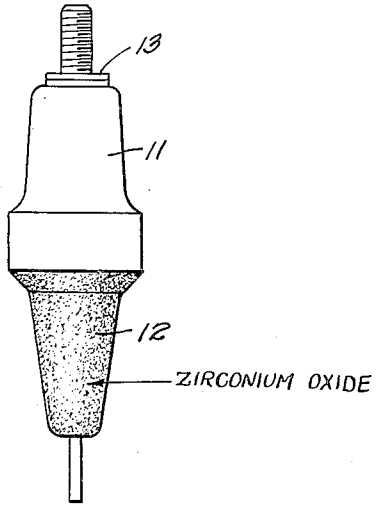
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SPARK PLUG PORCELAIN

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SPARK PLUG PORCELAIN

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4 Claims. (Cl. 123—169)

In the accompanying drawing, forming a part of this specification, a preferred embodiment of the invention has been illustrated.

It is customary to use glazed, shiny porcelain insulators in the spark-plugs employed in internal-combustion engines, arcs between the terminals of which ignite the compressed charges of gaseous fuel to explode the latter whereby to perform the work of operating the engine.

Experience has demonstrated that the insulating properties or characteristics of such porcelain members depend in substantial measure upon the presence and proper preservation of their surface glaze.

If this becomes materially damaged, the efficiency of the spark-plug is reduced in great degree and it shortly becomes practically useless as a suitable electrical insulating medium.

Under present-day operating conditions, high gas compressions are used in the engine-cylinders, and these, combined with the associated elevated temperatures in the combustion-chambers, allow the gases to attack and destroy such highly essential and important glaze, this being particularly true when tetraethyl-lead is present in the gases for the purpose of prolonging or retarding the explosions to avoid objectionable detonation.

The result is that spark-plugs as now made cannot successfully and satisfactorily perform their intended functions over an adequately long period and frequent replacements are required to keep the engine functioning in a reasonably satisfactory manner.

So far as I know, no reliable means has been heretofore forthcoming to avoid or to correct this difficulty and to escape the expense of repeated installations of new plugs.

My invention aims to overcome this obstacle by coating those glazed portions of the spark-plug porcelain 11 exposed to the action of such heat and gases with a protective medium 12 which maintains the glaze against unduly-rapid deterioration.

Such coating material must be one which will not flux under the degree of heat to which it is subjected in the engine combustion-chamber and which will not be detrimentally affected by the constituents of the ethyl gasoline, especially the tetraethyl-lead thereof.

Zirconium oxide is a suitable or appropriate material for this purpose, but oxides of other metals of the alkaline or rare earths would likewise serve the required purpose.

These metals are of the groups 2, 3, and 4 of the periodic system, and the members of such groups having oxides of the highest melting points are the ones most satisfactory for this purpose, such as the oxides of glucinum, calcium, barium, strontium, magnesium, scandium, titanium, cerium, etc., with aluminum included.

According to the present preferred method of protecting the spark-plug, characterized as a whole 13, after coating at least that portion of its porcelain element designed and intended to project into the combustion-chamber and to be exposed to the gases with zirconium oxide, either by brushing it on or by dipping or spraying, the plug is then subjected for a short time to a temperature of about 2500° Fahrenheit or over.

At such elevated temperature, the glaze becomes slightly soft, the zirconium oxide is attacked by the glaze and fluxes at the surface of contact, so that the glaze and coating become in a measure cemented or adhered together, thus assuring the maintenance of the coating or covering in proper place under ordinary service conditions.

During such heating, the coating becomes more or less vitrified and it may be left somewhat rough or it may preferably be polished to give it a smooth surface.

If aluminum oxide be employed as a coating material, it will probably not vitrify sufficiently to take a suitable polish, but it may be used without undergoing the polishing operation.

Such an external coating or protective layer over the exposed portion of the glazed porcelain intended to be subjected in service to the pressure, heat, and chemical action of the hot gases in the combustion-chamber of the engine resists or obviates overheating of the underlying shielded glaze and also prevents chemical reaction between the protected glaze and the chemical components of the gas, with the favorable result that the full electrical insulating properties of the glaze are preserved over a much longer period than has heretofore been possible under like operating conditions without such a protecting medium.

The invention has been defined by the appended claims, but it will be understood that it is not limited and restricted to the precise and exact details hereinbefore set forth and that these may be modified within substantial limits without departure from the heart and essence of the invention and without the loss or sacrifice of any of its material benefits and advantages.

Whereas I have herein indicated the use of certain oxides as suitable materials to be used for the coating, the invention is not necessarily limited thereto, as salts may be employed as the equiva-

lent of the oxides in some instances, for example, silicates.

I claim:

1. A glazed porcelain member adapted for use as an insulating means in a spark-plug of an internal-combustion engine having that glazed portion thereof designed to be subjected to contact with the gases of the engine covered with an oxide protective coating capable of withstanding the heat, pressure and chemical action of the engine gases without substantial deterioration, thus preserving the electrical insulating properties of the covered glaze of the porcelain.

2. A glazed poreclain member adapted for use as an insulating means in a spark-plug of an internal combustion engine having that glazed portion thereof designed to be subjected to contact with the gases of the engine covered with a zirconium-oxide protective coating capable of withstanding the heat, pressure and chemical action of the engine gases without substantial deterioration, thus preserving the electrical insulating properties of the covered glaze of the porcelain.

3. A glazed porcelain member adapted for use as an insulating means in a spark-plug of an internal-combustion engine having that glazed portion thereof designated to be subjected to contact with the gases of the engine covered with a protective coating bonded with the glaze and capable of withstanding the heat, pressure and chemical action of the engine gases without substantial deterioration, thus preserving the electrical insulating properties of the covered glaze of the porcelain.

4. A glazed porcelain member adapted for use as an insulating means in a spark-plug of an internal-combustion engine having that glazed portion thereof designed to be subjected to contact with the gases of the engine covered with a protective coating containing zirconium capable of withstanding the heat, pressure and chemical action of the engine gases without substantial deterioration, thus preserving the electrical insulating properties of the covered glaze of the porcelain.

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