Aug. 7, 1928.

1,679,987

H. RABEZZANA

SPARK PLUG

Filed July 9, 1925

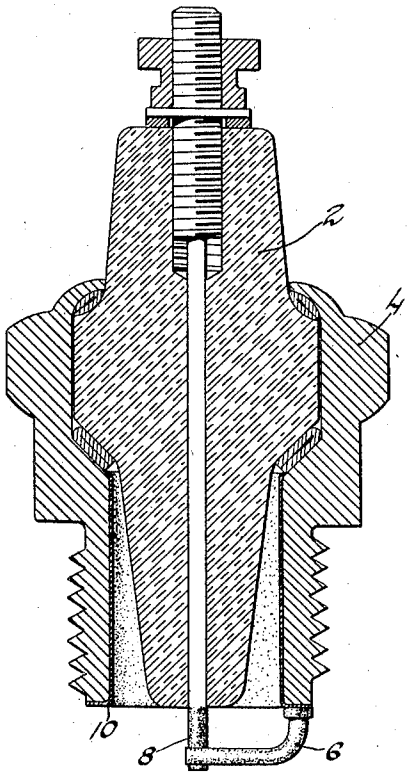


Fig. 1

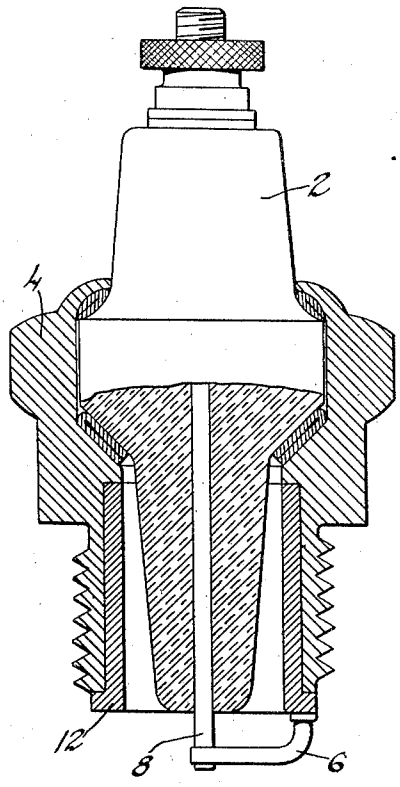


Fig. 2

Inventor

Hector Rabezzana

By Blackmore, Spencer & Flint

Attorney

Patented Aug. 7, 1928.

1,679,987

UNITED STATES PATENT OFFICE.

HECTOR RABEZZANA, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A COMPANY OF MICHIGAN.

SPARK PLUG.

Application filed July 9, 1925. Serial No. 42,489.

In the case of heavy duty motors such as those used in racing machines which are usually designed to operate at high compressions, very high temperatures are attained in the combustion chamber. The subjection of the insulators of the spark plugs to these extreme temperatures set up strains therein and otherwise affects the material of which they are composed not infrequently resulting in their failure.

The object of the present invention is to facilitate the transfer of heat away from the insulator in order to maintain it at a lower temperature, thus reducing the magnitude of the internal strains, and otherwise decreasing the liability of failure. This object I have accomplished by applying the well known law of physics that the rate of heat exchange between two bodies varies directly with the difference in temperature between them. Thus in the case of a spark plug if I can increase the difference in temperature between the insulator and the parts with which it is in conductive relation I will increase the rate of heat flow from the insulator and succeed in maintaining it at a lower temperature, although the temperature in the combustion chamber may remain the same. This I have accomplished by coating or lining the shell through which the heat of the insulator is transferred to the engine block with a material which is a relatively good reflector of heat and, since it does reflect heat in considerable quantities instead of absorbing it, this coating or lining is maintained at a relatively low temperature and serves to insulate the shell from the high temperatures of the combustion chamber. With the shell thus maintained at a low temperature the difference between the temperature of the insulator and the shell is greater and the rate of transfer of heat is increased with resultant lowering in temperature of the insulator.

As a further extension of this idea I have provided the electrodes with a coating or covering of a good heat reflecting material, preferably enamel. The electrodes themselves are thus maintained at lower temperatures. This, in the case of the side electrode, serves to keep the shell at a lower temperature, and in the case of the center electrode serves to reduce the flow of heat into the insulator.

In the drawing:

Figure 1 shows a sectional view of a conventional spark plug to which my invention is applied; and

Figure 2 is a similar view of a modified form.

Referring to the drawings, 2 is the insulator, 4 the shell, 6 the side electrode, and 8 the center electrode. In the form shown in Figure 1, I have coated or lined the interior of the shell with enamel as shown at 10. To keep the temperature of the shell lower than would otherwise be the case the enamel should possess better heat reflecting properties than the material of which the shell itself is composed. I give below the composition of one enamel which I have found to be suitable for this purpose. However, there are many others which may be used for the purpose and I do not desire to restrict myself to an enamel of this particular composition.

Potash feldspar	25.5
Soda ash	2.0
Sodium nitrate	2.0
Borax	14.4
Barium carbonate	3.3
Zinc oxide	7.0
Red lead	11.2
Fluorspar	3.3
Cryolite	2.0
Tin oxide	6.0

With a coating of this character applied the shell is maintained at a lower temperature, facilitating the flow of heat away from the insulator and effecting a reduction in the temperature of the latter.

As a further development of this idea I have applied a similar coating of enamel to the center and side electrodes. The purpose of this coating is to reduce the temperature of the electrodes. The reduction in temperature of the side electrode reduces the transfer of heat to the shell. The reduction in temperature of the center electrode reduces the transfer of heat to the insulator. The result in both cases is to assist in keeping the insulator cooler. It is obvious, of course, that the enamel must

not be applied to the portions of the surface of the electrodes between which the spark jumps for the enamel ordinarily used is a fairly good insulator and would tend to prevent the passage of the spark.

In place of an enamel, the shell may be provided with a liner such as shown at 12 in Figure 2, this liner being of a material possessing better heat reflecting properties than the material of which the shell is composed. I have found steel to be a suitable material of which to construct the liner and have combined it with a shell of brass. Since the brass is a very good conductor of heat, the heat which does pass through the steel liner is quickly carried off. Of course my invention is not restricted to the use of these particular materials, the only essential requirement being that the material used for the liner shall be a good reflector of heat while that used for the shell is preferably a good conductor of heat.

I claim:

1. A spark plug shell provided on the portion which is exposed to the high temperatures of the combustion chamber with an enamel possessing relatively high heat reflecting properties.

2. A spark plug electrode coated with enamel possessing relatively high heat reflecting properties.

3. A spark plug comprising a shell, an electrode mounted thereon, an insulator, an electrode associated with the insulator, said shell and said electrodes being covered with a material possessing relatively high heat reflecting properties.

4. A spark plug comprising a shell, an insulator in the shell, said shell and insulator having their lower portions normally exposed within the combustion chamber, an electrode in said insulator, the exposed portion of said electrode being provided with a coating of material possessing relatively high heat reflecting properties to reduce the flow of heat into the electrode and thence into the insulator.

5. In a spark plug as defined in claim 4, said shell having its exposed portion coated with a material possessing relatively high heat reflecting properties.

6. A spark plug comprising a shell, an insulator in the shell, the portion of the shell which is normally exposed to hot combustion gases being coated with an enamel containing tin oxide.

7. A spark plug comprising a shell having an electrode, an insulator in the shell, an electrode in the insulator, the portion of the shell which is normally exposed to the hot combustion gases and the said electrodes being coated with an enamel containing tin oxide.

In testimony whereof I affix my signature.

HECTOR RABEZZANA.