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NONCORROSIVE ALCOHOL COMPOSITION.

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My invention relates particularly to a composition made by introducing an inhibiting material in an alcohol so as to inhibit, retard or prevent the corrosion of containers used for transporting and storing the same. It also relates to the combination of a container with such composition therein enabling the material to be transported and stored over long periods of time. Furthermore, it relates to the process of protecting such containers.

Previously serious losses have occurred due to the corrosion of containers, and particularly containers made in part of tin plate, terne plate or iron, by reason of the fact that commercial grades of alcohols, and particularly completely denatured ethyl alcohol, have a deleterious action thereon, resulting in the corrosion of the containers and, frequently, discoloration of the liquid, as well as destruction of the container and loss of the contents due to leakage, etc. This corrosion seems to be due principally to the other constituents therein, such as aldehydes, acids, water or dissolved gases, as well as denaturants such as wood alcohol, pyridines, hydrocarbons, ether, acetone, esters, nitrobenzol, and their congeneries, etc., attacking the metal of the container. It is the object of my invention to avoid such losses by introducing into the alcohol a material which will serve to inhibit, that is to say, delay or prevent, partially or wholly, the action of the contents upon the container when made of materials that would be corrodible if the protecting material were not present. While this has application generally to alcohols of the paraffin series that are soluble in water, as, for example, ethyl alcohol, methyl alcohol, isopropyl alcohol, etc., and containers where such corrosion would occur, it is particularly useful in connection with commercial ethyl alcohol, denatured alcohol and products made therefrom such as, for example, carbon removers, motor fuels, primers for internal combustion engines, and liquids used for anti-freeze purposes. Also, while my invention applies to alcohols generally wherever such corrosion would result, containing other constituents of various kinds, it is especially applicable to commercial ethyl alcohol or denatured alcohol when containing water or added constituents as wood alcohol, pyridine, hydrocarbons, ether, acetone, esters, nitro-benzol or other impurities or denaturants.

In carrying out my invention I preferably utilize a soap which is soluble in the liquid, although I have found that there are other materials which will serve the purpose in varying degrees, as, for example, the higher fatty acids such as palmitic, oleic or stearic acid or other higher fatty acids. The soaps which I prefer to use in this connection are the soluble alkali soaps as sodium or potassium soaps formed from the higher fatty acids as, for example, palmitic, stearic or oleic acid, or from any of the ordinary acids and bases customarily used in making soaps. I can, if desired, use rosin soap, that is to say, a soap made from rosin and an alkali. In fact I may use for this purpose any material which will form an insoluble compound with the metal hydrates or salts formed on the container by the constituents of the alcohol, and preferably a material which lowers the surface tension of the liquid. These protective materials are useful in connection with any commercial grade of alcohol where their presence in the alcohol does not interfere with the use of the same. For example, in making commercial alcohol free from any substantial corrosive action upon a metal container, as in the case of tin plate, terne plate or iron, etc., for example, I may add to the alcohol an amount of ordinary soap, as, for example, a soap made from sodium hydroxide and free fatty acids, in the usual way in an amount from traces up to an amount sufficient to form a saturated solution of the soap in the liquid. For example, I may use 0.25 grams of the soap to 100 cc. of the liquid, or about 2 pounds of the soap to 100 gallons of the liquid. This last-mentioned proportion will be followed particularly in the case of denatured alcohol having the following composition:

100 parts by volume, ethyl alcohol not less than 160° proof; 2 parts by volume approved wood alcohol; .25 parts by volume pyridine bases; .50 parts by volume approved benzine (kerosene). However, a much smaller amount of the soap may be found effective for this purpose, as, for example, 0.038 grams per 100 cc. It will be understood, also, that the amount of the soap to be used for this

purpose will vary to some extent, according to the kind of soap used and the nature of the alcohol composition. In fact, it is found that satisfactory results in this connection may be obtained by, in some instances, using as low as 0.01 grams of ordinary soap in 100 cc. of an alcohol composition up to the saturation point of the soap in the alcohol.

The soap may be introduced into the liquid in any desired way, but preferably I dissolve the same therein by dissolving ordinary soap in the form of flakes, for example, in the alcohol in the proportion such as above referred to. The soap goes into solution and any remaining sediment may be filtered out or not, if desired.

An alcohol thus prepared will avoid any appreciable corrosion of the containers, as well as consequent discoloration and loss of the contents.

Also, by using the soap in the small percentages given above, that is to say, from 0.01 grams to 100 cc. of the alcohol up to an amount sufficient to make a saturated solution, the protecting effect is secured without interfering with the commercial uses to which the alcohol is applicable.

While the theory of the protective action is not entirely certain it is probable that the non-corrosive effect is due to the formation of a protective layer which adheres to the surface of the metal to protect the metal from the action of the impurities in the alcohol, such as aldehydes, acids, etc. This protective layer is formed by the soap or other protective material producing an insoluble soap with the metal hydrates or salts formed on the container. This results in inhibiting the chemical action on the container inasmuch as the protecting materials, comprised of the film of insoluble soap formed and the accumulated soluble material at the liquid-metal interface, prevent the access of the said impurities to the walls of the container.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

I claim:

1. In combination, a metal container having therein a non-corrosive alcohol composition containing a soap forming material, which composition would corrode the container if said soap forming material were absent.

2. In combination, a metal container having therein a non-corrosive alcohol composition containing soap, which composition would corrode the container if said soap were absent.

3. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing a soap forming material, which composition would corrode the container if said soap forming material were not present.

4. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing soap, which composition would corrode the container if said soap were absent.

5. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing a soap forming material, which composition would corrode the container if said soap forming material were absent, said soap forming material being present in an amount from 0.01 gram to each 100 cc. of the liquid up to a saturated solution.

6. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing soap, which composition would corrode the container if said soap were absent, said soap being present in an amount from 0.01 gram to each 100 cc. of the liquid up to a saturated solution.

7. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing a soap forming material, which composition would corrode the container if said soap forming material were absent, said soap forming material being present in an amount of approximately 0.038 grams for each 100 cc. of the liquid.

8. In combination, a metal container having therein a non-corrosive ethyl alcohol composition containing soap, which composition would corrode the container if said soap were absent, said soap being present in an amount of approximately 0.038 grams of the soap for each 100 cc. of the liquid.

9. A composition containing ethyl alcohol and a soap forming material adapted to inhibit corrosion of a metal container in an amount approximately 0.038 grams of the soap to each 100 cc. of the liquid.

10. A composition containing ethyl alcohol and soap adapted to inhibit corrosion of a metal container in an amount of approximately 0.038 grams of the soap to each 100 cc. of the liquid.

11. The process which comprises protecting a metal container from corrosion by depositing an insoluble soap on the walls of the same.

12. The process which comprises protecting a metal container from corrosion by depositing an insoluble soap on the walls of the same from an alcohol solution of a material adapted to form the insoluble soap with the metal of the container.

13. The process which comprises protecting a metal container from corrosion by depositing an insoluble soap on the walls of the same from an alcohol solution of a soap.

14. The process which comprises protecting a metal container from corrosion by de-

positing an insoluble soap on the walls of the same from an alcohol solution of a material adapted to form the insoluble soap with the metal of the container, said solution containing also an organic acid.

15. The process which comprises protecting a metal container from corrosion by depositing an insoluble soap on the walls of the same from an alcohol solution of a soap, said solution containing also an organic acid.

In testimony that I claim the foregoing, I have hereunto set my hand this 20th day of March, 1926.

WALTER T. SCHREIBER.