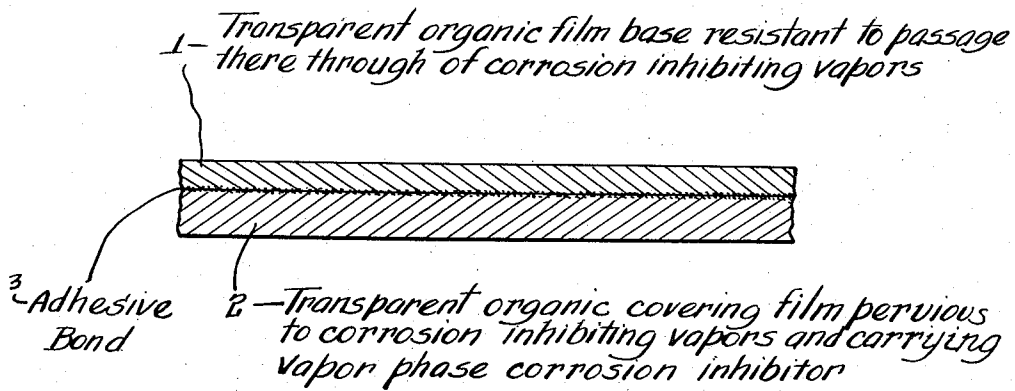


April 1, 1958

W. A. FESSLER ET AL
TRANSPARENT HEAT-SEALABLE SHEETS CARRYING VAPOR
PHASE CORROSION INHIBITORS
Filed Nov. 15, 1955

2,829,080



INVENTORS

William Alfred Fessler
Clemens A. Hutter
Lloyd Dean McBeth

By: Wallenstein & Spangenberg attys

1

2,829,080

TRANSPARENT HEAT-SEALABLE SHEETS CARRYING VAPOR PHASE CORROSION INHIBITORS

William Alfred Fessler, Glen Elynn, Clemens A. Hutter, Elmhurst, and Lloyd Dean McBeth, Chicago, Ill., assignors to Daubert Chemical Company, Chicago, Ill., a corporation of Illinois

No Drawing. Application November 15, 1955
Serial No. 547,021

20 Claims. (Cl. 154—50)

This invention relates to vapor phase corrosion inhibition of metals, particularly iron, steel and other ferrous metals, and articles made therefrom, and is especially concerned with the production of new and highly useful transparent heat-sealable sheets carrying or embodying therein vapor phase corrosion inhibitors the vapors of which are gradually released, in use, to effect the inhibition of the corrosion of the metals or metal articles which are wrapped or otherwise enclosed in said sheets.

It has heretofore been well known to produce sheet stock material containing vapor phase corrosion inhibitors. Thus, for example, it has been suggested to impregnate solid sheet packaging or wrapping materials such as paper, cloths, textile materials, metal foils, plastic films, and various laminates of the above or other materials with suitable vapor phase corrosion inhibitors, and to use the resulting impregnated sheets for the wrapping or packaging of metal, notably iron and steel, articles. In the case of laminated sheets, the metal has been wrapped so that the inhibitor-carrying side of the wrapping is adjacent to or is disposed towards the metal. In any event, the corrosion inhibiting vapors are gradually released from the wrapping material and serve to inhibit the corrosion of the metal article or articles which are wrapped or packaged therein.

Although numerous types of sheet stock have been suggested as wrapping materials, in which sheets the vapor phase corrosion inhibitors are incorporated by coating or impregnation procedures, as, for instance, those mentioned above as well as polyethylene, cellophane, polyvinylbutyral, ethyl cellulose, and the like, the only sheet stock which has actually been used in any significant practical way has been paper, notably kraft paper, one surface of which may or may not be coated or laminated with a metal foil such as tin foil or aluminum foil or coated with waxes or other coating materials such as polyethylene, alkyd resins, polyamide resins, and other synthetic coating compositions. Such sheet stock material, in which the kraft paper is impregnated with the vapor phase corrosion inhibitor, while highly effective from the standpoint of achieving inhibition of the corrosion of metal articles wrapped or packaged therein, nevertheless has a number of serious objections. One very significant defect is the fact that such vapor phase inhibitor sheet stock is opaque and it is impossible to ascertain the condition of the metal articles packaged therein, from the standpoint of their state of protection against corrosion, without removal of the wrapper or unwrapping of the metal article. Another serious defect is that such vapor phase inhibitor sheet stock does not have heat sealing characteristics and, therefore, the production of packages substantially sealed against ingress of air presents a difficult and cumbersome problem.

