

UNITED STATES PATENT OFFICE

2,599,729

NONCORROSIVE METAL CLEANING
COMPOSITIONJohn H. Secrist, Detroit, Mich., assignor to Detrex
Corporation, Detroit, Mich., a corporation of
MichiganNo Drawing. Application August 26, 1947,
Serial No. 770,751

1 Claim. (Cl. 252-118)

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This invention relates to the prevention of corrosion in the use of cleaning compositions containing a chlorinated hydrocarbon and water where such compositions are used in cleaning certain metals which are particularly susceptible to corrosion.

In a copending application which bears Serial No. 752,568, filed June 4, 1947, now Patent No. 2,576,419 issued November 27, 1951, there is described a solvent composition which is useful in the cleaning of fabrics and various metals. The cleaning composition referred to contains a chlorinated hydrocarbon such as trichlorethylene as a solvent, water in a predetermined amount and a coupler such as monoethanolamine oleate for combining the solvent and the water in a sub-emulsion form characterized by the fact that the final composition is a perfectly clear, non-turbid, easily flowing liquid. One of the advantageous characteristics of such a sub-emulsion cleaner is that most metals, even where cleaned by the method known in the art as "vapor degreasing," are not adversely effected by corrosive effects at the surface of the metal being cleaned even though water is present in the composition. However, it has been found that some metals, notably zinc and steel, show corrosive effects when cleaned with such sub-emulsion compositions under certain conditions which are sometimes encountered in the metal cleaning field.

The principal object of the present invention is to provide a suitable corrosion inhibitor to be used as one of the components of such cleaning compositions for the prevention of corrosion in the cleaning of metals such as zinc and steel.

It has been found that the objects of the present invention are achieved by the use of benzyl thiocyanate, sometimes referred to as benzyl sulfocyanide. This compound is highly effective in relatively small amounts in the prevention of corrosion of metals cleaned with sub-emulsion solvents of the type hereinafter described.

In carrying out the present invention, benzyl thiocyanate is added to the previously prepared sub-emulsion composition in an amount sufficient to inhibit corrosive action on metals such as zinc and steel. The amount of inhibitor may vary from 0.1 gram to 5.0 grams per 100 cc. of solvent depending on the length of time over which corrosion must be inhibited. The following examples are given as representative of the sub-emulsion and of the amount of inhibitor used, but it will be understood that considerable variation in the amounts of inhibitor is permissible and that the composition of the sub-emulsion may be

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varied. For instance, other halogenated hydrocarbons such as tetrachlorethylene (perchloroethylene) may be used and the coupling ingredients may be varied.

Example

Trichlorethylene (stabilized).....cc.	100
Triethanolamine oleate.....grams.	2
Monoethanolamine oleate.....do.	6
Sodium oleate.....do.	1
Water.....cc.	11

The above ingredients are mixed by first dissolving the triethanolamine oleate and the monoethanolamine oleate in the trichlorethylene. The sodium oleate is then separately dissolved in the water and this solution is mixed with vigorous agitation with the previously prepared trichlorethylene solution until a non-turbid sub-emulsion is formed. The formation of the sub-emulsion may be accelerated by applying heat. The final liquid composition is perfectly clear, and has a specific gravity of 1.38. It will be noted that the chlorinated hydrocarbon used in the above example, namely trichlorethylene, is designated as "Stabilized." Such stabilization is in addition to the inhibition of corrosion and is particularly desirable where the finished composition is to be used in vapor degreasing operations. Stabilization may be accomplished by the addition of small amounts of known stabilizers such as pyridine or triethylamine as described and claimed in U. S. Patent Number 2,096,735. Where other chlorinated hydrocarbons such as tetrachlorethylene (perchloroethylene) are used in producing the sub-emulsions referred to, it may be desirable to use other stabilizers as described in U. S. Patent 2,096,735.

To the above composition there is added 3.0 grams of benzyl thiocyanate as a corrosion inhibitor. The inhibitor is thoroughly mixed with the sub-emulsion by stirring and the finished composition is then ready for use in the cleaning of metals. This is carried out in metal cleaning apparatus well known to the art and comprises passing the metal to be cleaned through the stabilized liquid solvent or through hot, vaporized solvent or both.

The term "sub-emulsion" as used throughout this specification and the appended claim is intended to define a composition containing a chlorinated hydrocarbon to which water has been coupled in an amount and in a way which results in a perfectly clear, non-turbid, easily flowing liquid. In some cases such sub-emulsions may

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be colored but even where colored there is an absence of visible particles or turbidity.

I claim:

A noncorrosive metal cleaning composition consisting of the following ingredients in substantially the proportions specified:

Trichlorethylene (stabilized)-----cc--	100
Triethanolamine oleate-----grams--	2
Monoethanolamine oleate-----do-----	6
Sodium oleate-----do-----	1
Water-----cc--	11
Benzyl thiocyanate-----grams--	3

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

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