

R. H. WHISLER.
SPARK PLUG COIL.
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1,393,866.

Patented Oct. 18, 1921.

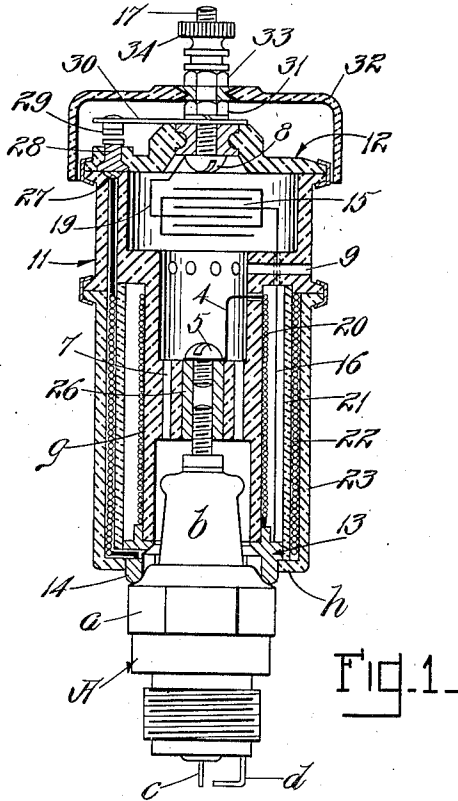


Fig. 1.

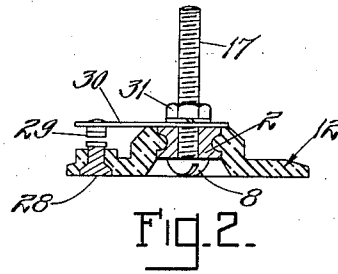


Fig. 2.

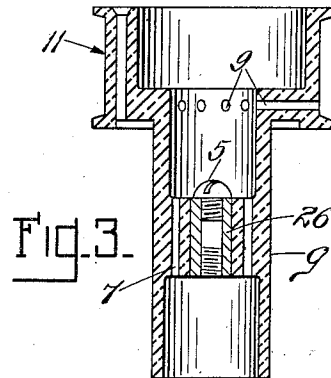


Fig. 3.

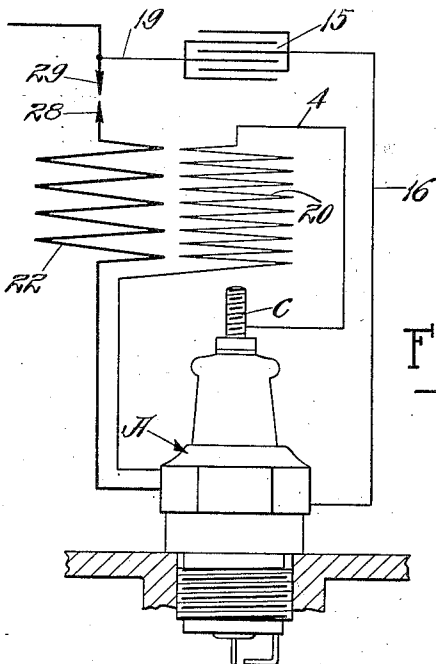


Fig. 6.

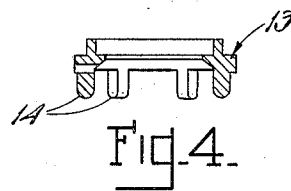


Fig. 4.

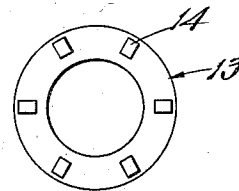


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SPARK-PLUG COIL.

1,393,866.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RALPH H. WHISLER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Spark-Plug Coils, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The present invention has for its object an improved spark plug coil for use as part of an ignition system of the type which may be conveniently termed a high frequency, high voltage system.

15 The invention covered by the present application is a unit intended to be mounted on the top of an ordinary spark plug forming part of an ordinary high tension ignition system and thereby, and without any other change in the system to convert it into a high frequency high voltage system.

I have found in the practical use of high frequency, high voltage systems that their perfect operation is likely to be interfered with by leakage or other losses. The nature of the current is such that electric leakage is more likely to occur than in the ordinary high tension ignition system particularly when the spark plugs are at a distance from the rest of the system. The present invention provides a unit which can be placed on the top of the spark plug so that all difficulties resulting from the transmission of high frequency high tension current are obviated.

25 The unit comprising my invention includes a condenser, a fixed spark gap and the primary and secondary windings, a disruptive discharge coil, the latter being connected on one side to one of the electrodes of the spark plug. In the form shown in the drawings, the condenser and both the primary and secondary coils are grounded to the metallic body of the spark plug on which the unit is placed, the system being a grounded system.

30 To convert an ordinary high tension system into a high frequency high voltage system, it is only necessary to screw the unit embodying my invention onto the top of the spark plug and connect the wire to a suitable binding post. Units may be applied to one or all of the plugs of the engine, and a corresponding change in the nature of the sparks will be produced.