It has been found, in accordance with the present invention, that transparent heat-sealable sheets may be prepared carrying or impregnated with vapor phase corrosion inhibitors. Said sheets have excellent transparency

2

so that metal articles wrapped therein are clearly visible to the naked eye whereby their condition can readily be ascertained merely by visual examination through the sheet wrapping. Furthermore, since, as stated, said sheets are heat-sealable, packages made therefrom using said sheets as wrapping are readily sealed, through usual heat procedures, electronically or otherwise.

In addition to the important qualities of excellent transparency and heat-sealability which the sheets of the present invention must possess, there is a number of other significant properties which said sheets, in order to be satisfactory for use under a wide variety of conditions, must have. The sheets must be tough so as to withstand tearing, puncturing or rupture under adverse or rough conditions of use or shipment and handling of metal articles wrapped therein. They must also possess good flexibility so that they may easily and readily be wrapped around metal objects of various, odd and conglomerate shapes in order, in general, reasonably to conform to the configuration of the metal article which is to be wrapped therein. Another important characteristic of such sheets is that they must release the vapor from the vapor phase corrosion inhibitors gradually but at a sufficient rate so that corrosion inhibition will be effective and yet, at the same time, the release of the vapors from the vapor phase corrosion inhibitors must not be at so rapid a rate as to result in dissipating too quickly the vapors from the vapor phase corrosion inhibitors. In this connection, it will be understood, of course, that, in general, the wrappers should retain their properties of inhibiting corrosion of metal articles packaged or wrapped therein for substantial periods of time, of the order of at least several months and, more advantageously, for a year or more. Still another important property which the sheets must possess is compatibility with the vapor phase corrosion inhibitors which are impregnated thereto, and with the corrosion inhibiting vapors which are released, so that, for instance, no adverse effect is had on the integrity of the sheets, and so, by way of further instance, reactions are not set up which produce vapors or materials which have an adverse effect on the metal articles within the package, or which interfere with the desired inhibition of the corrosion of said metal articles.

In accordance with the present invention, in its broad aspects, the novel transparent heat-sealable sheets comprise a transparent organic film base, which may or may not be a polymer but which is essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film which is bonded to said transparent organic film base and which is pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor compatible with and embodied in said organic covering film.

In the drawing, there is shown, in greatly enlarged form, a sectional view taken through a transparent heat-sealable sheet made in accordance with our invention, in which numeral 1 represents a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, 2 represents a transparent organic covering film which is pervious to the passage therethrough of said corrosion inhibiting vapors, said covering film carrying a vapor phase corrosion inhibitor, and 3 represents the adhesive bond between the films 1 and 2.

The transparent organic film base is, in general, selected so as to provide at least most of the mechanical strength of the transparent finished sheet. Said organic film base, as indicated, should be essentially resistant, impenetrable or impermeable to the passage therethrough of the corrosion inhibiting vapors in order to insure that the vapors will not be dissipated into the atmosphere but will pass

