Aug. 14, 1923. 1,464,685

R. SUNDBERG

SPARK PLUG

Filed Aug. 20, 1921

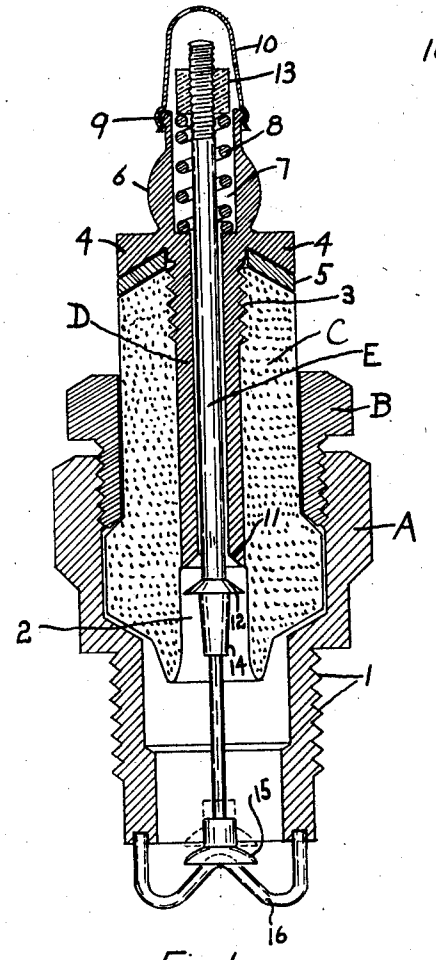


Fig. 1

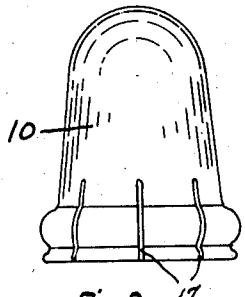


Fig. 2

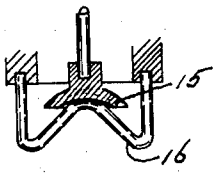


Fig. 3

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UNITED STATES PATENT OFFICE.

RICHELIEU SUNDBERG, OF SALT LAKE CITY, UTAH.

SPARK PLUG.

Application filed August 20, 1921. Serial No. 493,954.

To all whom it may concern:

Be it known that I, RICHELIEU SUNDBERG, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Spark Plugs, of which the following is a specification.

My invention relates to spark plugs used on internal combustion engines and has for its object to provide a spark plug which will allow air to enter the cylinder immediately around and contiguous the spark gap in order to make a better combustion of the gas and thereby prevent any accumulation of carbon on the electrode and on the insulator. A further object is to provide a spark plug having a movable electrode and which also forms the stem of a valve that in turn controls the air which I introduce as above mentioned. And a still further object of my invention is to provide an electrode which will carry any excess oil away from the spark gap.

These objects I accomplish with the device illustrated in the accompanying drawings in which similar letters and numerals of reference indicate like parts throughout the several views and as described in the specification forming a part of this application and pointed out in the appended claim.

In the drawings in which I have shown a substantial embodiment of my invention Figure 1 is a longitudinal section of my spark plug. Figure 2 is an elevation of the detachable cap. Figure 3 is a section of the deflector and electrode.

