J. F. CAVANAGH.

IGNITION DEVICE.

APPLICATION FILED OCT. 13, 1910.

995,400. Patented June 13, 1911.

Fig. 7.

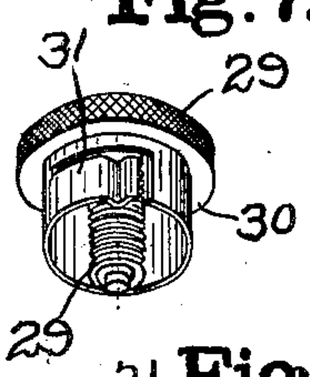


Fig. 8.

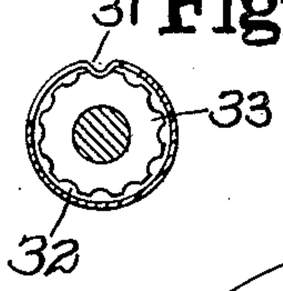


Fig. 1.

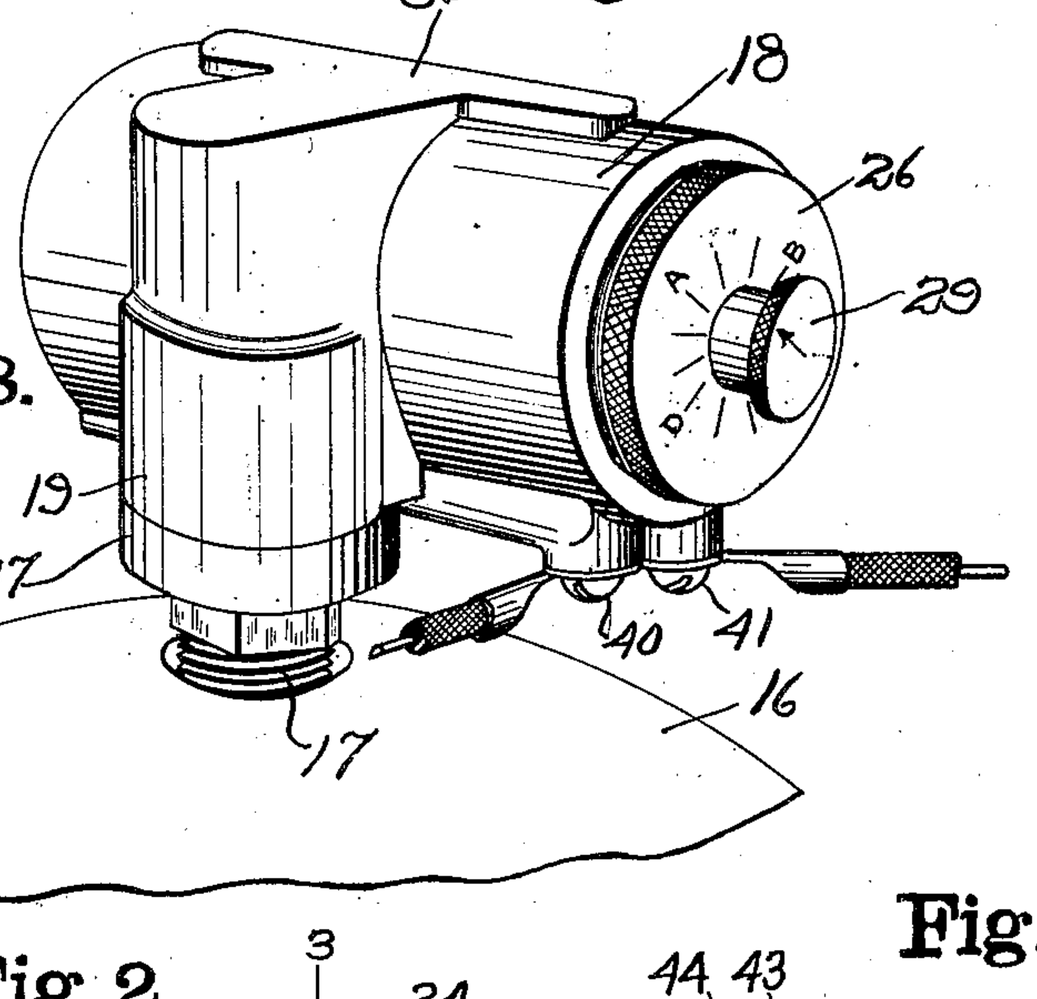


Fig. 2.

