Dec. 10, 1946. J. C. MORRELL 2,412,528

COATED METAL CONTAINER

Filed April 30, 1941

Fig. 1.

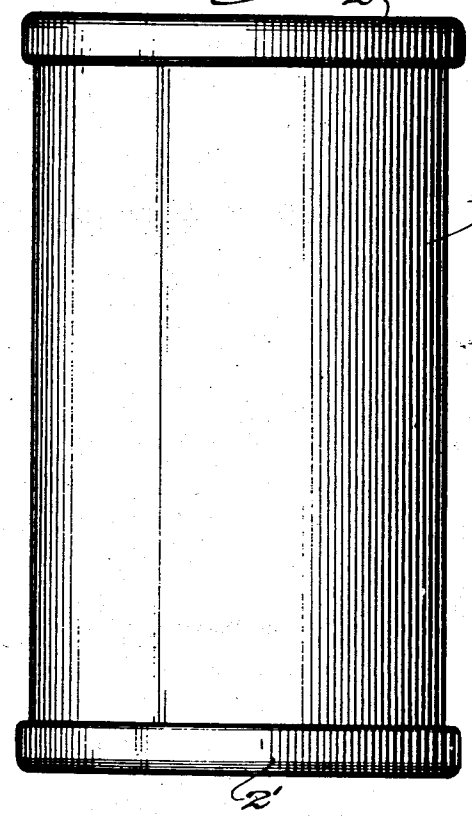


Fig. 2.

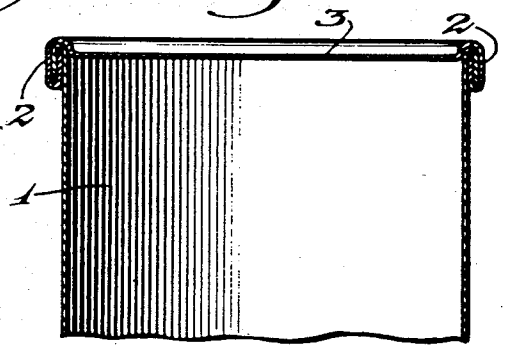
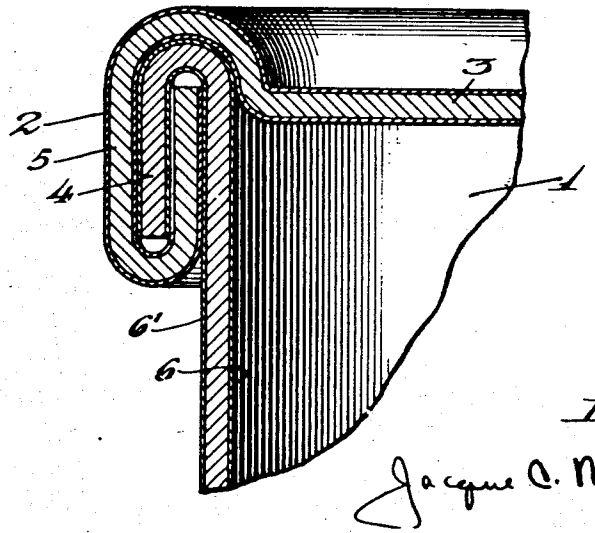


Fig. 3.



Inventor:

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REISSUED

UNITED STATES PATENT OFFICE

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COATED METAL CONTAINER

Jacque C. Morrell, Oak Park, Ill.

Application April 30, 1941, Serial No. 391,067

2 Claims. (Cl. 220—64)

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This application is a continuation-in-part of my application Serial No. 239,283, filed November 7, 1938, and now abandoned.

This invention relates to improvements in receptacles or containers and processes of making the same and refers particularly to receptacles, containers or cans for packaging solid or liquids or mixtures of the same such as foodstuffs and perishables generally.

The invention has for its general object the use of cheaper and/or better materials than those now commonly employed. The materials now used for making ordinary metallic cans or containers are thin sheet iron or steel plated with tin. This has been common practice since the industry began about a century ago and very few improvements have been made in the art in respect of materials employed for the manufacture of cans. For most purposes tin plating is satisfactory to prevent corrosion of the container. However there are many uses where it is unsatisfactory even though there are some modifications in the materials employed where special corrosion conditions are encountered.