I have discovered that the fouling of spark plugs is caused by a lack of oxygen in the gas and particularly at the spark gap, and the present invention overcomes such difficulty by providing means to introduce air around the spark gap, the oxygen content thereof combining with the gas and aiding combustion at that particular point in the combustion chamber of the engine. The invention consists of a metal shell or casing A externally threaded, as at 1, to be screwed into the combustion chamber of the engine, and the co-operating sleeve nut B which is used as a jam nut to fasten a porcelain plug C within said shell A. The said porcelain plug C is provided with a central bore or hole 2, a portion of which is internally threaded, as at 3. A sleeve nut D is externally threaded to mesh with the said threads 3 and is screwed into the upper portion of said porcelain plug C, a portion of said nut D is extended as a cap or covering for said plug C, as shown at 4, and a packing washer 5 is carried on said sleeve nut D between the extended portion of said nut D and the porcelain. The upper end of said porcelain plug C is given a conical shape and likewise said washer 5 and the extended portion 4 of said sleeve nut D. The upper end portion of said sleeve nut D is given a globular shape 6 to form a terminal post for the current carrying wire, and the interior of said terminal post 6 is bored out to form a spring chamber and priming cup 7, within which is carried the spiral spring 8. The upper edge of said cup is outwardly flanged as at 9 to be engaged by the dust cap 10. The lower edge of said dust cap is slotted as at 17 to allow air to pass through, and also giving a spring effect to the slotted portion. The lower end of said sleeve nut D is chamfered out to form a valve seat 11, within which a valve 12 seats. Within the said central bore of said sleeve nut D is loosely carried the valve stem E on which said valve 12 is secured, and which stem is spaced from the inner wall of said sleeve nut D. A nut 13 is screwed on the upper end portion of said stem and said nut bears against said spring 8. The tension of which spring is such as to practically carry the weight of said stem and its connections, in order that said valve will be seated easily by the compression action of the engine piston and unseated by the suction of the engine piston. Immediately beneath the said valve 12 the said valve stem is made larger as at 14 to provide a shoulder thereon for carrying more firmly the said valve 12. On the lower end of said valve stem E is secured the conically shaped deflector 15 to direct the flow of any oil which may enter said spark plug to the periphery edge of said deflector and away from the spark gap. An electrode wire 16 is fastened at each end in the lower end of said casing A and the said wire is passed diametrically below and across the opening of said deflector, and with its medial portions bent or curved upwardly to contact with said deflector 15 when the engine piston is sucking or being moved downwardly.

The operation of my invention is as follows:—With the engine in operation and electric energy supplied to cause a spark

between the electrode 16 and the deflector 15 as timed to occur at the instant of greatest compression, air will be drawn through the slots 17 of the dust cap and downwardly between the interior of the sleeve nut D and the valve stem E and around and by the valve 12 to the lower portion of the interior of said shell A and surrounding the spark gap between deflector and electrode. At the same time the explosive gas will be drawn into the cylinder of the engine and on the compression stroke of the piston the valve 12 will be seated and the gas will be compressed as usual with more than the usual amount of air immediately surrounding the gap between the electrodes. The gap is produced by the valve 12 seating and moving the stem E and deflector 15 away from the electrode 16. The length of travel of the valve stem E is regulated by means of the nut 13 when turned on the stem E. If my spark plug is to be used in cylinders which deposit an excess of carbon on the electrode, by loosening the nut 13 on the stem E the deflector 15 will strike the electrode 16 and remove the carbon and polish the electrode and thereby give a hotter spark. If at any time it is found desirable to introduce gasoline for priming the cylinders it is easily done by pouring gasoline into the priming cup 7, and any cylinder cleaning liquid may be introduced into the cylinder in the same manner. Should more lubricating oil be used than is required in the cylinder any excess oil will be deflected away from the spark gap by the deflector 15 and all such excess oil will drip from the lower point or bend in said electrode or be consumed as fuel without fouling the spark gap and all excess carbon in the compressed gas will be supplied with oxygen from the air introduced by my invention and burned, thus preventing the accumulation of carbon on the electrodes and on the insulator, and keeping the spark plug clean and cooling the porcelain insulator thereof. Also the air entering the plug is forced against the wall of the insulator at its lower end and by passing it over the periphery of valve 12 and thereby keeping the insulator perfectly clean and assuring more perfect insulation.

Having thus described my invention and its operation I desire to secure by Letters Patent and claim:—

A spark plug comprising two metal shells screwed together to hold an insulator; an insulator having a central bore longitudinally therein and with internal threads therein to receive a sleeve nut; a sleeve nut screwed in said bore and having a valve seat on its lower end; a hollow terminal post formed on the outer end of said sleeve nut; a valve stem spaced from and carried in said sleeve nut; a spiral spring carried on said stem and within the hollow of said terminal post to seat a valve; and a valve formed on said stem adapted to seat in the lower end of said sleeve nut.

In testimony whereof I have affixed my signature.

RICHELIEU SUNDBERG.