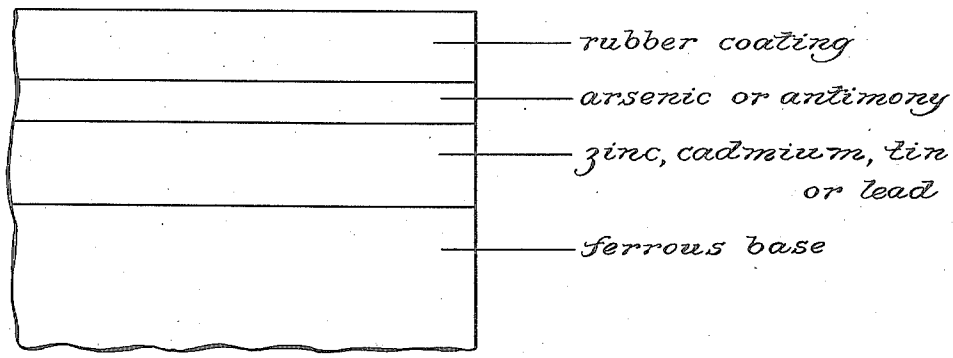
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RUBBER ADHERENT ARTICLE

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Inventor:
Elgin Earleton Domm.
By Dyer, Holt, Esch, Whittemore & Wills.
Atty's.

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RUBBER ADHERENT ARTICLE

Elgin Carleton Domm, Niles, Mich., assignor to National-Standard Company, Niles, Mich., a corporation of Michigan

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13 Claims. (Cl. 91—68.2)

This invention relates to a rubber-adherent article and, more particularly, to a method of increasing the adherence to rubber or corrosion-resistant ferrous base articles.

This application is a continuation, in part, of my co-pending applications, Ser. No. 665,425, filed April 10, 1933, and Serial No. 737,666, filed July 30, 1934, and Serial No. 749,304, filed October 20, 1934.

As set forth in the latter application, I have discovered that the adhesiveness to rubber of zinc may be increased by coating the zinc with a thin layer of copper, and then alloying the copper with the zinc in the cold, or under the mild heat of vulcanization, to produce a thin layer of brass. As was also set forth in that application, the adherence of cadmium, tin and lead to rubber may be increased in the same manner.

It has now been discovered that the adherence of zinc, cadmium, tin and lead may be increased with respect to rubber by plating thereon a thin layer of a metal of the class consisting of antimony and arsenic.

While neither arsenic nor antimony has great adherence to rubber, the thin layer apparently alloys throughout, or at least is chemically affected by the zinc in such manner that the resultant product has greater adherence than either zinc or antimony alone.

In carrying out the invention, the base which has been coated with zinc, cadmium, lead or tin is plated with arsenic or antimony either by electro deposition or by electroplating. In the case of steel tire bead reinforcing wires, the base coat is preferably of galvanized zinc and the arsenic or antimony is applied thereto.

In the case of arsenic, the coating is preferably .06 to .021 gram per kilogram, having a diameter of .037 inch. The preferred range is .066 to .114 gram per kilogram.

In the case of antimony, the preferred coating is from 0.1 to .35 gram per kilogram.

The coatings are in the order of .000001 to .000004 inch in thickness.

In plating the arsenic or antimony, a bath such as those disclosed in my co-pending applications Ser. No. 720,891, Serial No. 706,737 and Serial No. 706,736 may be used, and the metals plated by electrodeposition from such a bath. On the other hand, they may be plated by electroplating of the ordinary form. Following the plating, it is preferred to dip the articles in hot water and dry them so that they may be rapidly dried.

Such a bath, in the case of antimony, consists of 3 ounces of sodium cyanide in one gallon of warm water in which ½ ounce of antimony trisulfide is dissolved, and which is then heated to 120° F. The solution is preferably maintained at about this temperature during the reaction.

In the case of arsenic, solutions may be prepared from the respective trisulfides in substantially the same molecular proportions shown for the antimony trisulfide.

After plating, the articles are covered with a coating of rubber which is vulcanized throughout.

The invention is illustrated diagrammatically in the drawing. It is understood that the thicknesses shown in the drawing are not properly illustrative of the true relative thicknesses, but are shown purely for the purpose of illustration.

The term "electrodeposition" as used in the claims, covers electrodeposition either by the use of an electric current or simply the substitution of one metal by another.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. The method of attaching an article coated with metal of the class consisting of zinc, cadmium, tin and lead to rubber, which comprises applying to such coating a thin layer of metal of the class consisting of arsenic and antimony, the layer being thin enough to alloy throughout with the underlying metal and produce a thin layer of alloy thereon, whereby the adhesiveness to rubber is increased, and vulcanizing a layer of rubber thereto.

2. The method of attaching a ferrous base metal object having a coating of a metal of the class consisting of zinc, cadmium, tin and lead thereon to rubber, which comprises applying to such coating a thin layer of metal of the class consisting of arsenic and antimony, the layer being thin enough to alloy throughout with the underlying metal and produce a thin layer of alloy thereon.

3. The method as set forth in claim 1, in which the layer of arsenic and antimony has a thickness of the order of .000001 to .000004 inch.

4. As an article of commerce, a base having a coating of a metal of the class consisting of zinc, cadmium, lead and tin, and a thin layer consisting originally of substantially pure metal of the class consisting of arsenic and antimony thereon,

the overlying metal layer being of a thinness to alloy throughout with the underlying metal and produce a thin layer of alloy thereon, and a rubber coating vulcanized thereto.

5. As an article of commerce, a ferrous metal base having a coating of a metal of the class consisting of zinc, cadmium, lead and tin, and a thin layer consisting originally of substantially pure metal of the class consisting of arsenic and antimony thereon, the overlying metal layer being of a thinness to alloy throughout with the underlying metal and produce a thin layer of alloy thereon, and a rubber coating vulcanized thereto.

6. A steel tire bead reinforcing wire having thereon a galvanized zinc coating, and having a thin layer of a metal of the class consisting of arsenic and antimony thereon, said layer being of a thinness to alloy throughout with the zinc and produce a thin layer of alloy thereon, and a coating of rubber vulcanized thereto.

7. The method as set forth in claim 1, in which the arsenic or antimony is applied by electrodeposition.

8. An article as set forth in claim 4, in which the arsenic or antimony layer is an electrodeposited layer.

9. The method as set forth in claim 1, in which the first coating is of zinc.

10. The method as set forth in claim 1, in which the coating of arsenic and antimony are of the order of .000001 to .000004 inch in thickness.

11. An article as set forth in claim 4, in which the thickness of the arsenic or antimony is of the order of .000001 to .000004 inch.

12. An article as set forth in claim 4, in which the outer metal coating is of arsenic.

13. An article as set forth in claim 4, in which the outer metal coating is of antimony.

ELGIN CARLETON DOMM.