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PROCESS FOR CLEANING SPARK PLUGS AND COMPOSITION THEREFOR

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This invention relates to cleaning and polishing compositions, and more particularly to cleaning and polishing compositions for removing deposits from the insulators of spark plugs.

Spark plugs as normally used on internal combustion engines collect a deposit on the insulator surface which reduces the effectiveness of the insulator. Though aircraft spark plugs are completely shielded, they do collect a deposit which causes deterioration of the insulating properties of the spark plug insulator. The deposit consists of minute particles of metal which are sputtered off by corona discharge from the metal components both at the top and the bottom of the spark plug well, of ingredients of the cable insulation which may become volatilized, of the residue from the silicone jelly used to fill spaces between components in the barrel area, of particles of carbon, of gum and of metal from tools used to insert the spark plug. This collection of dirt and grime conducts electricity especially when it has absorbed some moisture and reduces the insulating properties of the spark plug insulator.

This compound may be removed by employing a cleaning and polishing composition in conjunction with a polishing tool or wheel. Various cleaning compositions and procedures have been proposed for cleaning the deposits on spark plug insulators, but they are exceedingly slow and laborious. In accordance with this invention the applicants have provided a cleaning composition consisting of a powdered abrasive, an organic solvent, and a suspension or gelling agent. The composition is in the form of a gel which adheres to the surface deposit on the spark plug insulator and dissolves or softens the binder or gum portion of the deposit before the abrasive cleaning and polishing action commences.

It is the object of this invention to provide a cleaning and polishing composition having both a solvent action and an abrasive action in the form of a gel which will adhere to the deposit on the spark plug insulator, so that it will simultaneously dissolve and abrade the deposit.

Another object of the invention is to provide a composition capable of cleaning the gum deposits from spark plug insulators when used in conjunction with a polishing tool or wheel.

Another object of the invention is to provide a gel of powdered feldspar, diethylene glycol monobutyl ether and a water suspension of bentonite for use as a cleaning and polishing composition.

The insulator surface of spark plugs used on internal combustion engines becomes covered with a deposit of small particles of carbon metal, etc., bonded together by a gum or varnish. This

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deposit reduces the insulating capacity of the insulator. This fouling of the spark plugs is especially dangerous in aircraft engines. Thus proper aircraft maintenance requires that the spark plug insulators be maintained free of these deposits.

On aircraft spark plugs this deposit forms particularly rapidly in the spark plug well. Thus a special tool has been devised to distribute and actuate or work the abrasive cleaning composition. The tool consists of a rotatably mounted cylindrical element having helical threads on its surface. This tool or any suitable polishing tool or wheel may be used to actuate this cleaning composition.

The cleaning composition made in accordance with this invention consists essentially of a fine powdered abrasive material and an organic solvent for the organic binder or gum of the deposits together with a material to maintain the abrasive in suspension in the solvent constituent. The organic solvent used may be naphtha, a low boiling point hydrocarbon paraffin, or benzene, an aromatic, or carbon tetrachloride, a chlorinated carbon, or chloroform, a chlorinated hydrocarbon. The solvent acts to dissolve and soften the gum or varnish which holds the deposited material on the insulator surface. The feldspar is a fine abrasive material which will scour or abrade the deposit and assist the cleaning action of the solvent. The bentonite when mixed with water forms a gel which will hold the abrasive and solvent in suspension or distributed in the gel. In addition, the gel is a convenient and practical form, as compared to a liquid, for using the cleaning composition.

A suitable cleaning composition may be made by compounding these ingredients within the range of percentages by weight specified in Table I.

Table I

	Percent
Bentonite	0.25 to 2.0
Water	2.8 to 23
Feldspar	40.0 to 65.0
Solvent	Balance

A feldspar having the particle size as defined in Table II has been found particularly suitable for removing these deposits from spark plug insulators.

Table II

	Percent
0 to 5 microns	25 to 30
5 to 10 microns	22 to 25
10 to 20 microns	24 to 32
20 to 40 microns	18 to 22
Over 40 microns	0.5 to 1.5

We have also found that an improved cleaning composition may be formulated by employing a water soluble organic solvent in the above composition. When a water soluble organic solvent is employed in the cleaning composition, the compound is more stable and more active both as a solvent and as a cleaning abrasive. This improved action appears to be due at least in part to the improved homogeneous nature of the mixture when the water soluble solvent is used. Water soluble solvents, such as the polyglycols and their mono or diethers, and especially diethylene glycol monobutyl ether, are particularly advantageous due to their non-toxic and non-inflammable properties. The preferred cleaning composition consists by weight of 57% powdered feldspar and 6% of a 9% water suspension of bentonite and 42% of diethylene glycol monobutyl ether.

The cleaning composition or gel is swabbed on the cleaning tool or the work. The solvent softens the gum or varnish binder in the deposit, while the abrasive as moved under the action of the tool abrades the deposit. This action continues throughout the cleaning operation with the solvent and abrasive continuously softening and removing by abrading the deposit.

Numerous modifications of the invention may be made without departing from the spirit and scope as defined in the appended claims.

We claim:

1. A spark plug cleaning composition consisting of a mixture by weight of 0.25 to 2.0% bentonite, 2.8 to 23% of water, which forms a gelatinous suspension agent and 40 to 65% of a powdered feldspar abrasive material and the balance diethylene glycol monobutyl ether.

2. In a process for cleaning spark plugs, the step of applying a cleaning composition consisting of a mixture by weight of from .25 to 2.0% bentonite, from 2.8 to 23% water, from 40 to 65% powdered feldspar abrasive and the balance diethylene glycol monobutyl ether, between a tool and the spark plug and moving said tool and spark plug with respect to each other to clean said spark plug.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,812,321	Davidson	June 30, 1931
1,862,322	Soley	June 7, 1932
2,006,162	Fuchs	June 25, 1935
2,296,097	Emiley	Sept. 15, 1942
2,356,792	Oakes et al.	Aug. 29, 1944
2,364,281	Ellinger	Dec. 5, 1944
2,376,945	Stine	May 29, 1945