Sept. 24, 1929. L. B. SAUER 1,729,492

COIL

Filed Jan. 30, 1928

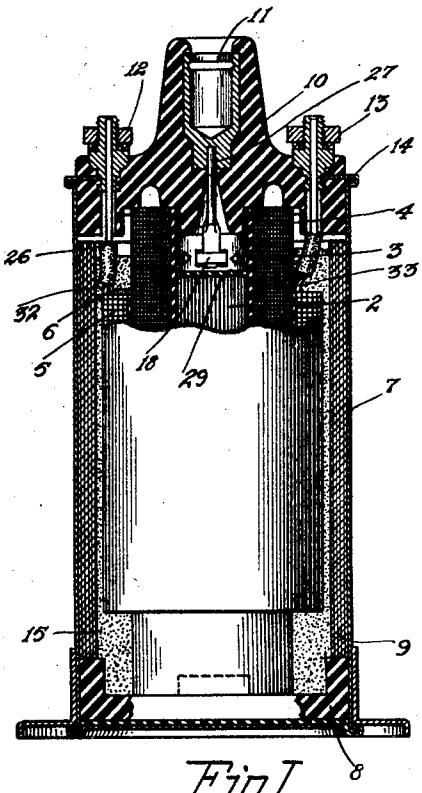


Fig. 1.

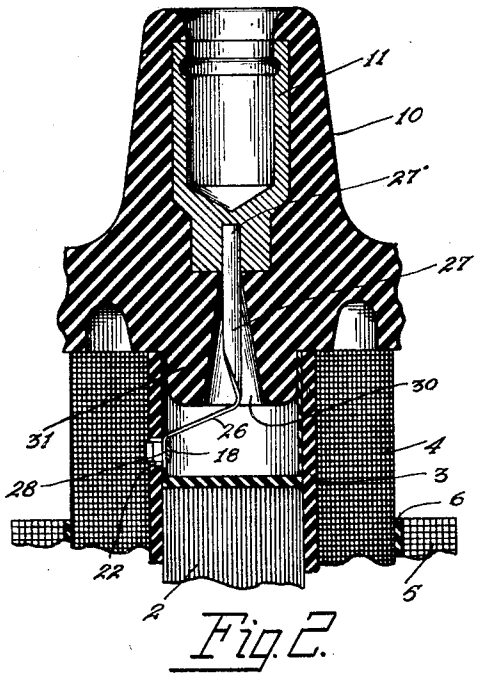


Fig. 2.

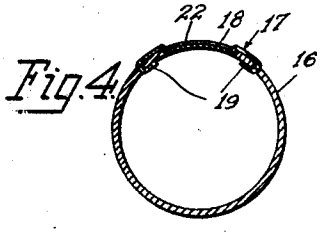


Fig. 4.

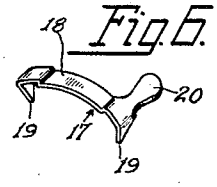


Fig. 6.

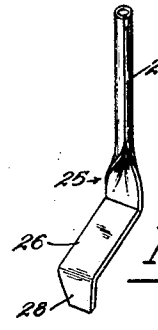


Fig. 5.

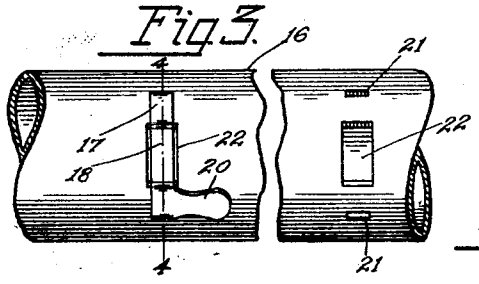


Fig. 3.

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UNITED STATES PATENT OFFICE

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COIL

Application filed January 30, 1928. Serial No. 250,438.

My invention relates to coils and more particularly to the type known as spark or ignition coils, such as are employed in ignition systems of internal combustion engines, and an object of my invention is the provision of an improved terminal arrangement for connecting the various elements of the coil structure to the external terminals of the spark or ignition coil.