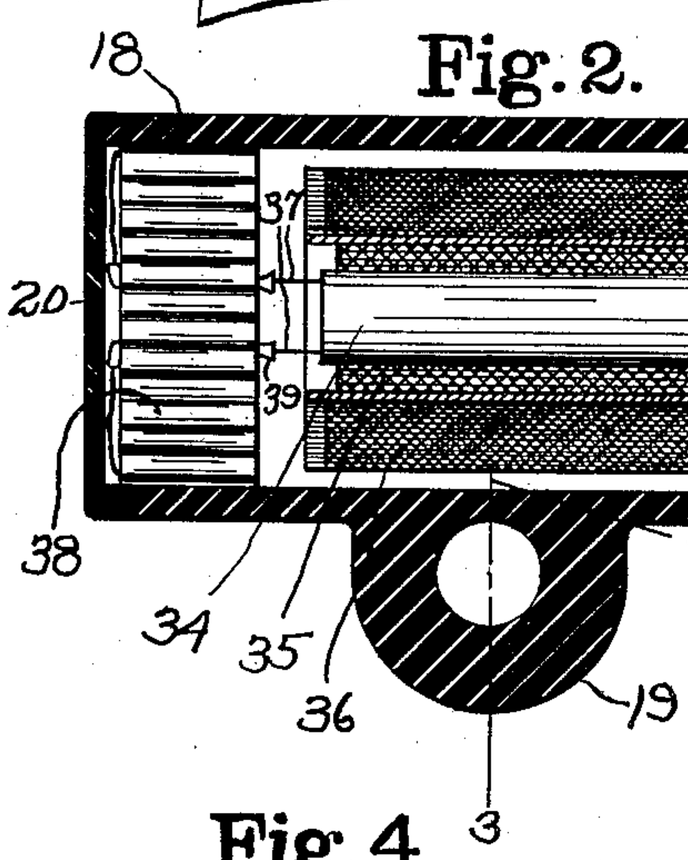


Fig. 3.

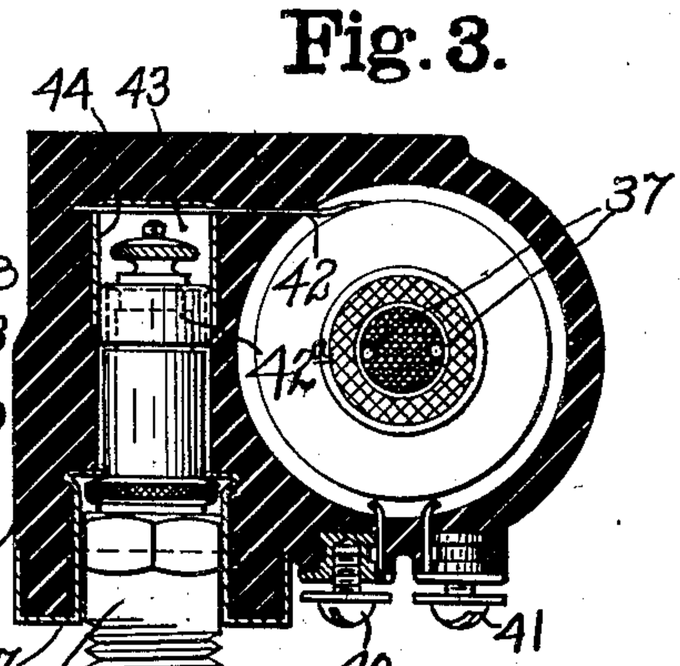


Fig. 4.

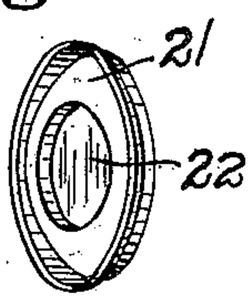


Fig. 5.