Apparently the can making industry considers the use of tin a vital necessity. However its continued use is complicated by the fact that tin is an expensive metal and the source of supply is limited and comes principally from outside the United States. Also, as indicated, tin does not protect against corrosion in many cases, which defeats the very object of the use of tin plating or coating. It is important therefore to find a solution of this problem by the elimination of tin and the substitution of cheaper and more effective protective materials against corrosion.

One of the difficulties about tin coatings on a steel base container is corrosion due to the relative differences in solution potentials between tin in the coating and iron in the steel base. Corrosion of tin is caused by the contents of many containers or cans, which produce hydrogen and cause what is known as a "hydrogen springer" or "hydrogen swell." This reduces the normal acidity of the product and increases the concentration of the metal salt therein. After perforation of the tin coating an electro-motive couple between the tin and the iron is set up which causes still more rapid corrosion and possible perforation of the iron. The elimination of tin in the present improvement will avoid difficulties due to electro-motive couples.

Corrosion of the tin and iron or steel base of the container, even though there is no perforation thereof, may cause tarnishing of the container due to the formation of black sulfides, e. g., iron and tin sulfides and other compounds which mix with the products, for example food products in the container, producing an undesirable appearance therein. Such discolorations may also be present in alkaline as well as acidic environments, although the acidic type is apparently more commonly met.

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In its broadest aspects the present invention consists of coating ordinary sheet iron or steel which may be but is preferably not tin-plated with a protective layer or primer coat or under coating of materials such as a drying oil or similar suitable substance which may be admixed with minor proportions of a resin and a pigment, if desired, and which in general is relatively flexible and adheres to the metal and thereafter with an additional or surface layer of a thermoplastic synthetic resin which is more impervious and resistant to the chemical actions of the content of the can than the primary layer. In another non-equivalent aspect of my invention a film or coating of resinous or plastic material containing minor amounts of a drying oil, a plasticizer and a pigment, if desired, may be applied directly to the sheet iron which has not been tin-plated. The thermoplastic synthetic resins, such as the alkyd or glyptal, the vinyl and the polystyrene resins are useful in this connection.

The coatings may be applied to the metal prior to forming into a container or can or after the latter are formed. In general the primer coating is flexible to permit working of the metal such as crimping or curling to attach the tops and bottoms.

It is not the purpose of the present invention to change the method of manufacture of the container or receptacle now employed except insofar as it is necessary to do so in more or less minor detail to adapt the present invention to the present methods of manufacture. It is contemplated applying my invention to all of the methods of manufacture of the receptacle or container per se now employed or which may hereafter be developed, the main purpose or object of the invention being an application of protective coatings or lining to insure against corrosion and to prevent contamination of the contents of the can. Certain changes in manufacture, such as elimination of tin coatings, may necessitate electric welding of the sheet steel at the side seam of the can or by deposition of tin, copper, etc., along these edges soldering may be resorted to if desired.

The tops and bottoms of the container may be attached in the usual manner. The ends of

the walls may be crimped or curled to permit attachment of the top and bottom in the conventional manner as employed in the metal can or container industry, using a rubber composition or other suitable material to seal the same. The invention is also applicable to special forms, such as the "self opening" type of cans, which have a relatively narrow strip integral with the metal collar or cylindrical portion or sides of the container at a point beneath the top or lid.

Referring to the drawing, Fig. 1 is a side elevational view of a can or container which is shown for illustrative purposes. Fig. 2 is a cross-sectional side elevation view of Fig. 1 which illustrates in general the method by which the tops and bottoms of the container are attached in the conventional method. Fig. 3 is a fragmentary enlarged view of Fig. 1, which shows in detail the method of attachment of the top or bottom of the can or container by crimping or curling as well as illustrating the inner and outer protective films described in the present invention.

Referring more particularly to Fig. 1, 1 represents the body of the container and 2 and 2' represent the raised portions on the sides at the top and bottom of the container respectively, resulting when the top and bottom are attached to the body of the container by curling or crimping. In Fig. 2, which is a fragmentary side elevational cross-section view of Fig. 1, 1 is the body of the container, 2 the raised portion of the side caused by crimping the top 3 onto the body of the container and 2', not shown, would be the raised portion caused by crimping the bottom 3', not shown, onto the body of the container.

