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PROCESS AND COMPOSITION FOR PRESERVING METAL SURFACES AGAINST RUST

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The present invention relates to the art of preserving metal surfaces against rust corrosion during storage and, in particular, to the preservation of internal surfaces in internal combustion engines against rusting during extended periods of non-use. More particularly it relates to an atomizable composition for protecting and preserving such metal surfaces.

Storage of farm machinery, marine engines, and other types of seasonal use apparatus powered by internal combustion engines presents a serious problem in the matter of rust prevention. So far as I am aware, prior to the advent of this invention no satisfactory method has been devised for applying a protective coating comprising a corrosion inhibitor and protective film to the inlet valve stems, valve seats, cylinder walls, exhaust valve seats, and exhaust valve stems of internal combustion engines that has not necessitated stopping an engine and partially dismantling it.

The present invention entirely eliminates such procedure; it enables the application of a tenacious, lasting film of an oleaginous, rust inhibiting composition to all such surfaces at one time and while the engine is running.

An object of this invention is to provide an atomizable composition for protecting metal surfaces and especially ferrous metal surfaces which are difficult to reach.

Another object of this invention is to provide a process for coating interior surfaces in an internal combustion engine with a rust preventing film while the engine is in operation under its own power, which film is nonflammable and indestructible by the heat or products of combustion present at its application.

A further object is to provide a method for depositing a non-flammable, adherent film coating on interior surfaces of an internal combustion engine in operation.

A still further object is to provide a novel rust inhibiting composition for application to interior surfaces of internal combustion engines.

In carrying out the process of this invention a suitable rust inhibiting composition in liquid form is packaged in a known type of pressurized spray dispensing can or "Aerosol" bomb in admixture with a propellant that is liquid at the can pressure but which expands rapidly into a gaseous state when released, so that the contents of the can are discharged as an atomized spray or mist.

When a gasoline engine is to be treated for storage it is run at a fast idle or slow race speed and the composition is sprayed from the can into the carburetor air intake while the engine is running. In a Diesel engine the composition is sprayed into the inlet manifold while the engine is running. In both cases spraying is continued until sufficient protecting coating has been deposited, by which time the atomized coating composition entrained in the stream of induction air and propellant gas will have coursed entirely through the engine and will have been deposited as a continuous adherent film completely covering the inlet valve stems, valve seats, cylinder walls, exhaust valve seats, exhaust valve stems and into the exhaust manifold.

The most effective propellants I have found as the result of numerous experiments are the normally gaseous fluorinated hydrocarbons known by the commercial name of "Freon" or its equivalent, namely: 1,1-difluorethane, trichlorotrifluorethane dichlorodifluoromethane, monochlorodifluoromethane, monofluorotrichloromethane, 1-chloro-1,1-difluorethane, and 1,2-dichloro-1,1,2,2-tetrafluoroethane. They are nontoxic, nonflammable, and odorless. The liquid components are placed in a suitable container, preferably metal, or bomb provided with a controllable atomizing exit capable of producing a fine spray or foam. The propellant is then introduced under pressure until sufficient is added to atomize all liquid components upon opening the valve of the container.

When the rust inhibitor composition hereinafter described is atomized with the gaseous propellant the product is a nonflammable mist or foam which on contact with the interior surfaces of a running engine deposits an adherent, oleaginous, nonflammable film that does not break down under the heat and products of combustion and which retains its form and constituency in situ until removed.

An advantage of the invention is that it provides a safe and dependable composition for protecting metal surfaces. Another advantage is that the compositions are economical to make and do not present toxic or health hazards in use. They do not have an injurious effect on internal combustion engines and after service is renewed the engines do not require cleaning. The compositions can be applied by the ordinary mechanic or normal careful person. Other advantages will be apparent from the above.

The novel composition of this invention comprises in a suitable container an inert gaseous propellant, lubricating oil, either petroleum or vegetable oil such as degummed castor oil or a mixture of these oils, with a relatively low volatility, a relatively volatile hydrocarbon solvent for the oils, a ferrous metal corrosion inhibitor and an oil-soluble dispersing and deterging agent, e.g. an ammonium, alkali metal or alkaline earth metal salt of a hydrocarbon monosulfonic acid or monosulfuric acid ester of 8 to 18 carbon atoms. Instead of using a solvent, a satisfactory mixture of the oils may be obtained by heating them to a high temperature and mixing them at such temperature. During the development of this process many types of oil and proportions were used. Petroleum oil with the corrosion inhibitor and oil-soluble agent gave good results but the combination of petroleum oil and degummed castor oil combined was found to be more satisfactory. Suitable solvents comprise, among others, benzene, toluene, solvent naphtha, benzine and gasoline. In general the liquid components of the composition comprise 60% to 90% of lubricating oil which may be petroleum oil, a degummed castor oil or a mixture of these oils, 4% to 8% volatile hydrocarbon solvent, 1.05% to 10% of corrosion inhibitor and 0.05% to 2.5% of oil soluble dispersing and deterging agent, all percentages being by weight.

Suitable corrosion inhibitors include organic esters of phosphorous acids and thiophosphorous acids, and their metal salts. Typical esters include the mono- and dioleyl phosphates and mono- and di-stearyl phosphate and zinc dithiophosphate. A large number of suitable compounds are given in U.S. Patent No. 2,080,299.

Among the useful oil soluble dispersing and deterging agents are the sodium, potassium, calcium, and magnesium salts of decyl, dodecyl, tetradecyl and octadecyl mono-sulfonic acids and monosulfate.

Various lubricating oils can be used, including degummed castor oil but they are generally light oils of the spindle oil type, light oils and medium viscosity lubricating oils, e.g. S.A.E. 10 to 40.

I claim:

1. Process for coating interior surfaces in an internal combustion engine, which comprises, running the engine and simultaneously spraying into the air intake an atomized rust inhibiting mist from an atomizing container essentially comprising an inert gaseous propellant, a lubricating oil, a metal corrosion inhibitor and an oil-soluble detergent agent having dispersing properties.

2. Process for coating interior surfaces in an internal combustion engine which comprises, running the engine and simultaneously spraying into the air intake and atomized mist from an atomizing container essentially comprising an inert gaseous propellant, and a liquid composition comprising 35% to 45% degummed castor oil, 35% to 45% lubricating oil, 4% to 8% volatile hydrocarbon solvent for said oil, 0.05% to 10% of a corrosion inhibitor, and 1.05% to 2.5% of an oil-soluble agent having dispersing properties.

3. Process for coating interior surfaces in an internal combustion engine which comprises running the engine and simultaneously spraying into the air intake an atomized mist from an atomizing container comprising an inert gas propellant, and a liquid composition essentially comprising 80% to 90% of a lubricating oil, 0.05% to 10% of a corrosion inhibitor, and 1.05% to 2.5% of an oil-soluble agent having dispersing properties.

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