The invention will be fully understood from the following description when taken in connection with the accompanying drawings, and the novel features thereof will be pointed out as clearly defined in the claims at the close of this specification.

In the drawings, Figure 1 is a side elevation of a spark plug to which is applied a unit embodying my invention, the unit being shown in section.

Fig. 2 is a section of the cap.

Fig. 3 is a section of the body.

Fig. 4 is a section of the base.

Fig. 5 is a bottom plan view of the base.

Fig. 6 is a wiring diagram of the unit.

Referring now to the drawings, there is shown at A a spark plug of ordinary form having a body *a*, insulation *b*, a central electrode *c* which is screw-threaded at its upper end and a side electrode *d*. The electrode *d* is on the metallic body and is therefore grounded. The spark plug is of ordinary construction.

The combined elements of my unit are contained within and supported by a body 11, a cap 12, and a sheath 23 which are composed of moldable insulating material such as mica and shellac compound, bakelite, or the like.

Into the bottom of the body 11 is molded a metallic base 13 (see Figs. 4 and 5). Said base is ring-shaped and is provided with legs 14 adapted to rest on the upper surface of the spark plug body. In the body 11 is located a condenser 15 one side of which is electrically connected by the wire 16 with the metallic base 13 so that the condenser is grounded on that side.

The cap 12 is provided with a screw-threaded binding-post 17 which projects through a collar 2 molded into the insulating material comprising the cap. A wire 19 connected to the condenser 15 is secured beneath the head 8 of the binding-post 17.

The secondary winding 20 of the transformer coil is placed around the barrel portion *g* of the body, and outside of this is a cylinder 21 of insulating material. This is surrounded by the primary winding 22 of the transformer coil. The whole is incased within a sheath 23 which is slipped on over the bottom of the unit and has an turned flange *h* which rests against the shoulder of the metallic base 13. One end of the secondary coil 20 is connected by the wire 4 and

screw 5 to a thimble 26 which is molded into the body 11. This thimble 26 is screw-threaded for engagement with the central electrode *c* of the spark plug and forms the means of attachment of the unit to the spark plug. The other end of the coil 20 is grounded to the base 13. The primary winding 22 of the transformer coil is grounded to the metallic base 13 at one end, and the other end is connected to a contact member 27 set into the body 11. In the cap 12, there is a second contact member 28 which rests on the first contact member 27, and also acts as one point of a fixed spark gap. The other point 15 29 of the fixed spark gap is secured to a metallic strip 30 which is fastened to the binding-post 17 by a nut 31. A cover 32 of molded insulating material is placed over the cap 12 and is secured in place with a nut 33 on the binding-post 17. The binding-post 17 is also furnished with a thumb nut 34 by means of which connections may be made with the wire running to ordinary ignition system.

25 In order to free the unit from as much heat as possible, air may circulate through its interior, entering through the spaces formed by the legs 14 on the base, passing up through holes 7 in the body 11 and out through holes 9.

30 From the foregoing it will be seen that the unit may be put in place on the top of the spark plug with which it is to be used by screwing it bodily onto the upper end of the spark plug electrode *c*. It will also be seen that the spark gap may be adjusted by removing the cover 32.

The electrical operation of the device will be clearly understood by reference to Fig. 40 6. It will be seen that the condenser 15 is grounded by a wire 16. The secondary coil 20 is connected by wire 4 to the central electrode *c* of the spark plug and on the other side is grounded to the engine. The primary winding 22 is also grounded to the en-

gine on one side and on the other side connected to the spark gap 28, 29 which is itself connected to the ungrounded side of the condenser by the wire 19.

The unit is supplied with current from the 50 regular high tension system through a suitable lead wire attached to the binding-post 17. The condenser 15 discharging through spark gap 28, 29 and primary coil 22 produces a current which is of very high frequency 55 and this induces a current of high frequency and extremely high voltage in the secondary coil 20 which produces a corresponding discharge between the electrodes of the spark plug.

60 Since the parts are all contained in a single unit mounted on the top of the spark plug, danger of electrical leakage is done away with.

What I claim is,

65 1. A spark plug unit comprising a body of molded insulating material, a metallic base secured thereto, a condenser contained in a chamber within said body, a spark gap mounted on said body, the primary and secondary windings of a disruptive discharge 70 coil surrounding said body, a sheath for said windings, and a removable cover of insulating material over the spark gap, said condenser and spark gap being in circuit with the primary winding. 75

2. A spark plug unit comprising a body of insulating material, a metallic base therefor, a screw-threaded thimble for engagement with the central electrode of the spark 80 plug, primary and secondary windings around said body, both of said windings being connected to said base and said secondary winding being connected to the said thimble, a condenser within said body and 85 a cap thereon and a spark gap in circuit with said condenser, said spark gap being mounted on said cap.

In testimony whereof I affix my signature.
RALPH H. WHISLER.