Fig. 3 which is an enlarged fragmentary view of Fig. 2, and which may represent either top or bottom but which for present illustrative purposes represents the top, shown 1 the body of the container, 2 the raised portions referred to in Figs. 1 and 2, 3 the top, 4 the crimp on the body of the container whereby it is attached to the top, and 5, the crimp on the top of the container whereby it is attached to the body. A rubber sealing ring, which is positioned at the outer edge of the under-side of the top and bottom prior to attachment, seals the surfaces and points of contact and where crimping or curling occurs. 6 represents the inner layer or layers of protective film in accordance with the invention and is illustrated as extending throughout the contact surfaces wherein the top and sides of the container are crimped and attached to each other. 6' shows a similar film or coating for the outside, which likewise extends throughout the crimped portion. The top of the container is also coated in accordance with the process of the invention. The rubber sealing material on the top may be put directly on the metal or over the coatings.

In one modification of the application of the primer coat (method 1), a film of a drying oil, (such as vegetable and animal oils generally), is applied comprising such oils as linseed, tung, (China-wood), perilla, fish oil, (such as refined menhaden and sardine oils), olticica, soya bean, castor oil, rape seed oil, etc., or mixtures thereof. Tung oil is usually preferred, although the other oils have useful properties and may be employed. These oils may be dissolved in thinners, for example low boiling petroleum and coal tar hydrocarbons, turpentine and other suitable solvents. The oils may be applied either by brushing or preferably by spraying and may then be air dried or preferably, the drying process may be speeded up by heating in a current of warm air which simultaneously removes the solvent and polymerizes and oxidizes the drying oil to an elastic film. Dryers may be added if required.

As another modification of the application of the primer coat (method 2), resins or gums either natural or synthetic but preferably the latter, may be added in small amounts to the drying oils prior to thinning with a volatile solvent. The solution of resin in the drying oil may then be applied by brushing or spraying and then may be dried in a current of warm air as described above.

A modification of both methods 1 and 2 of applying a primer coat is the addition of a relatively small amount of rubber, preferably raw, natural or unvulcanized, or rubber-like material to either the drying oil or the drying oil to which a resin has been added. The rubber may be dissolved in mineral spirits, turpentine or mixtures.

The rubber lends flexibility and elasticity to the prime coatings and facilitates crimping and working. In preparing the rubber coating approximately one part of dry and preferably unvulcanized rubber may be dissolved in eight parts of petroleum ether, preferably at an elevated temperature of approximately 120° F. This solution may be brushed or preferably spread on and dried in a current of warm air.

Other substances than natural rubber which have more desirable characteristics, particularly in resistance to solution and chemical action, may be employed as a minor or as the principal ingredient of the primer coating such as those which have rubber-like properties, for example synthetic rubbers, such as butadiene or methyl butadiene polymers or copolymers of butadiene with various substances such as acrylonitrile, styrene, butylenes and the like, polymerized chloroprene, (e. g. neoprene, Duprene, etc.), polymerized isobutylene and similar polymers or copolymers, (e. g. Vistanex). Other types of synthetic rubbers or rubber-like materials may also be employed such as various chlorinated rubbers and hydrochlorides of rubber, Pliofilm, Thiokol, (organic polysulphide), Koroseal, and other types of plasticized vinyl chloride polymers and the like. Solutions of these various materials in suitable solvents usually of an aromatic type may be substituted in whole or in part for the drying oils and may function in one aspect of my invention without an additional top coating of other materials.

As one of the features of the invention, particularly to improve the appearance of the can or container and to give it certain protective properties both inside and outside, the primary flexible layer comprising the drying oils may be admixed with certain pigments of any desired color, preferably white. The drying oils containing minor amounts of resins may also be mixed with pigments to give a flexible product approximating an enamel, e. g., tung oil with a thermoplastic synthetic resin and zinc oxide. Usually these pigments are of a mineral character, but may also be made of suitable non-poisonous dyes and in general the safety factor is insured by the later addition of a surface film of thermoplastic resin. The use of polystyrene or vinyl resins in the top coating assures a satisfactory transparency and visibility of the pigment.

