June 9, 1959 C. W. MAJOR 2,890,365

DUAL FIRING SPARK PLUG

Filed June 28, 1955

Fig. 1

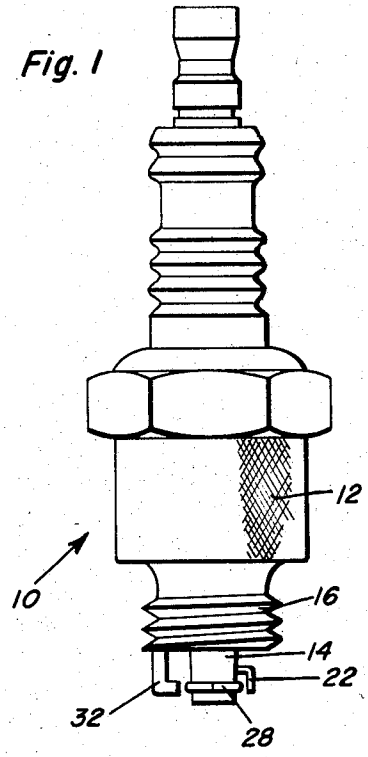


Fig. 4

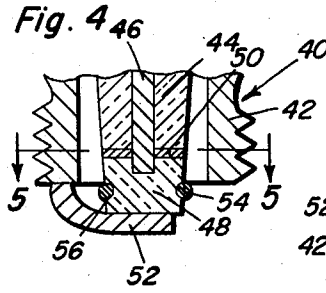


Fig. 5

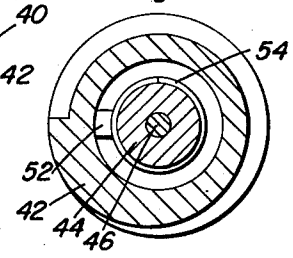


Fig. 6

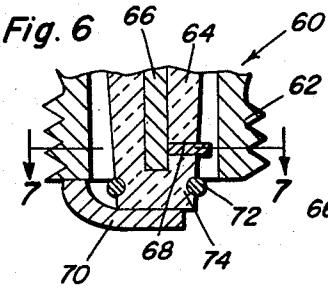


Fig. 7

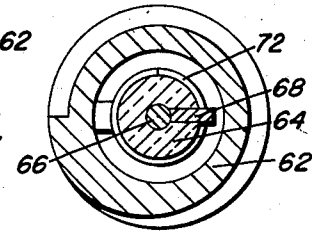


Fig. 2

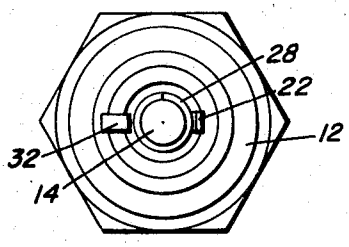
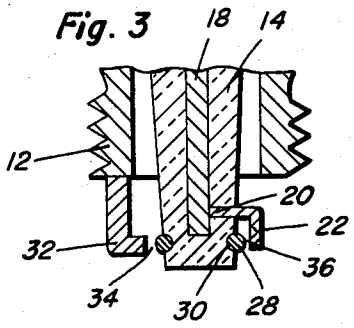


Fig. 3



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2,890,365

DUAL FIRING SPARK PLUG

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2 Claims. (Cl. 313—123)

This invention relates to spark plugs for internal combustion engines, and more particularly to spark plugs adapted to provide multiple sparks for igniting the fuel.

The primary object of the present invention resides in the provision of a multiple spark arrangement for spark plugs of conventional size and shape which can be either adapted for installation on previously manufactured conventional spark plugs or which may be utilized in original manufacture without requiring extensive changes to molds, dies and the like used in forming the conventional spark plug.

A further important object of the invention resides in the provision of a dual firing spark plug which includes a pair of electrodes having a conductive ring spaced therebetween for ensuring that there will be more than one spark provided for igniting the fuel in the cylinders of an internal combustion engine so as to gain optimum performance from the engine.

