A. MEYER.

METAL COVERING FOR CAR OR VEHICLE BODIES AND METHOD OF PREPARING THE SAME.

APPLICATION FILED FEB. 7, 1912.

1,221,561. Patented Apr. 3, 1917.

Fig. 1.

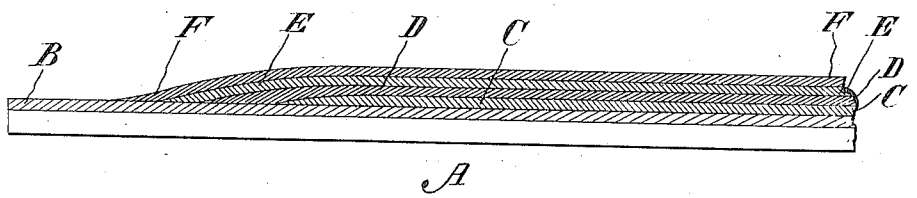
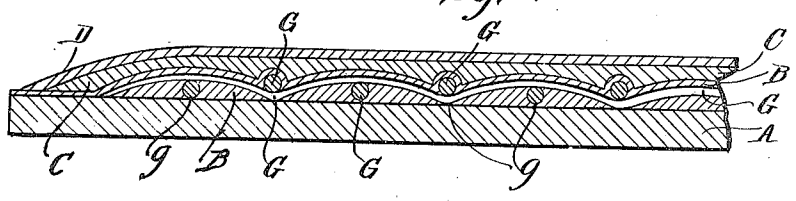


Fig. 2.



Witnesses:
G. L. Baker.
G. C. Denny Jr.

Inventor:
A. Meyer
by Foster Freeman Watson & Coit
Attys

UNITED STATES PATENT OFFICE.

ALEXANDRE MEYER, OF PARIS, FRANCE.

METAL COVERING FOR CAR OR VEHICLE BODIES AND METHOD OF PREPARING THE SAME.

1,221,561. Specification of Letters Patent. Patented Apr. 3, 1917.

Application filed February 7, 1912. Serial No. 676,092.

To all whom it may concern:

Be it known that I, ALEXANDRE MEYER, engineer, citizen of the French Republic, residing at 10 Rue Thimonnier, Paris, Department of the Seine, France, have invented certain new and useful Improvements in Metal Coverings for Car or Vehicle Bodies and Methods of Preparing the Same, of which the following is a specification.

The present invention provides for the employment of vitrified enameled or decorated sheet iron previously prepared at the factory for application in the external covering of passenger carriages and other vehicles, while insuring for the interior thereof the best hygienic conditions that should exist today in general passenger carriages.

For this application it is necessary to make a judicious selection of the kinds of sheet-metal.

Sheet-iron gives very good results, but it is not easily shaped.

Sheet-steel is distinctly suitable for this purpose, provided that it is charged as highly as possible with manganese (0.300 to 0.350).

Sheet aluminium and sheet copper can also be employed.

It is desirable that the sheet metal, particularly sheet steel, etc., before being worked at the factory for the purpose of conversion into panels or other articles for covering carriages, should be prepared in the following manner: carefully scoured, the part intended to form the back face covered with a thin layer of oxid-resisting vitrification material, subjected to the action of fire for two or three minutes at a temperature of about 900° C. in order to discover the flaws that may be produced by the impurities which have remained in the sheet-metal, and to make the latter as ductile as possible. The heating of the sheet as described will cause the location of flaws or imperfections in the sheet to be indicated by bubble-like formations in the covering on the back face.

This firing operation will likewise remove from the unglazed surface the scales which could not be got rid of by the first scouring. The sheet-metal is drilled on the back face where the wrinkles or flaws have appeared in order to reach the impurities or the cavity, so as to form an air-passage in order to obviate their formation in the operations of decorative vitrification or enameling that follow. The sheet-metal is then vigorously rolled for the purpose of straining the fibers.

After being worked into panels or covering articles of the desired shape, the surface of the sheet metal that is to be vitrified or enameled is subjected to the action of a powerful stream of a hard abrasive substance (any kind of industrial carbon), carborundum for example, in order to impart to it a roughness that will increase the adhesion of the vitrifying material or of the enamel.

The sheet metal worked and shaped for being placed and ready for being enameled or vitrified is again exposed to the action of fire, but at a temperature of about 700° C., once more scoured and carefully washed.

The surface that is to be decorated receives a first vitrifying layer termed oxid resisting, the formula of which is approximately as below having the nearest coefficient of expansion to the sheet steel known as Martins:

Borax	45	parts
Quartz	25	"
Torrified flint (flint which has been heated in order to facilitate grinding thereof)	5	"
Feldspar	16	"
Carbonate of potassium	5	"
Saltpeter	2.75	"
Oxid of cobalt	0.25	"
Bi-oxid of manganese	0.75	"
Oxid of iron	0.25	"

This first layer is melted to a temperature of about 1000° C.