from the cover film into the interior of the package or wrapped body so as to create an atmosphere of corrosion inhibiting vapors within the package containing the metal article. Various transparent organic film bases can be used as, for instance, cellulose acetate, cellulose acetate butyrate, cellophane (which may be ordinary uncoated cellophane or which may, for example, be cellophane having a moisture-resistant coating on one side such as nitrocellulose or the like in which case the opposite side would be bonded to the cover film), polyesters, notably ethylene glycol-terephthalic acid polymers such as those sold under the trademark "Mylar," cellulose nitrate and ethyl cellulose. While, in the broader aspects of the invention, organic films of the non-polar and other types as, for instance, polyethylene, rubber hydrochloride, polyvinylidene chloride ("Saran"), copolymers of vinyl chloride and vinyl acetate, and vinyl chloride-vinylidene chloride copolymers can be utilized, they are, in general, not as desirable as those earlier mentioned because of their relatively greater degree of permeability, generally speaking, to vapors of the types of vapor phase corrosion inhibitors which are utilized in accordance with the particularly preferred embodiments of the present invention as hereafter pointed out. Of outstanding utility are cellophane, either uncoated or moisture-resistant on one side, and ethylene glycol-terephthalic acid polymers such as those sold under the trademark "Mylar."

The transparent organic covering film, which has the property of being pervious to the passage therethrough of the corrosion inhibiting vapors, which is utilized in accordance with the present invention, is also one which may be selected or derived or prepared from various materials which are available to the art. Typical examples of transparent organic covering films, adapted to be bonded to the transparent organic film base, which are pervious to the passage therethrough of corrosion inhibiting vapors, are polyvinyl acetate, polyvinyl acetals, plasticized polystyrene, polyamides, and polyacrylates as, for instance, polyethyl acrylate, polymethyl acrylate, which usually contain plasticizers, and the like. Illustrative examples of products from which said transparent organic covering films may be produced are, for instance, polyvinyl acetates sold under the name "Paisley EK-222"; polyamide resin (e. g. "Versamid 930" produced by reacting dimerized soya bean fatty acids with ethylenediamine—sold by General Mills Corporation); various polyacrylates sold by Rohm & Haas Company under the trademark "Rhoplex." These are polymers or copolymers of acrylic or methacrylic acid esterified with C_1 to C_8 alcohols, e. g. methyl, ethyl, propyl, butyl, etc. alcohols. Certain of said polymers include vinyl acetate as a component thereof. Typical of such polyacrylates are those sold under the names "Rhoplex AC-33," "Rhoplex WN-80" and "Rhoplex B-85." "Rhoplex WN-80," for instance, contains a proportion of vinyl acetate. Compatible mixtures of polymers and copolymers can be used as, for example, mixtures of "Rhoplex WN-80" and "Rhoplex B-85." Generally speaking, polyvinyl acetates and transparent organic covering films containing chlorine are not preferred because of the possibility of their releasing, through slow hydrolysis or other possible action, acids. Of exceptionally satisfactory character for the purposes of the present invention are the polyacrylates, notably, the polyethyl acrylates, either as such or modified, and mixtures, exemplified by the aforementioned products sold under the trademark "Rhoplex."

The vapor phase corrosion inhibitors employed in the practice of the present invention can be selected from a wide and extensive group of known inhibitors of this type. These include, for instance, volatile amine carboxylates, such as cyclohexylammonium benzoate, diisopropylammonium benzoate, monoethanolamine benzoate, 2-butylamine benzoate, di-isopropylammonium suc-

inate, and numerous others some of which are disclosed, for instance, in U. S. Patent No. 2,629,649.

Another known group of vapor phase corrosion inhibitors which can be utilized in the practice of the present invention are the organic amine nitrite salts, and mixtures thereof, such as dicyclohexylamine nitrite, morpholine nitrite, di-isopropylamine nitrite, guanidinium nitrite, and di-secondary-butylamine nitrite. Such and numerous other organic amine nitrites, and mixtures thereof, and mixtures thereof with stabilizing agents and the like, are disclosed, for instance, in Patents Nos. 2,449,962; 2,484,395; 2,577,219; 2,630,368; 2,643,176; 2,643,177; 2,643,178; and 2,711,360.