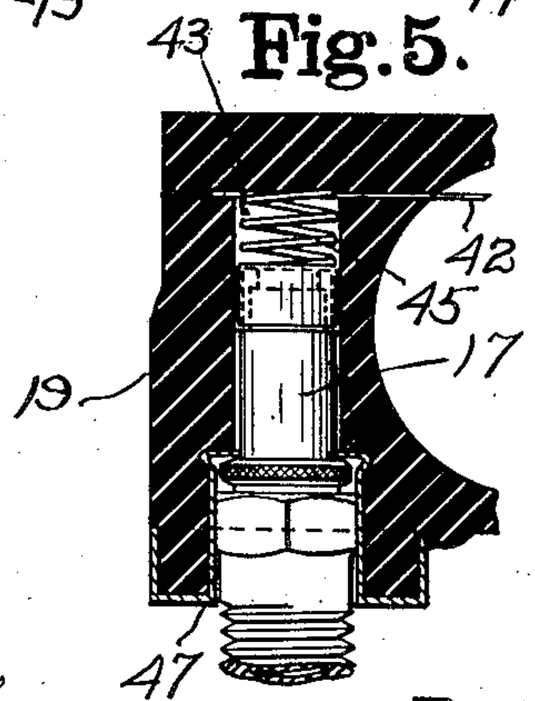
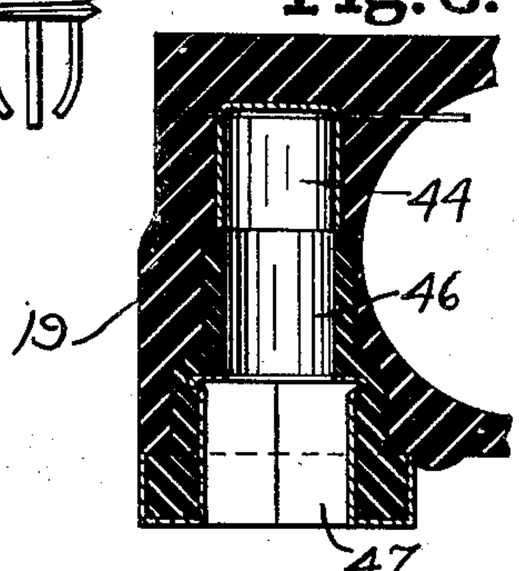


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN F. CAVANAGH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF THREE-FOURTHS TO THE LINDSLEY AND ALLEN ELECTRIC COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

IGNITION DEVICE.

995,400. Specification of Letters Patent. Patented June 13, 1911.

Application filed October 13, 1910. Serial No. 586,894.

To all whom it may concern:

Be it known that I, JOHN F. CAVANAGH, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Ignition Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to spark coil mechanism and casing that is especially adapted for use in connection with spark plugs of gas engines.

When the spark coil and the plug are located in separate places as is customary, and connected by a high tension wire, there is liable to be some loss of energy, and moreover the said wire may become loosened or injured.

One of the objects of the present invention is to provide an improved structure whereby the usual high tension connecting wire is dispensed with.

Another object is to provide a device of this character which can be used in connection with any standard spark plug, and which may be quickly removed from one spark plug to another, or different coil mechanisms substituted one for another in connection with any given spark plug.

Another object of the invention is to provide an improved form of condenser which will retain its shape and place in the coil casing.

To these ends the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings: Figure 1— is a perspective view of my improved device mounted in position on an engine. Fig. 2— represents a horizontal section of the device shown in Fig. 1. Fig. 3— represents a section on line 3—3 of Fig. 2. Fig. 4— is a perspective view of the cap plate at the end of the core. Figs. 5 and 6— are views similar to a portion of Fig. 3 but illustrating slight modifications hereinafter described. Fig. 7— is a perspective view of the adjusting screw and its retaining device. Fig. 8— is a detail illustrating the means for holding the adjusting screw.

Similar reference characters indicate the same or similar parts in all of the views.

A portion of an engine cylinder is indicated at 16 in Fig. 1, a standard spark plug being indicated as a whole as at 17. It is understood of course that all spark plugs are screwed tightly in position to avoid leakage. I have provided a structure of coil and coil casing so that the spark plug itself can be utilized as the sole means of holding the coil in proper position relatively to the spark plug, an especial advantage of this being that I am enabled to dispense with the usual high tension connecting wire.

Referring first to Figs. 1, 2, 3 and 4, I provide a cylindrical casing 18 having an integral projection 19 at one side, this casing as a whole being formed of an insulating compound which is molded under heavy pressure. As shown in Fig. 2, one end of the cylinder 18 is closed by a disk 20 of material similar to that composing the rest of the casing, said disk being sealed in place after the internal mechanism has been placed in the cylinder. The other end of the cylinder 18 has an opening in which is secured a cap 21 (see Fig. 4), said cap having a central portion pressed out to form a recess 22 in its inner wall, for the purpose of receiving and supporting the end of the core, thus enabling the primary winding to be carried very close to the end of the core, contrary to the usual construction, by which construction the maximum number of turns of wire may be applied to a core supported in this manner. The end 23 of the cylindrical portion of the casing supports mechanism similar to that illustrated and claimed in my application 490,721, filed April 19, 1909. This structure includes two concentric soft metal rings 24, 25 embedded in the material of the casing. A cap 26 is screwed to the outer ring 24. A vibrator disk 27 is mounted on the inner ring 25, said disk 27 carrying the armature 28 opposite the central portion of the cap 21. An adjusting screw 29 serves to control the flow of current in the usual manner. In the present case, to hold this screw in its adjusted position, I provide it with a flange 30 having a spring tongue 31 adapted to enter either one of a plurality of notches

32 formed in the periphery of a boss 33 of the cap 26.