The superposed layers of enamel which follow and are employed, in the decoration of the panels should always leave the circumferential edges free from enamel, that is to say should stop, becoming thinner, at a suitable distance from the edges. This method of application insures important advantages in regard to the strength of the decorative enamel applied to the first vitrification layer, termed oxid-resisting. This is illustrated in Figure 1 of the drawing hereinafter referred to.

The same is done even around holes employed for fixing, notches, etc., which may be formed in the metal sheets previously worked (the superposed layers of enamel

constituting the decoration are preferably applied to the metal sheets by means of the aerograph in order that the layers may be as thin as possible).

The metal blank or sheet, before being enameled, is shaped and formed to adapt it to fit properly over the space to be covered and provided with holes, notches, etc., for the passage of screws, bolts or other fastening devices by which it is to be secured in place. It will be evident that plates of any desired form and size may be provided and the abutting edges of the plates, when attached to the body of a car or vehicle, or to the frame of such body, covered by suitable strips, which may also be of metal enameled in accordance with the method herein described. No claim is made herein to any particular form of plate, means for connecting the plate to the frame or body of a car or vehicle, or means for concealing the edges of the attached plates, as it is obvious that there may be great variation in these particulars without departing from the spirit of the present invention.

The primary cause of the lack of resistance in enamels applied generally to metals: iron, steel, cast-iron, copper, aluminium, etc., is that when enamels are applied to metals either as grounds or first layers or as decoration, colored or non-colored materials are employed which are of a nature to produce opacity and highly fusible, that is to say strongly charged with alkalis, very frequently in the proportions of 1 of silicic acid: (quartz silex, silicious sand) to 1 to 1.5 of various alkalis such as hydrated borate of soda (borax), neutral carbonate of sodium (soda), carbonate of potassium (potash) and nitrate of potash or nitrate of soda. The consequence of this enormous quantity of alkalis is a lack of homogeneousness and of power of resisting chemical, physical and thermic agents.

It has been recognized that it is preferable to apply immediately over the first oxid resistant or anti-oxid vitrification layer, a formula for which was given above, a very slightly fusible opacity producing solution strongly charged with silicic acid in the proportion of:

Silicic acid (quartz)	2
Silicate of alumina	1
"Saline" oxid of lead (Pb_3O_4= $2PbO,PbO_2$)	0.25
Alkalis (hydrated borate of soda)	0.15
Ground oxidated titanium (rutile)	0.015

This mixture the elements of which should be fused thoroughly together at a high temperature preferably by means of the electric furnace and which should then be thoroughly ground in water, can be applied directly in the manner of ordinary enamels, preferably by means of the aerograph to all metals previously prepared, that is to say covered with an anti-oxid layer of vitrifying material prepared according to the ordinary formulas but preferably less alkaline. In consequence of its plastic homogeneous nature and power of resisting chemical, physical and thermic influences, this mixture when applied as a first layer over anti-oxids will act as an adhesive and equilibrating agent to the more fusible decorating enamels which may be employed for completing the work.

The plastic nature of this mixture the plasticity of which can be increased or diminished by proportionately increasing or reducing the "saline" oxid of lead and the rutile, the hydrated borate of soda or addition of other alkaline elements, will enable the flat sheet metal plates or panels covered with this mixture, to be rolled after coming from the furnace, thus facilitating the straightening of the pieces put out of shape during the fusion of the said mixture and thus enabling them to be kept in their proper form during the operations of fixing the more fusible decoration enamels applied thereafter.

This mixture may be made opaque to the degree desired even by the ordinary means and be colored any tint by the known methods without practically reducing its fusing point.

It has this particular property of being employable for the ground as well as for decoration in layers which are very appreciably thinner than is possible with ordinary enamels. In the carrying out of the decoration it likewise enables different shades or tints to be placed in juxtaposition even by means of the aerograph, without any mixture being introduced into the adjointing tints, thus likewise avoiding excessive thickness.

The first plastic ground layer may if desired have a high fusing point, and the following layers be more fusible, which enables the sheets put out of shape to be straightened by rolling after the fusion of the first ground layer.

This layer may finally be covered with a superficial layer of crystalline, transparent, colorless vitrifying material, having a low melting point (550° to 600°) which would unify the surface and make the decoration stand out.

This mixture may be employed in greater thicknesses in uniform tints, or as decoration and colored, arranged in juxtaposition in the style of mosaic work.

By being rolled with heated cylinders it may be furnished with various designs, sunk and in relief.