Still another group of vapor phase corrosion inhibitors which are useful in the practice of the present invention are nitro-thiophene compounds such as 2-nitro-thiophene; 2,5-di-nitrothiophene, etc., as disclosed in Patent No. 2,592,451.

Another class of vapor phase corrosion inhibitors which can be used in the practice of the present invention comprises mixtures of organic amides with inorganic metal nitrites, a particularly preferred embodiment thereof being mixtures of substantially equal parts of urea and sodium nitrite. Such corrosion inhibiting compositions are disclosed, for instance, in Patent No. 2,521,311.

Still other types of vapor phase corrosion inhibitors which are useful in the practice of the present invention are, for instance, sodium benzoate, ammonium benzoate, benzoic acid esters such as n-propylbenzoate, n-butylbenzoate, iso-propylbenzoate, iso-butylbenzoate, propylcinamate, and the like.

Of outstanding utility in the practice of the present invention are mixtures of substantially equal parts of urea and sodium nitrite and, especially, in admixture with a volatile organic amine carboxylate such as monoethanolamine benzoate, the weight ratio of the urea, sodium nitrite and carboxylate being advantageously about 1:1:2. Also exceptionally suitable in the practice of the present invention are various of the volatile organic amine nitrites, notably, di-isopropylamine nitrite and cyclohexylamine nitrite as well as mixtures thereof. These and various other vapor phase corrosion inhibitors have been found, surprisingly, not adversely to affect the transparency of the finished sheets even when used in very substantial proportions as, for instance, in amounts of about 5 to about 20% by weight of the transparent organic covering film.

It will be understood that, in all instances, the particular vapor phase corrosion inhibitor which is selected for use with any particular transparent organic covering film should be compatible therewith. In other words, with any given transparent organic covering film, a vapor phase corrosion inhibitor should be selected which, as indicated, is compatible with said film and which will not result in an unduly adverse effect on the properties of said film as, for instance, by causing material weakening thereof or by materially reducing the desired transparency. In the light of the teachings provided herein, it is apparent that, by simple test, it can readily be ascertained whether any given vapor phase corrosion inhibitor desired to be employed will be compatible with the particular transparent organic covering film utilized. It may be stated, in general, that the vapor phase corrosion inhibitors of the type of the organic amine nitrites; the volatile organic amine carboxylates; and the mixtures of the organic amides and inorganic nitrites, such as urea and sodium nitrite, with or without organic amine carboxylates such as monoethanolamine benzoate, diethanolamine benzoate, etc., are compatible with the transparent organic covering films generally and, especially, with the polyacrylates, notably the polyethyl acrylates. In certain cases, it may be advisable to control the pH of the transparent organic cover film composition when the vapor phase corrosion inhibitor is admixed therewith. Thus, for example, where such vapor phase corrosion inhibitors as mixtures of so-

dium nitrite and urea; or sodium nitrite, urea and monoethanolamine benzoate, are utilized, they are preferably used in an environment having a pH of between about 7.5 and 9. Hence, when employed in commercial polyvinyl acetate emulsions, which may have a pH on the acid side, the pH of the polyvinyl acetate emulsion should first be adjusted to about 8.5 to 9, for instance by the addition of sodium carbonate solution, after which the vapor phase inhibitor is admixed therewith.

The transparent heat-sealable sheets of the present invention can be made in a variety of ways. One suitable mode of procedure is, for example, to lay down, for instance by roller coating or brushing, on a transparent organic film base, in sheet form, an emulsion of the transparent organic covering film-forming material to which has been added and advantageously dissolved therein, although it may also simply be suspended or dispersed therein, the vapor phase corrosion inhibitor. The above or other conventional coating techniques can be used to lay down a uniform, even film of desired thickness after which the sheets which may be dried, for example, in a suitable oven at appropriate temperatures, generally of the order of 140 degrees F. In commercial operations, the coating and drying and roll winding operations can be conducted in a continuous manner using conventional continuous equipment.