The coil comprising the usual core 34, primary winding 35 and secondary winding 36, is mounted in the cylinder 18 with the end of the core fitting the recess 22 of cap 21. In Fig. 2 I omitted representation of the usual wax filling surrounding the coil, in order to avoid confusion in said figure.

Heretofore it has usually been customary to run the condenser leads outside of the winding in which position it was difficult to insulate from the secondary winding and made the device more bulky. As best shown by comparing Figs. 2, 3, the wrapping of the bunch of wires comprising the core includes also two leads 37 which are therefore in such position that they are always protected, and are located out of proximity to the secondary winding 36.

The primary coil at one end is connected to a terminal 40 (see Fig. 3) and the ring 24 has a connection with a terminal 41, and the secondary winding is connected by a lead 42 extending through the body of the casing to the bottom of a socket 43 formed in the side projection 19. This lead 42 at its inner end may be so formed that it will itself connect with the tip of the spark plug, but further projection may be made for better contact with the spark plug. As shown in Fig. 3 a shell 44 may be molded into the bottom of the socket 43, said shell having the lead 42 extending directly to it. This shell extends far enough away from the end of the socket to embrace a cap 42^a attached to the upper end of the spark plug 17. As shown in Fig. 5 the connection from lead 42 to the spark plug may be by means of a spring 45 coiled in the bottom of the socket 43. In Fig. 6 I show the same form of shell 44 as in Fig. 3, but the wall of the plug receiving socket is, in this case, provided with a lining 46 of high heat resisting material. In each of Figs. 3, 5 and 6 I show a reinforcing shell 47 for the mouth or entrance end of the plug socket.

It will now be understood that the device as shown in Figs. 1, 2 and 3 may be readily slipped upon the spark plug so as to be supported thereby, and may be as conveniently removed from the spark plug. The fact that the spark plug receiving socket is formed with a projection at one side of the cylinder 18, and at a substantial right angle thereto, and substantially midway thereof, will hold the device without undue strain upon any of the parts. And owing to the fact that the coil-carrying casing has a contact adapted to complete a circuit with a spark plug, no separate high resistance wire is necessary, and the connection with the spark plug is quickly made. Some engines have the spark plug projecting laterally from the casing 16. In this case it is desirable to so couple the igniting device to the spark plug that it cannot be jarred loose therefrom. As shown in Fig. 6 the reinforce 47 is polygonal in form so as to fit the usual wrench engaging portion of the standard spark plug so that the igniter cannot rotate on the spark plug. The reason why the aperture or opening in the coupling is polygonal is so that it can be slipped over the spark plug in order to get it to a position below or past the wrench engaging faces of the spark plug. Since the coupling has flanges which engage below the said wrench engaging faces, and a curved wall which is clamped upon the igniter casing, the said igniter cannot become jarred loose from the spark plug; this also serves to radiate heat from the socket.

As shown in Fig. 1 the side of the cylindrical portion 18 of the casing is formed with an elongated flat face which flat face extends out over the upper end of the projection 19. This wide flat area is purposely provided to afford a surface which may bear instructions for the attachment and use of the igniter and a diagram to aid in the same.

The operation of the timer is of course as usual and need not be described herein.

I claim:

1. In an ignition device, a coil-carrying casing having a contact carrying socket for readily receiving and completing the circuit through a spark plug, the axis of said socket being in a different plane from that of the coil casing, and a contact adapted to complete a circuit with a spark plug.

2. In an ignition device, a coil-carrying casing having an integral projection at one side, said projection having a socket to receive a spark plug, the longitudinal axes of the coil-carrying portion of the casing and of the socket being substantially at a right angle to each other.

3. In an ignition device, a coil-carrying casing having an integral projection at one side, said projection having a socket to receive a spark plug, the longitudinal axes of the coil-carrying portion of the casing and of the socket being substantially at a right angle to each other and in different planes.

4. In an ignition device, a coil-carrying casing having an integral projection substantially at the center of one side thereof, said projection having a socket to receive a spark plug, the longitudinal axes of the coil-carrying portion of the casing and of the socket being substantially at a right angle to each other.

5. An ignition device having a coil-carrying cylindrical portion and a projection at

one side thereof all being formed of pressed and integral material, a socket being formed in said projection to receive a spark plug.

6. In an ignition device, a coil-carrying casing having a socket for a spark plug, the walls of said socket being composed of a high heat insulating material the remaining portion of said casing being constructed of a comparatively low heat resisting material, said socket carrying a contact to complete a circuit with the spark plug.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN F. CAVANAGH.

Witnesses:
HOWARD E. BARLOW,
E. I. OGDEN.