Still further objects and feature of this invention reside in the provision of a dual firing spark plug that is simple in construction, highly efficient in operation, easy and inexpensive to manufacture, and which can be readily installed in lieu of existing spark plugs, thereby permitting wide use and distribution.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by these dual firing spark plugs, preferred embodiments of which have been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is an elevational view of one form of the dual firing spark plug comprising the present invention;

Figure 2 is a bottom plan view of the spark plug;

Figure 3 is an enlarged sectional detail view of the electrode end of the spark plug;

Figure 4 is a sectional detail view illustrating a portion of a modified form of dual firing spark plug;

Figure 5 is a horizontal sectional detail view as taken along the plane of line 5—5 in Figure 4;

Figure 6 is another sectional detail view illustrating another modified form of the invention; and

Figure 7 is a sectional detail view as taken along the plane of line 7—7 of Figure 6.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, and with initial attention directed to the embodiment as is shown in Figures 1 through 3, reference numeral **10** is used to generally designate the dual firing spark plug comprising the present invention. This spark plug includes a metallic shell **12** having an insulating core **14** carried thereby. The metallic shell is suitably threaded, as at **16**, for engagement within the female threads in the engine block of the internal combustion engine with which the spark plug **10** is adapted to be associated.

The insulating core **14**, as is conventional in spark plugs, has a conductive main electrode rod **18** embedded therein and extending therethrough. A pin **20** is provided which is electrically connected to the main electrode rod **18** and carries a projection **22** forming one of the electrodes of the spark plug. A ring **28** of conductive material is pressed and seated into a groove **30** formed in the core **14**.

Another electrode **32** is attached to the shell **12** and is arranged in spaced relationship to the ring **28**. Thus, two gaps, as at **34** and **36**, of substantially equal size are provided across which the spark may jump, thereby assuring dual firing of the spark plug during its use.

In Figure 4, there is shown a modified form of the invention in which there is disclosed a spark plug **40** having a shell **42** of a suitable metallic material and an insulating core **44**. A main electrode rod **46** extends therethrough and positioned between the core cap **48** and the main core section **44** is a washer or disk **50** of electrically conductive material. The main electrode rod **46** is in electrical contact with the disk **50**. The disk **50** therefore forms an electrode. Another electrode **52** is secured to the shell **40** and extends underneath and engages the core cap **48** to not only hold the core cap **48** in position but to form a gap between itself and an electrically conductive ring **54** substantially equal to the gap between the ring **54** and the electrode **50**. The ring **54** is pressed and seated into a groove **56** formed in the cap **48**.

Referring now to the embodiment of spark plug generally designated by reference numeral **60** in Figure 6, it will be seen that herein there is disclosed a spark plug employing a metallic shell **62** and a core **64** of insulative material having a main electrode rod **66** extending therethrough with the electrode rod **66** being embedded in the insulative material of the core **64**. A pin **68** of electrically conductive material is secured in the core **64** and engages the electrode rod **66**. This pin **68** therefore serves as an electrode, and another electrode **70** is secured to the shell **62** and is shaped so as to engage the insulative material of the core **64**. An electrically conductive ring **72** is suitably seated in a groove **74** in the core **64** and is equivalently spaced from the electrode **68** and the electrode **70** so as to thereby form two gaps across which the spark may jump to the conductive ring **72**. This assures proper and desirable dual firing of the spark plug.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A spark plug comprising a metallic shell, an insulative core carried by said shell, a main electrode rod carried within said core and enclosed by said core, a first electrode connected to said shell, a second electrode said second electrode supported in said core and extending through said core to engage said electrode rod, and a conductive ring carried by said core and spaced from said first electrode and said second electrode, said second electrode comprising a disk, said first electrode extending beneath said core in supporting relationship thereof.

2. A spark plug comprising a metallic shell, an insulative core carried by said shell, a main electrode rod carried within said core and enclosed by said core, a first electrode connected to said shell, a second electrode said second electrode supported in said core and extending through said core to engage said electrode rod, and a conductive ring carried by said core and spaced from said first electrode and said second electrode, said second electrode comprising a disk, said disk separating said core into a main core and a core cap, said first electrode en-

gaging said core cap, said first electrode extending beneath said core cap in supporting relationship thereof.

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