Another way in which the transparent sheets of the present invention can be made is by dissolving the ingredients from which the transparent organic covering film material is to be derived in a suitable volatile organic solvent, admixing with the said solvent solution the vapor phase corrosion inhibitor in the requisite proportions, then laying down a coating thereof on the transparent organic film base in accordance with conventional coating techniques, and evaporating off the organic solvent.

Still another way of preparing the transparent sheets of the present invention comprises first producing the transparent heat-sealable sheet by bonding or laminating together the transparent organic film base and the transparent organic covering film, in sheet form, either in a continuous or discontinuous manner, the bonding being effected in any suitable way as, for instance, by heat sealing or electronic heat sealing techniques or through the use of softening or tackifying organic solvents. The resulting transparent duplex sheet may then be treated to impregnate the transparent organic covering film with the vapor phase corrosion inhibitor through contacting said covering film with a solution or emulsion or dispersion of the vapor phase corrosion inhibitor for a period of time to effect the desired degree of impregnation, after which the sheet may be dried.

In those cases where polyethylene constitutes the trans-

ene solution or dispersion, and then is cooled to effect solidification of the polyethylene.

The thickness of the transparent heat-sealable sheets of the present invention is, of course, variable. In all instances, however, they should not be so thick as to interfere with their flexibility and the ability to utilize the same for wrapping and packaging purposes. In general, the finished transparent sheet desirably has a thickness of about 0.5 to about 5 to 10 mils, particularly, from about 3 to 3 or about 1 to 5 mils. The transparent organic film base, for example, may have a thickness of the order of 0.5 mil and the thickness of the transparent organic covering film may, for instance, also be of the order of 0.5 mil but is more desirably of a thickness of 1 to 3 or 5 mils so that the total thickness may be, for instance, from 1 to 5 mils for the final finished transparent sheet.

The amount of vapor phase corrosion inhibitor which is embodied in the transparent organic cover film is somewhat variable, depending, among other things, upon the desired useful life of the sheet from the standpoint of its effectiveness to inhibit the corrosion of metals wrapped therein. Generally speaking, the vapor phase corrosion inhibitor is embodied in the transparent organic cover film in an amount sufficient to constitute, by weight, from about 0.1 to about 1 or 2 grams per square foot of the area of the transparent sheet. Preferably, the amount of vapor phase corrosion inhibitor incorporated into the transparent organic cover film will, in most cases, range from about 0.2 to about 0.6 gram per square foot of area of the sheet. In terms of the amount, by weight, of the vapor phase corrosion inhibitor based on the weight of the transparent organic cover film, good results are obtained, in at least most cases, with the vapor phase inhibitor comprising from about 5 to about 20%, by weight, of the cover film. It may here be pointed out that, in the particularly preferred embodiments of the present invention, there appears to be a better retention of the vapor phase corrosion inhibitor than is the case with commercial kraft paper vapor phase corrosion inhibitor products. Hence, lesser amounts, for instance, 0.2 to 0.6 gram of vapor phase corrosion inhibitor per square foot of transparent sheet surface appear to have as prolonged utility as, for instance, 1 to 2 grams per square foot in the case of kraft paper.

The following table illustrates specific examples of transparent heat-sealable sheets made in accordance with the present invention which are highly effective for their intended purposes. It will be understood that these examples are given merely by way of illustration and are not intended in any way to be limitative of the full scope of the invention.