Various other coloring materials may be used such as saffron, gamboge, turmeric (yellow), sandarac and sandalwood (red), and various alcohol

soluble food dyes. Hydrocarbon soluble dyes in various colors and preferably non-toxic, lakes or dyes which have been precipitated on a transparent base, either aniline dyes or natural dyes, for example employing tannic acid for precipitation, may also be employed. The colored materials in general may emphasize or augment the color of the materials in the cans.

It is desirable in many cases to employ pigments in the primary coating and this comprises another aspect of my invention. Examples of pigments are zinc oxide, gypsum, whiting, titanium oxide, etc., all of which may be suitable for white pigments, chrome green and yellow, burnt umber and ocher for browns and various red pigments, such as burnt sienna. Powdered metals such as aluminum may also be employed. The pigments and powdered metals may be protected from contact with the contents of the cans by the top surface coat of thermoplastic resins, except where it is found desirable to color the thermoplastic resin itself, in which case dyes and pigment may be employed to the extent of about 2 per cent of the former and 5 per cent of the latter. The purpose of pigments in the primary coat is to obscure or hide the natural color of the sheet steel and at the same time to afford a protective effect and from this viewpoint the pigments may be added to all of the aforementioned modifications only to the extent necessary to accomplish the purpose. The primer coat or film in general must be as thin as possible and pigments tend to offset flexibility; hence minimum quantities are added.

In addition to the pigments rust inhibitors, such as zinc chromate may be added. Also inhibitors to prevent deterioration of the oil, rubber, etc., such as the naphthols and phenol derivatives generally of non-poisonous character, etc., may be added in small amounts.

The use of a metal below hydrogen in the electromotive series to coat or plate the steel or iron base of the container such as copper or brass may be employed. The copper may be applied either by immersion in a solution of a copper salt or by electrolysis.

Similarly other metals above hydrogen in the electromotive series, such as aluminum, zinc, chromium, cobalt and nickel may be applied by plating, especially where such metals are cheaper, more readily obtainable or more readily applied than tin or where there is an improvement in adhesion of the primary or of the top or surface coat, e. g., the application of thermoplastic synthetic resin coating direct to the deposited metal film. Generally speaking this procedure is not necessary, but may be advantageous in certain cases.

In general the preferred resin or plastics to be employed are the thermoplastic synthetic resins, e. g., such as the polystyrene, vinyl or Vinylite types. The vinyl or polystyrene types are most preferred because they have high temperature softening points and are clear and colorless. (The vinyl or Vinylite polymers may include acetate, halides, polyvinyl alcohols plus aldehydes, etc.) Other types of thermoplastic synthetic resins may however be employed, among which are the alkyd resins sometimes referred to as Glyptals, which permit oils to dry throughout the film and which are made from polybasic acids such as phthalic and maleic acids and polyhydric alcohol, such as glycerol, glycols, etc., the acrylic or acrylate resins, e. g., methacrylate.

The types of resins which may be included in

the present invention in general have been classified under the heading of synthetic resins and more particularly thermoplastic synthetic resins as distinguished from cellulose derivatives and natural resins. The thermosetting resins set or cure on the application of heat and do not soften appreciably when reheated, whereas the thermoplastic type may be softened by reheating.

A regrouping of the above types of thermoplastic synthetic resins might be shown as (*a*) styrenes, (*b*) vinyl resin, (*c*) alkyds, (*d*) acrylates. The polystyrenes are colorless, odorless, and tasteless, and are soluble in esters and chlorinated hydrocarbons and are compatible with such plasticizers as dibutyl and homologous phthalates and tricresyl and homologous phosphates. The vinyl resin plastics include, as stated, the polymers of the acetates and esters generally, ethers, halides, polyvinyl alcohols, acetals, and aldehydes, and one of the outstanding thermoplastic resins in this group is made by the copolymerization of vinyl chloride and vinyl acetate, referred to in the trade as Vinylite. The acrylate resins as well as the polystyrenes and vinyls are characterized by the unsaturated radical $CH_2{=}CH-$ known as the vinyl radical, and in one sense therefore the three types belong to one large family, which may be referred to as the vinyl thermoplastic synthetic resins and may also include divinyl types, and serves to define the entire group.