A feature of my invention is the provision of a novel terminal arrangement in association with a flexible connecting member for connecting one terminal of the secondary winding to the high tension terminal of the ignition coil without any extraneous securing means such as solder or the like.

Another feature of my invention is the provision of an improved terminal to which one end of the secondary winding of the coil is secured and the novel means provided on the said terminal whereby an end of the flexible connecting member may be placed in electrical connection with the same.

The above features as well as others not specifically pointed out will be more fully described in the ensuing specification and appended claims.

For a more complete understanding of my invention reference may be had to the accompanying drawing in which like references in the several views denote like parts, and in which:

Fig. 1 is a longitudinal section through an ignition coil provided with the terminal arrangement of my invention.

Fig. 2 is an enlarged fragmentary sectional view of the terminal end of the ignition coil to clearly illustrate the terminal arrangement of my invention.

Fig. 3 is an enlarged plan view of the paper tube upon which the secondary winding of the ignition coil is wound and showing the improved terminal of my invention secured thereto.

Fig. 4 is a sectional view along the line 4—4 of Fig. 3.

Fig. 5 is a perspective view of the flexible connecting member of my invention which connects one end of the secondary winding of the coil to the high tension external terminal of the same, and

Fig. 6 is an enlarged perspective view of the terminal to which one end of the secondary winding of the ignition coil is secured.

Referring now more in detail to my invention as illustrated in the accompany drawing the core 2 of the coil comprises a bundle of magnetic wires inserted in the sleeve 3 of insulating material upon which is wound the secondary winding 4 of the coil. The primary winding 5 is wound upon a suitable insulating sleeve 6 and is positioned outside of the secondary coil winding 4. The coil structure, comprising the primary and secondary windings 5 and 4, is placed in a suitable can or container 7 of sheet metal. Within the bottom of the container or can 7 is a disk 8 of insulating material so formed as to support the core 2, secondary winding 4 and magnetic sleeve 9 which is positioned within the container 7 around the coil structure.

An insulating cap 10 projecting into the top of the container 7 carries the high tension terminal 11 and the low tension terminal 12 and ground terminal 13 which are moulded into the cap 10. The cap 10 also carries sealing strip 14, and to retain the cap 10 in position within the upper end of the container 7 the sealing strip 14 is spun over the outer edge of the upper outwardly projecting edge of the container 7. The container 7, after the coil structure has been placed in the container as just described, is filled with a suitable melted substance such as sealing wax 15, which when cooled hardens and maintains the coil structure against displacement.

Having described in general the construction of the ignition coil with which the terminal arrangement of my invention is applicable I will now describe in detail the construction of the terminal arrangement of my invention and the method of extending the connection from one terminal of the secondary winding of the ignition coil to the high tension external terminal 11 of the same. In Fig. 3, 16 represents a tube of any suitable insulating material such as paper, upon which the secondary winding 4 of the ignition coil is wound. The terminal 17 which

is arcuate in shape is provided with an intermediate offset portion 18 and a pair of depending legs 19 and a terminal or tab 20 integrally formed with the terminal 17 and extending at right angles from the same. The tube 16 is provided with a pair of parallel slots 21 spaced apart and which are adapted to receive the depending legs 19 of the terminal 17. The legs 19 extend through the slots 21 into the inside of the tubing 16 and these protruding ends of the legs 19 are bent over or clinched and serve to secure the terminal 17 in place on the tube 16. The tubing 16 is provided with a rectangular shaped orifice 22 lying between the parallel slots 21 and is adapted to receive the intermediate offset portion 18 of the terminal 17 as clearly illustrated in Fig. 4. The secondary winding 4 of the ignition coil is wound on the tubing 16 with the inside end of the secondary winding 4 attached to the tab 20 of the terminal 17 in any suitable manner.