Example No.	Base film (impermeable to vapors)	Cover film	Vapor phase corrosion inhibitor and percentage by weight thereof in cover film
1.....	Cellophane.....	Polyvinyl acetate ("Paisley EK-222").	Morpholine caprylate (20%).
2.....	Ethylene glycol-terephthalic acid polymer ("Mylar").	do.....	Do.
3.....	Cellophane.....	do.....	1 part urea, 1 part sodium nitrite, 2 parts monoethanolamine benzoate (20%).
4.....	do.....	Polyethyl acrylate ("Rhoplex AO-33").	1 part urea, 1 part sodium nitrite, 2 parts monoethanolamine benzoate (10%).
5.....	Ethylene glycol-terephthalic acid polymer ("Mylar").	do.....	Do.
6.....	Cellophane.....	Polyethyl acrylate ("Rhoplex WN-80").	Di-isopropylamine nitrite (20%).
7.....	Ethylene glycol-terephthalic acid polymer ("Mylar").	Polyamide Resin ("Versamid 930").	Morpholine caprylate (10%).
8.....	do.....	Polyethyl acrylate ("Rhoplex WN-80").	Di-isopropylamine nitrite (20%).
9.....	Cellophane.....	do.....	Do.

NOTE.—The cover film in each of the above examples was deposited from an emulsion, except in the case of Example 7 which was deposited from a solution in an organic solvent (mixture of equal parts of benzene and isopropyl alcohol).

parent organic covering film, the polyethylene is desirably melted, the vapor phase corrosion inhibitor is admixed therewith to form a solution or uniform dispersion, the transparent organic film base is coated with said polyethyl-

While the transparent heat-sealable sheets made pursuant to the present invention constitute duplex films, in the sense that they comprise bonded transparent layers one of which is essentially resistant to the passage therethrough

of corrosion inhibiting vapors and the other of which is pervious to the passage therethrough of said corrosion inhibiting vapors, the vapor phase corrosion inhibitor being embodied in said latter layer, it will be understood that, in certain cases, it may be desirable to produce multiplex transparent sheets, that is, sheets containing at least three transparent films or layers. Thus, for example, if, in a given transparent duplex film made in accordance with the preferred teachings set forth above, the rate at which the vapors of the particular vapor phase corrosion inhibitor are released into the package containing the metal is greater than may be desired, the rate of such release or diffusion can be decreased, for instance, by coating the transparent organic cover film, which bears the vapor phase corrosion inhibitor, with a film or coating which retards such release or diffusion. Another procedure, in this same general connection, comprises laying down, on a surface of the transparent organic base film, such as cellophane, a thin layer of an adhesive-type transparent organic covering film composition, for instance an emulsion of polyvinyl acetate in which emulsion the vapor phase corrosion inhibitor has been incorporated, and then bonding thereto a transparent preformed film or sheet which may correspond to the composition of the film-forming ingredient of said emulsion, to wit in the given example, polyvinyl acetate. In this case, the composite sheet will comprise transparent sheets or films of cellophane and polyvinyl acetate bonded or laminated together, in sandwich form, with a transparent polyvinyl acetate which carries the vapor phase corrosion inhibitor. In most cases, at least, resort need not be made to such latter procedures.

As stated previously, the transparent heat-sealable sheets of the present invention are desirably made in such a way that the effectiveness of the protection afforded to metal articles packaged or wrapped therein will last for substantial periods of time, at least for 3 to 4 months and preferably for a period of one or more years under storage or transit conditions. Since packages made from the transparent sheets can be heat sealed, there will be little or no free flow of air through gross openings. Hence, any loss of vapor phase corrosion inhibitor protection from the system will be by diffusion through the transparent organic film base outwardly and this diffusion rate will, in general, be very low.

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A transparent heat-sealable sheet comprising a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film.

2. A transparent heat-sealable sheet comprising a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film, said corrosion inhibitor comprising from about 0.1 to about 2 grams per square foot of said sheet.

3. A transparent heat-sealable sheet comprising a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film, said corrosion inhibitor comprising a volatile organic amine nitrite.

4. A transparent heat-sealable sheet comprising a

transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film, said corrosion inhibitor comprising a diisopropylamine nitrite and comprising from about 0.1 to about 1 gram per square foot of said sheet.

5. A transparent heat-sealable sheet comprising a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film, said corrosion inhibitor comprising urea and sodium nitrite and comprising from about 0.1 to about 1 gram per square foot of said sheet.