The acrylates are produced by the polymerization of the monomeric derivatives of acrylic and methacrylic acids, esters, acrolein, aconitic acids and similar substances. The acrylates, which have good properties similar to the other two groups, are notable because of their light transmission properties. In general the vinyl thermoplastic synthetic resins are resistant to heat and water as well as generally to acids and alkalis.

The alkyd resins, which are produced from polybasic acids, such as stated above, phthalic and polyhydric alcohols, such as glycerol and which are also important from the viewpoint of thermoplastic synthetic resins, have been referred to above.

A recently developed type of thermoplastic synthetic resin which it is contemplated employing in connection with the present invention and which may be considered a vinyl derivative and in the vinyl group is the polymerized vinylidene chloride resin, i. e., polymers of vinylidene chloride or copolymers for example with vinyl chloride or similar compounds. These resins are resistant to acids and alkalis and generally to solvents, being soluble generally speaking only in the more active oxygen-containing organic solvents such as the oxides and ethers.

Resins with accompanying plasticizers such as tricresyl and homologous phthalates and dibutyl and homologous phthalates and the like may also be employed. Although not equivalent to the thermoplastic synthetic resins other plastic materials may in some cases be incorporated therewith in relatively minor amounts, e. g., natural rubbers, synthetic rubbers and other natural and synthetic plastics.

As pointed out previously, the preferred form of the present invention however is to apply a drying oil preferably dissolved in a thinner which may or may not contain a small amount of a resin, dryer and pigment, (the resulting film being adapted to retain its flexibility during fabrication of the can and packing the same), directly to the metal, i. e., the untinned or unplated thin sheet iron, heating the same or otherwise treating it

to convert to a thin film upon which a thermoplastic synthetic resin-surfacing material may later be applied as a second layer but also in a thin film. The oil film is preferably heated to remove the solvent, preferably in the presence of a dryer such as the naphthenates, linoleates and resinates of cobalt or manganese. During the process the oils are partially polymerized and oxidized. The thermoplastic synthetic resin surface coating is then applied over the oil film also in a thin film, preferably in solution in a suitable solvent and the latter is removed and the resin film dried at a temperature of approximately 200° to 400° F.

In order to render the thermoplastic synthetic resin more flexible in some cases plasticizers, drying oils, or softening agents generally in small amounts may be used by adding the same to the resin; among which may be ethyl, butyl, amyl esters, phthalates, and tricresyl phosphate and triphenyl phosphate. Small amounts of drying oil may also be added to the resin.

The thermoplastic synthetic resins when properly selected are resistant to moisture, alkali and acid and prevent corrosion. They also dry with less oxygen absorption than natural resins and thus reduce peroxides and other unstable compounds.

In some cases mixtures containing resins such as the vinyl types in major proportions and plasticizers and/or drying oils in minor proportions may be employed direct as a single coat where conditions of use warrant it, particularly the high temperature thermoplastic type such as the Vinylite, alkyd, (Glyptal) and polystyrene resins, although this is not equivalent to the method employing a primary and a top coating. The plasticizers and drying oils assist in adhering the resin to the metal surface and give flexibility to allow working and crimping of the metal container. Pigments may also be employed here in relatively small amounts. Various mixtures of these materials (as well as in the primer coats) may be used.

The solvents employed with these, the resin and plasticizer materials, comprise generally the alcohols, ethers, ketones, aldehydes, esters or mixtures, in general relatively low boiling, also various hydrocarbons and derivatives.

Among the solvents may be mentioned low boiling esters such as ethyl acetate, high boiling esters such as butyl and amyl acetates and propionates, ethyl and butyl lactates, trade solvents such as the Cellosolves and Carbitols, aromatic hydrocarbons such as benzene, toluene, xylenes, solvent naphtha, petroleum naphthas, alcohols from methyl to amyl and mixtures of these as well as others. The resin solution is sprayed or brushed on, or applied by dipping and is then dried as described.

