, and that said secondary winding is spaced at its ends a distance from the adjoining primary windings for a purpose hereinafter mentioned. Additionally, there is interposed between the adjacent ends of the primary and secondary windings insulating sheets 30; such as mica, said sheets being shown as constituting end parts of a lami-

nated U-shaped member, the closed portion 31 thereof lying between the secondary and the leg of the magnetic circuit not enclosed by said windings. The primary windings 21 are likewise insulated from the end walls of the windows of the core by sheets of insulating material 32, such as mica, which constitute the upturned ends of insulating sheets 33 that lie along and between the lower part of the core structure and the insulating sheets 31. Preferably and in practice, the space between said insulating sheets 31, 33 constitutes an insulating sheath for the conductor connected to the outer turn of one of the primary windings 21 so as to bring the terminal 36 of said conductor out on the same end of the coil structure as the conductor 37 of the other primary winding (Figure 5). This primary winding circuit includes the binding posts 38, 39, appropriated respectively to the switch and interrupter (not shown).

The said secondary and primary windings may be fixedly sustained on the core, while being assembled, by the use of insulating spacing strips 21′ (Figure 5) between the ends of said windings, and all conducting elements not in circuit with each other are held rigidly sustained and are embedded in a body 33′ of insulating compound, poured within the casing after the coil structure has been installed therein, said compound thereafter hardening as an insulating and a holding mass.

40 (Figures 5, 6 and 12) designates a condenser that is included in a circuit which is herein shown as connected between the interrupter binding post 39 and the condenser binding post 41. As shown in Figure 5, the condenser 40 can, by a flat or strip conductor 43, be grounded on the core structure through the binding post 41, which is applied on the end of the core structure and is pierced for the passage of said binding post. Said flat conductor can be pressed closely on the core end by the application of the adjacent end cover 17, and the terminal thereof can be bent over as an extension 48 to lie along the lateral edge of the core structure (Figure 5). Said binding post 41 has an optional connection 42 (Figure 5) which may be grounded to a good ground connection exterior to the coil, in the event that the condenser ground within the coil circuit should become defective. The optional connection 42 can be confined between a washer 48′ and a base piece 47′ of the said binding post 41.

55 designates a high tension current binding post which is in a circuit that is grounded on the outer turn of the secondary winding, and which also includes one of the electrodes 56 of the spark plug of an ignition system. The mechanical ground connection between the post 55 and the secondary coil embraces an S-shaped spring 60 within the casing 15 which is welded or otherwise connected to said binding post and bears at its other end against the conducting distributing plate 26, that is connected to one end of the primary winding, as hereinbefore described and as shown in Figure 10.

From the foregoing, it will be noted that when using dual primary windings, said windings are separated along the core structure by large air spaces to provide ample insulation between the ends of the secondary winding and the primary windings, and so also to avoid transmission of heat from the secondary to the primary windings. Furthermore, the disposition of the primary and the secondary windings on the core, as shown, enables the potential difference between the turns of the secondary to be small. The coil structure is very compact and is easily assembled on the core structure and the connections are readily brought out.

The core casing can be supported by means of an adapter bracket 65 of U form, the end legs 66 of which are clasped tightly on the outer faces of the end caps 16, 17. Said end legs are secured to the end caps by studs 67 which extend through openings 67′ in said legs, and enter openings 68 in the caps. The entire coil structure is held from turning about said studs as a pivot by passing the legs 66 closely between parallel guide and holding ribs 69. The adapter fitting shown is provided with a number of openings 70, some of which are in the closed portions thereof and others in the legs of the bracket, for the reception of a fastening screw 72, that extends through a support 73; a lock washer 74 being employed to hold the screw in place. The number of openings 70 shown in the closed and leg portions of the adapter bracket provide means for attaching the coil structure case in various positions on the carrying support, that is to say, from either end thereof, or centrally or eccentrically.

I claim:

1. In an electric jump spark coil, a core, a secondary winding centrally on one leg of said core, two primary windings connected in series and mounted on and spaced along said leg a distance from each end of the secondary winding to avoid heat transference from the secondary to the primary windings, and an insulating sheet lying between the secondary winding and the other leg of said core and turned outwardly at its ends to form insulating barriers between the ends of the secondary and the primary windings.

2. In an electric jump spark coil, a core, a secondary winding centrally on one leg of said core, two primary windings connected in series and mounted on and spaced along the leg a distance from each end of the secondary winding to avoid heat transference from the secondary to the primary windings, an insulating sheet lying between the

secondary winding and the other leg of said core and turned outwardly at its ends to form insulating barriers between the ends of the secondary and the primary windings, and a second insulating sheet parallel to said first insulating sheet and having out-turned ends which lie along the outer faces of the primary windings.

3. In an electric jump spark coil, a core, a secondary winding centrally on one leg of said core, two primary windings connected in series and mounted on and spaced along the leg a distance from each end of the secondary winding to avoid heat transference from the secondary to the primary windings, an insulating sheet lying between the secondary windings and the other leg of said core and turned outwardly at their ends to form insulating barriers between the ends of the secondary and the primary windings, and a secondary insulating sheet parallel to said first insulating sheet and having out-turned ends which lie along the outer faces of the primary windings, the outer terminal of one of said primary windings extending between the intermediate portions of said insulating sheet and brought out on the same end of the coil as the outer terminal of the other primary winding.

4. In combination, a jump spark coil including an enclosing shell having a metallic end cap, a U-shaped adapter bracket fitted over said shell and having one of its arms lying against and detachably fastened to said cap, and there being numerous spaced openings distributed along the arms and the connecting part of the bracket between the arms to receive a connection to clamp the bracket in different positions on a support.

5. In combination, a jump spark coil including an enclosing shell and a metallic end cap, said end cap having spaced ribs on the outer face, a bracket comprising a part lying beside said shell and arms extending across the ends of the shell, one of said arms fitting between said ribs on the cap, fastening means holding the latter arm to said cap, and there being numerous spaced openings distributed along said bracket, both in the part lying beside the shell and the arms, said openings being adapted to receive a connection to hold the bracket in different positions on a support.

In witness whereof I claim the foregoing as my invention, I hereunto append my signature this 18 day of February, 1925.

CHESTER H. THORDARSON.