Patented Mar. 1, 1949

2,462,970

UNITED STATES PATENT OFFICE

2,462,970

FROST REMOVING COMPOSITION

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No Drawing. Application October 28, 1944, Serial No. 560,905

3 Claims. (Cl. 106—13)

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This invention relates to an anti-frost composition, that is, to a composition of matter which prevents frost accumulation on refrigerating equipment from adhering tenaciously to the cooling equipment.

In commercial and household refrigerating equipment, a particular problem is to prevent the building up of too thick a coating of frost. A heavy layer of frost over the refrigerating coils is disadvantageous mainly on account of the reduction of heat transfer from the cooling coils to the surrounding space to be cooled. Usually, in commercial refrigerating plants and household refrigerators, means are provided for defrosting at periodic intervals. In refrigeration plants, considerable time is usually lost in defrosting. This loss is especially disadvantageous in large scale refrigeration plants. The composition of the present invention is a paste-like material which, when applied to the coils of such refrigeration units, prevents the frost adhering tenaciously to the coils and permits frost formation at any time to be discharged from the coils by simple tapping or such other simple means of dislodging frost from the coils.

The composition of this invention is a highly gelatinous mass capable of cold flow, formed largely from a petroleum oil of non-corrosive characteristics with minor proportions of a water-insoluble soap, a corrosion inhibitor and a freezing point depressant compound. Thus, a typical composition according to the invention is as follows:

	Per cent
White mineral oil, vis. 55 Saybolt secs. at 100° F	72.5
Oleic acid	8.7
Stearic acid	1.6
Hydrated chemical lime	2.8
Anhydrous calcium chloride, technical	13.0
Sodium nitrite, technical	0.7
Water	0.7

In the above composition, a good grade of substantially odorless white oil is used because of the intended use of the composition in refrigerators containing edible materials, but for less exacting uses any lubricating oil of suitable viscosity may be used. The oleic acid is present essentially as a reactant with some of the hydrated lime to form a calcium soap. The stearic acid present also reacts with the lime to form a calcium soap by the amount of which the consistency of the composition as a whole is controlled. The calcium chloride is present largely as a freezing point depressant, while the sodium

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nitrite and the excess lime present serve as corrosion inhibitors. The water present in small amount assists in the compounding of the composition as a whole and in the reaction of the various constituents so as to form the desired composition which adheres satisfactorily to the coils and without corrosion.

The amounts in which the mineral oil is present in the composition according to the invention vary from about 60% to 80%. The water-insoluble soaps are present in amounts in the final composition ranging in total amounts from about 5% to 12%. The viscid nature of the composition is determined by the presence of an alkaline earth soap usually of stearic acid, but the alkaline earth derivatives of palmitic, arachidic, myristic, lauric or behenic acids, or mixtures of these compounds, may also be employed in amounts between 1% and 2% by weight of the composition as a whole. The mineral salts present as freezing point depressants are usually calcium chloride but may be magnesium chloride, zinc chloride or other highly water-soluble salt. The polyhydric alcohols, particularly the 1–2 glycols, may also be used as freezing point depressant materials. These freezing point depressant agents may be present in amounts together ranging from about 12% to 18%. Any iron corrosion inhibiting substance together with the lime—and particularly sodium nitrite—is added in small amounts, usually from about 0.5% to 1%. Water in small amounts is also required in the preparation of the composition in order to permit the satisfactory compounding of the various constituents together into a viscid mass capable of cold flow and to permit the freezing point depressant salts to exert the desired activity in the composition.

In the preparation of the composition according to the invention, illustration will be taken of the specific composition previously given. Thus, the sodium nitrite and dry calcium chloride are ground together in about 45% of mineral oil, generally using a colloid or ball mill or any such pulverizing equipment to obtain the proper degree of grinding. The oleic and stearic acids are dissolved with heat in the remainder of the mineral oil. The lime and water are then added to the acid-in-oil solution and the mixture then heated to about 200° F. with good agitation. The mixture thus formed thickens and finally sets to a paste-like mass. After the consistency of the mass has become pasty in character, the suspension of the mineral salts in the mineral oil is added and the mixture thoroughly stirred.

Thus, the compositions prepared according to the invention are well adapted for use with all types of refrigeration units. They may be modified by the use of white mineral oil and relatively odorless grades of fatty acids for use in refrigeration units for low temperature storage of foods and in the preparation of ice. As prepared, the compositions containing the white oils are without odor and have substantially no corrosive effects upon metallic equipment. A single application of the composition to the refrigeration coils is generally satisfactory for preventing the tenacious holding of the frost to the coils after easy defrosting has been effected four or five times. The separation of the frost from the coils due to the presence of a thin film of the composition of the present invention normally occurs during the operation of the refrigeration units, if so desired, and thus overcomes time losses for periods of defrosting as normally occur without use of the compound.

What is claimed is:

1. A non-corrosive paste-like composition of matter for preventing the tenacious adhesion of frost to chilled surfaces consisting essentially of 60 to 80% by weight of white mineral oil, 12 to 18% of calcium chloride, substantially the remainder of the composition being a substantially water insoluble calcium soap of higher fatty acids for imparting a grease-like consistency to said composition and a small amount, not more than 1% of an inorganic iron rust inhibitor.

2. A non-corrosive paste-like composition of matter for preventing tenacious adhesion of frost to chilled metallic surfaces consisting essentially of 60 to 80% by weight of white mineral oil, 12 to 18% calcium chloride, 0.5 to 1% sodium nitrite, substantially the remainder of said composition being calcium soap of higher fatty acids for imparting a grease-like consistency to said composition.

3. A non-corrosive paste-like composition of matter consisting essentially of 72.5% white mineral oil, soap compounded from 8.7% oleic acid, 1.6% stearic acid, 2.8% hydrated lime and 13.0% of calcium chloride, based on the weight of the finished composition, and 0.7% sodium nitrite, said composition being suitable for preventing substantial adhesion of frost to refrigerated surfaces and being free of materials which would render foodstuffs inedible on contact therewith.

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