Varnishes are essentially gums and resins cooked in a drying oil and thinned with a volatile solvent. If the coatings employed in my invention are compared with varnishes for illustrative purposes the primer coat is essentially a drying oil and hence contains much less gums and resins than conventional varnishes, whereas the top or surface coat is essentially a resin, i. e., contains less drying oil than the conventional type of varnish. When applying the resin direct one that has flexibility or to which flexibility may be imparted is selected, e. g., the thermoplastic, e. g., vinyl, alkyd, polystyrene, to which a small amount of plasticizer and/or drying oil has been added. The alkyds or phthalics permit oil to dry throughout the film, apparently by polymerization instead of a combination of oxidation and polymerization, as is required with ordinary oil and varnish films and hence may be used in this modification.

Phthalic resins are best when light colors are required, but they do not dry hard unless applied in very thin films. They tend to remain soft underneath and are therefore desirable in the present connection for crimping or bending of the walls at the top of the container or receptacle to make a seal as practiced. Phthalics are particularly good in connection with enamel-like materials, i. e., where pigments are present and where discoloration is objectionable.

Increase in pigment increases flatness. Increase in non-volatiles and gums and resins increases gloss. With the paints, enamels, or varnishes, i. e., the more oil relative to resins the more flexibility and softer the film. Care must be used in the selection of pigments which cannot stand excessive baking. Smaller quantities of dryers are used when baking than when air drying.

The various coatings may be dried, especially by varying composition, in a matter of minutes to hours depending upon the temperature and the percentage of the various ingredients and components and the film thickness.

When pigments are ground in the mixture of drying oils and resins enamel-like surfaces may be produced.

Drying oils influence the flexibility and drying time of the material. The gums and resins impart hardness and wearing qualities.

Dryers may be used in certain mixtures containing the oils. They are metallic soaps or metal compounds of fatty acids, such as those of cobalt, manganese and other metal compounds of linoleic and abietic acids, known as linoleates and resinates as well as the naphthenates.

Where it is desirable to have a drying of the surface cobalt dryers are preferable, whereas manganese and others dry through the film. Excess dryers cause wrinkling, particularly on baking. Smaller amounts of dryers are used when baking than when air drying.

As general and more specific examples of the relative amounts of materials to be used in the primer coat the following may be mentioned: (*a*) drying oil or mixtures of drying oils without any additions; (*b*) drying oils containing in general less than 50 per cent pigment and preferably less than 10 per cent pigment; (*c*) drying oil containing generally less than 50 per cent of resin and preferably less than 10 per cent resin; for example employing an ester gum or phenol formaldehyde resin and a mixture of China-wood and bodied linseed oil in the proportion of 4 to 9 parts of China-wood to 1 part of bodied linseed oil. The amount of resin or ester gum would generally be less than one pound per gallon, although larger or smaller amounts might be used depending upon requirements. (*d*) Rubber may be incorporated, as described, in any of the mixtures using generally less than 10 per cent, but in some instances more may be employed.

Dryers of the order of several ounces for each 10 gallons of drying oil may be employed. Also in all cases solvents or thinners comprising mixtures of turpentine and mineral spirits or coal tar distillates such as xylene and mineral spirits varying from 1 to 5 or more times the amount of drying oil employed may be used.

Pigments, as stated before, from 1 to 50 per

cent, usually less than 10 per cent may be used in all the mixtures. Generally the amounts of addition materials to the primer coat, including pigments, synthetic resins and rubber should be kept as low as is consistent with the desirable properties imparted by these addition materials to retain the flexibility of the primer coating.

The top or surface coating composed mainly of resins is on the opposite extreme of the composition of the primer coat so far as the relative proportions of resins to drying oil and plasticizer are concerned. Generally it is not necessary to introduce pigments into the top coating, as this is purely a protective coating and will be transparent enough ordinarily for the pigment of the bottom coating to be seen therethrough. Where the pigment in the bottom or primer coating reduces the flexibility thereof too greatly it may be placed in the top coating, using care and precaution to avoid destroying the hardness, gloss and homogeneity of the top coating. The amount of solvent employed should be sufficient to permit ready application of the top coating by spraying, brushing or dipping and this of course applies to the bottom coating also. Usually two to three times the amount of the solvent by weight of the resin employed will suffice, although this is varied in accordance with the requirements as stated.