The secondary winding 4 and the core 2 within the tube 16 are supported on the disk 8 resting on the bottom of the container 7 as before described with the upper end 29 of the core 2 terminating below the orifice 22 in the tube 16 which receives the offset portion 18 of the terminal 17, after the elements of the coil have been placed in the container 7 and the intervening space between the coil windings 4 and 5 and the magnetic sleeve 9 has been filled with the sealing wax 15, the necessary connections from the coil windings 4 and 5 are made with the terminals 11, 12 and 13 in the cover cap 10.

A conducting member 25 adapted to connect the inside terminal end of the secondary winding 4 with the high tension terminal 11 in the cap 10 is constructed of a suitable strip of metal such as thin spring brass and by means of a suitable forming operation is shaped as clearly illustrated in Fig. 5 with an intermediate flat angular portion 26, a cylindrically formed end portion 27, and at its opposite end a depending tab or tongue portion 28 is provided with converging sides. Before the cover cap 10 is placed over the open end of the container 7, a suitable tool is inserted in the open end of the tube 16 to engage the offset intermediate portion 18 of the terminal 17 resting in the orifice 22 to flex the same sufficiently to permit the insertion of the tab end 28 of the connecting member 25 between this flexed offset portion 18 and the wall of the tube 16. The cylindrical end 27 of the member 25 which extends upward beyond the end of the tube 16 is now inserted in the tapered orifice 30 in the depending lug 31 of the cover cap 10 to permit the end 27′ of the cylindrical portion 27 to contact with the high tension terminal 11. One end of the primary winding 5 is connected by a conductor 32 to the terminal 12 while the other end of the coil 5 is joined to a terminal of the secondary winding 4, and by means of a conductor 33 these terminal windings are connected to the ground terminal 13. With the connections made as just described the cover cap 10 is now positioned on the top of the container 7 causing the intermediate angular portion 26 of the member 25 to be flexed thus placing the some under tension insuring a positive electrical connection between the terminal 17 and the tab 28 of the conducting member 25 and also insuring a positive electrical connection between the cylindrical end of 27′ of the member 25 and the high tension terminal 11 secured to the cover cap 10. The cover cap 10 is now secured to the container 7 as before described and the intermediate portion 26 of the member 25 remains flexed and maintains the respective ends 27′ and 28 of the some in electrical contact with the respective terminals 11 and 17.

While I have illustrated and described my invention with a specific type of ignition coil it is to be understood that it is applicable to other types of coils and changes and modifications will readily suggest themselves and the invention, therefore, should be limited only by the scope of the appended claims.

Having described my invention what I claim is new and desire to secure by United States Letters Patent is:

1. An ignition coil of the character described including a secondary winding and a supporting tube for the same, a terminal secured to said tube associated with a terminal end of said secondary winding, an enclosing casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, and a connecting link provided with integrally formed means for engaging respectively said terminal and said secondary terminal in said cap.

2. An ignition coil of the character described including a winding and a supporting tube for the same, a terminal secured to said tube associated with a terminal end of said winding, an enclosing casing for said winding and a cover cap for closing said casing, a second terminal in said cap, a connecting link for making electrical contact with said terminal and said second terminal, said cap maintaining said connecting link in position.

3. An ignition coil of the character described including a secondary winding and a supporting tube for the same, a terminal secured to said tube associated with a terminal end of said secondary winding, an enclosing casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap and a connecting link provided with tab and pin formed extremities for engaging respectively said terminal and said secondary terminal in said cap.

4. An ignition coil of the character de-

scribed including a secondary winding and a supporting tube for the same, a terminal secured to said tube associated with a terminal end of said secondary winding, an enclosing casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link provided with tab and pin extremities for engaging respectively said terminal and said secondary terminal, the said cap maintaining said connecting link in engagement with said respective terminals.

5. An ignition coil including a secondary winding and a tube supporting the same, a terminal secured to said tube associated with a terminal end of said winding, an offset portion in said terminal and an orifice in said tube for receiving said offset portion, a casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link, and means integral with said link for respectively engaging said offset portion of said terminal and said secondary terminal in said cap.