6. A transparent heat-sealable sheet comprising a transparent organic film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor compatible with and embodied in said cover film, said corrosion inhibitor comprising urea, sodium nitrite and a volatile organic amine carboxylate.

7. A transparent heat-sealable sheet comprising a transparent organic film base resistant to the passage therethrough of corrosion inhibiting vapors, a transparent organic covering film bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, said sheet having a thickness of about 0.5 to 5 mils, and a vapor phase corrosion inhibitor embodied in said cover film, said corrosion inhibitor comprising about 1 part urea, about 1 part sodium nitrite, and about 2 parts monoethanolamine benzoate, said corrosion inhibitor comprising from about 0.1 to 1 gram per square foot of said sheet.

8. A sheet in accordance with claim 1, wherein said transparent organic film base is an ethylene glycol-terephthalic acid polymer, and the covering film is a polyacrylate.

9. A sheet in accordance with claim 4, wherein said transparent organic film base is an ethylene glycol-terephthalic acid polymer, and the covering film is a polyacrylate.

10. A sheet in accordance with claim 5, wherein said transparent organic film base is an ethylene glycol-terephthalic acid polymer, and the covering film is a polyacrylate.

11. A sheet in accordance with claim 7, wherein said transparent organic film base is an ethylene glycol-terephthalic acid polymer, and the covering film is a polyacrylate.

12. A sheet in accordance with claim 1, wherein said transparent organic film base is cellophane, and the covering film is a polyacrylate.

13. A sheet in accordance with claim 4, wherein said transparent organic film base is cellophane, and the covering film is a polyacrylate.

14. A sheet in accordance with claim 5, wherein said transparent organic film base is cellophane, and the covering film is a polyacrylate.

15. A sheet in accordance with claim 7, wherein said transparent organic film base is cellophane, and the covering film is a polyacrylate.

16. A transparent heat-sealable sheet comprising a transparent polyester ethylene glycol-terephthalic acid polymer film base essentially resistant to the passage

therethrough of corrosion inhibiting vapors, a transparent covering film of a polyethyl acrylate bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor embodied in said polyethyl acrylate film, said corrosion inhibitor comprising urea, sodium nitrite and a volatile organic amine carboxylate and being present in a total amount of from about 5 to 20% by weight of said polyethyl acrylate film.

17. A sheet in accordance with claim 16, wherein the urea, sodium nitrite and carboxylate are present, in a ratio to each other, by weight, of about 1:1:2.

18. A transparent heat-sealable sheet comprising a transparent polyester ethylene glycol-terephthalic acid polymer film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent covering film of polyethyl acrylate bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor embodied in said polyethyl acrylate film, said corrosion inhibitor comprising a volatile organic amine nitrite in an amount of from about 5 to 20% by weight of said polyethyl acrylate film.

19. A transparent heat-sealable sheet comprising a transparent cellophane film base essentially resistant to the passage therethrough of corrosion inhibiting vapors,

a transparent film of polyethyl acrylate bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor embodied in said polyethyl acrylate film, said corrosion inhibitor comprising urea, sodium nitrite and monoethanolamine benzoate in a total amount of from about 5 to 20% by weight of said polyethyl acrylate.

20. A transparent heat-sealable sheet comprising a transparent cellophane film base essentially resistant to the passage therethrough of corrosion inhibiting vapors, a transparent film of polyethyl acrylate bonded to said film base and pervious to the passage therethrough of said corrosion inhibiting vapors, and a vapor phase corrosion inhibitor embodied in said polyethyl acrylate film, said corrosion inhibitor comprising a volatile organic amine nitrite in an amount from about 5 to 20% by weight of said polyethyl acrylate film.

References Cited in the file of this patent

UNITED STATES PATENTS

2,416,734	Boggs	Mar. 4, 1947
2,534,201	Hutter	Dec. 12, 1950
2,717,196	Wachter	Sept. 6, 1955
2,717,843	Wachter	Sept. 13, 1955
2,731,324	Kalinowski	Jan. 17, 1956