The drying oil and plasticizer in the top coating are merely to lend a small degree of flexibility thereto and would therefore be of an order of less than 20 per cent based on the resin, either natural or synthetic, and generally will vary from 1 to 10 per cent by weight of the resin employed. Drying oils and plasticizers may be added in somewhat larger quantities when a single coat comprising mainly resin and solvent is employed direct on the metal. In this case pigment may be employed and the addition products will facilitate adhesion of the resin to the metal.

It is desirable in many cases when the metal is being crimped to attach the tops and bottoms to the body to maintain it in a sufficiently heated condition to permit the thermoplastic resin to soften somewhat while working the same.

In all of the modifications described it is intended to cover the metal parts of the container so as to permit working the same in the conventional manner to allow proper closure for the purpose of sealing up the contents.

The term "primer coating" as used herein means an under coating in contradistinction to a top or surface coating.

As pointed out, various plasticizers some of which have already been referred to and which may include others, e. g., derivatives of glycerol and of dibasic and fatty acids, and a large group of substances may be used to soften and otherwise change the properties of the thermoplastic synthetic resins referred to and employed herein. On the other hand, if desired, although not necessary, I may employ minor proportions of thermosetting resins and other suitable plastic materials to harden and raise the softening point of

the thermoplastic synthetic resins employed by me. Mixtures of the latter among themselves may also be employed.

The thermoplastic synthetic resins are distinguished from the thermosetting types usually in being better in appearance, clearer, and in most cases colorless, and being more readily applied as well as having other desirable properties in connection with the present invention compared with the thermosetting types. The thermoplastic synthetic resin has the property of softening by reheating, whereas the thermosetting type sets or cures on the application of heat.

It is particularly desirable to distinguish the class of resins which I employ in my invention and referred to as thermoplastic synthetic resins from the cellulose type of plastic referred to generally as cellulose derivatives, such as the nitrate and acetate of cellulose. The cellulose types of plastics are generally simple derivatives of cellulose itself, whereas the thermoplastic synthetic resins are polymers and/or condensed substances. The thermoplastic synthetic resins have the desirable property in connection with my invention of being water resistant in character as well as being resistant to the action of acids or acidic substances. The cellulose derivatives or cellulose plastics on the other hand are permeable to water and are destroyed or acted on by acids. It is therefore clear that there is a sharp line of demarcation and distinction in the use and definition of what I refer to as the thermoplastic synthetic resins comprising in general the vinyl group as the preferred members, e. g. polystyrene, polymerized vinyl esters and the like and acrylic resins and the alkyd resins and similar types as broadly defined above and in general which are substantially of a non-cellulose type on the one hand and the use of plastics made from cellulose or derivatives thereof on the other. By the term polymerizable double bond is meant one capable of combining with another double bond so that the resulting compound is a polymer.

It will be understood that the various specific substances and percentages of materials shown herein are given by way of illustration, and that the invention is not limited thereto; also that there may be many modifications and departures within the broad spirit and scope of the invention.

I claim the following invention:

1. A container comprising a body, a top and a bottom of sheet metal and at least the interior of which is coated with a relatively flexible prime coating comprising a polymerized hydrocarbon and a relatively rigid top coating comprising a thermoplastic synthetic resin.

2. A container comprising a body, a top and a bottom of sheet metal and at least the interior of which is coated with a relatively flexible prime coating consisting of polymerized olefin hydrocarbons, and a relatively rigid top coating consisting of a thermoplastic synthetic resin.

JACQUE C. MORRELL.

Disclaimer

2,412,528.—*Jacque C. Morrell*, Oak Park, Ill. COATED METAL CONTAINER. Patent dated Dec. 10, 1946. Disclaimer filed Mar. 1, 1949, by the inventor.

Hereby enters this disclaimer in connection with claim (1)—to any polymerized hydrocarbon except those which have been derived at least in part by polymerizing reaction of an acyclic hydrocarbon; and in connection with claim (2)—to any polymerized olefin hydrocarbon except those which have been derived at least in part by polymerizing reaction of an acyclic hydrocarbon.

[*Official Gazette March 29, 1949.*]

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