6. An ignition coil including a winding and a tube supporting the same, a terminal secured to said tube associated with a terminal end of said winding, an offset portion in said terminal and an orifice in said tube for receiving said offset portion, a casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link, and means integral with said link for respectively engaging said offset portion of said terminal and said secondary terminal in said cap, said cap when in position maintaining said link in position.

7. An ignition coil including a winding and a tube supporting the same, a terminal secured to said tube associated with a terminal end of said winding, an offset portion in said terminal and an orifice in said tube for receiving said offset portion, a casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link provided with tab and pin shaped extremities adapted to engage respectively said offset portion of said terminal and an orifice in said secondary terminal to connect said terminal end of said winding to said secondary terminal of said cap.

8. An ignition coil including a winding and a tube supporting the same, a terminal secured to said tube associated with a terminal end of said winding, an offset portion in said terminal and an orifice in said tube for receiving said offset portion to permit access to said terminal, a casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link provided with tab and pin shaped extremities adapted to engage respectively said offset portion of said terminal and an orifice in said secondary terminal to connect said terminal end of said winding to said secondary terminal in said cap, the said cap when in position maintaining said link in position.

9. An ignition coil including a winding and a tube supporting the same, a terminal secured to said tube associated with a terminal end of said winding, an offset portion in said terminal and an orifice in said tube for receiving said offset portion, a casing for said coil and a cover cap for closing said casing, a secondary terminal in said cap, a connecting link provided with tab and pin shaped extremities and a flexible intermediate portion, said tab and pin adapted to engage respectively said offset portion of said terminal through said orifice in said tubing and an orifice in said secondary terminal, said cover when positioned on said casing flexing said flexible intermediate portion to insure electrical contact between said offset portion of said terminal and said orifice in said secondary terminal.

10. A coil of the character described including a supporting tube, a winding supported by said tube, a terminal, supported by said tube and attached to said winding, a housing for said tube and winding, a cover cap adapted to fit onto said housing, a terminal supported by said cover cap, and a spring member adapted to connect the terminal in said cap to the terminal supported by said tube.

11. A coil of the character described including a supporting tube, a winding supported by said tube, a terminal supported by said tube and attached to said winding, a housing for said tube and winding, a cover cap adapted to fit onto said housing, a terminal supported by said cover cap, and a spring member adapted to fit into an orifice in the terminal supported by said cap and adapted to yieldingly engage the terminal supported by said tube to connect said winding to the terminal supported by said cap.

12. An ignition coil including a winding and a tube supporting the same, a terminal clip secured to said tube and connected with a terminal end of said winding, a casing for said winding and a cover cap for said casing, a terminal in said cap, a connecting link the respective ends of which engage said terminal clip and said terminal, and a flexible intermediate portion for said link flexed by said cap when the same is positioned on said casing to insure contact between said terminal clip and said terminal.

13. An ignition coil including a supporting tube, a winding on said tube, a terminal clip secured to said tube and connected to said winding, a casing for said winding and a cover cap adapted to fit on to said casing, a terminal supported by said cap, a connecting link engaging respectively said clip and said terminal to connect the clip on said tube to the terminal in said cap and a flexible intermediate portion for said link flexed by

said cap when the same is positioned on said casing to insure contact between said clip and said terminal.

14. An ignition coil including a supporting tube, a winding on said tube, a terminal clip secured to said tube and connected to said winding, a casing enclosing said winding and tube and a cover cap adapted to fit onto said casing, a terminal supported by said cap, a connecting link provided with an intermediate flexible portion, said connecting link adapted to engage respectively said clip and said terminal when said cap is positioned on said casing, said intermediate portion of said link being flexed by the positioning of said cap on said casing to insure electrical contact between said clip and terminal in said cap.

15. A coil of the character described including a supporting tube, a winding surrounding said tube, a contact member secured to said tube, an enclosing casing for said winding, a cap for said casing, a contact member for said cap, and a flexible connecting link extending from said contact member of said tube to said contact member of said cap.

Signed by me, at Chicago, in the county of Cook and State of Illinois, this 27th day of January, A. D. 1928.

LOUIS B. SAUER.