In order that satisfactory work may be effected, the impressing cylinders are made rather large and are preferably heated inside by means of Bunsen lamps or steam. Dur-

ing the treatment with the cylinders, the plates or panels are kept at a sufficiently high temperature by a Bunsen battery (gas blow pipes) which heats them below at the beginning of the treatment and when they leave the straightening rollers arranged in the ordinary form at the place of exit.

This plastic mixture may be reinforced with metal trellis or other mounting which is scoured and previously fixed on the plates by electric soldering or otherwise is rolled and then covered with anti-oxid vitrifying material at the same time as the sheet metal plates and afterward coated with the layers of plastic enamel. The mixture may be applied to the front and the back of the plates, fusion being effected by suspension and panels with double fronts thus formed. In order that the material may adhere better to the plates, these may be worked with the planing machine or otherwise that is to say be shaved so that shavings are formed which remain adhering to the plate.

The layers of plastic enamel applied either to one face or to the front and the back may be as thick as is necessary for the purpose for which they are employed.

The cooling of the pieces covered with this mixture should preferably be effected slowly after the fusion.

In the accompanying drawing,

Figure 1 is a sectional view through a portion of a plate or sheet prepared in accordance with the invention;

Fig. 2 is a similar view, on a somewhat larger scale, showing a reinforcing trellis secured to the body of the plate.

In the drawing the sheet proper is designated by the reference character A, the first, oxid resisting, layer on the front face of the sheet is represented at B, and in Fig. 1 four subsequently applied, superposed, layers of enamel are designated by the reference characters C, D, E and F.

In the embodiment of the invention illustrated in Fig. 2 a metal trellis G is included, such trellis being secured, by welding or otherwise, as at the points *g*, directly to the plate A. The oxid-resisting layer B coats the trellis as well as the surface of the plate and the layer C covers any unevenness in the surface of the layer produced by the trellis.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. The herein described method of preparing metal for use as a covering for car or vehicle bodies comprising cleaning a suitable blank, coating one surface of the blank with suitable oxid-resisting material, heating the coated blank to disclose flaws due to impurities or imperfections in the body thereof, treating the blank to prevent such flaws appearing in the finished article, shaping the blank for the particular use for which it is intended, subjecting the surface to be enameled to the action of a blast of abrasive material, applying to said surface a coating fusing only at a relatively high temperature, and subsequently applying a more readily fusible enamel coating.

2. The herein described method of preparing metal for use as a covering for car or vehicle bodies comprising treating and shaping a suitable blank to adapt it for the intended use and to receive an antioxid enamel coating, coating the entire surface which is to be enameled with an oxid-resisting material, applying to said surface a plastic coating, fusing at such a high temperature that the coated sheet or plate may be subsequently heated and rolled to straighten it without damage to said coating, and subsequently applying a more readily fusible enamel coating.

3. The herein described method of preparing metal for use as a covering for car or vehicle bodies comprising treating and shaping a suitable blank to adapt it for the intended use and to receive an antioxid enamel coating, coating the entire surface which is to be enameled with an oxid-resisting material, applying to said surface a plastic coating fusing only at a relatively high temperature, impressing suitable designs on or in said layer, and thereafter applying a second enamel coating.

4. The herein described method of preparing metal for use as a covering for car or vehicle bodies, comprising applying to a suitable blank an anti-oxid layer having a co-efficient of expansion substantially the same as that of the blank, and superimposing on said layer, first, a layer of enamel the fusing point of which is relatively high and thereafter an enamel layer the fusing point of which is relatively low.

5. The herein described method of preparing metal for use as a covering for car or vehicle bodies comprising treating and shaping a suitable blank to adapt it for the intended use and to receive a coating of enamel, fixing to the surface of the blank to be enameled a reinforcing means, coating said surface and reinforcing means with an oxid resisting material, and thereafter applying a second enamel coating.

6. The herein described method of preparing metal for use as a covering for car or vehicle bodies comprising treating and shaping a suitable blank to adapt it for the intended use and to receive a coating of enamel, applying to said blank an enamel reinforcing means, and superposing on the blank and reinforcing means two layers of enamel fusing at different temperatures.

7. A metal sheet or plate adapted to be employed in covering car or vehicle bodies having a surface provided with an enamel

coating and having a metal, enamel reinforcing means secured to said surface and covered by the enamel coating.

8. A metal sheet or plate adapted to be employed in covering car or vehicle bodies having a surface provided with car enamel coating comprising a layer of anti-oxid material, applied directly to the sheet or plate, and a plurality of layers superimposed thereon, the layer immediately adjacent the layer of anti-oxid material being less fusible than the layer or layers superimposed thereon.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDRE MEYER.

Witnesses:
CLAUDIUS LUSSON,
H. C. COXE.