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COATED MAGNESIUM OR MAGNESIUM ALLOY ARTICLE

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5 Claims. (Cl. 148—6)

The invention relates to coated articles of magnesium and magnesium alloys. It more particularly concerns an improved protective coating and method of producing the same upon magnesium and its alloys, said coating being capable of being dyed in a wide variety of colors.

Heretofore highly protective as well as abrasion-resistant coatings capable of being dyed in many colors have not been commercially available for magnesium and its alloys. It is a desideratum in the art to provide such coatings.

We have discovered that by subjecting magnesium and its alloys to the action of an aqueous solution of an alkali carbonate above the normal boiling point under pressure a strongly adherent, corrosion-resistant coating is produced. This coating, besides being useful as a protection for the metal, has the unique property of being capable of taking a dye so that highly decorative effects are obtainable by subjecting the coated article to a dyeing operation.

In carrying out our invention, the magnesium or magnesium alloy article is preferably first cleaned as by wire brushing, sand blasting, acid pickling or buffing, according to the degree of luster desired in the ultimate coating. The degree of luster depends upon the smoothness of the metal surface before being subjected to the coating operation. For example, sand blasting the metal prepares it to exhibit a relatively dull coating, while buffing or polishing the metal to a bright smooth surface results in the article exhibiting a smooth lustrous, but more or less white, opaque surface.

After having suitably cleaned the article to be coated, it is then subjected to the action of an aqueous solution of an alkali carbonate in an autoclave at elevated temperature and pressure, the duration of such treatment depending upon the temperature or pressure employed. The aqueous carbonate solution may be made by dissolving in water from about 2 to 20 per cent or more by weight of a soluble alkali carbonate, such as that of lithium, sodium, or potassium. In general, we prefer to employ sodium carbonate in a concentration of about 10 per cent by weight. The temperature to employ may be between about 110° C. and 250° C. or more and the pressure should be that corresponding to the vapor pressure of the solution at such temperature. Such vapor pressure may be from about 20 to 400 pounds pressure per square inch and may be used advantageously to regulate the temperature of the operation. The duration of the treatment with the alkaline carbonate solution may be from about 1 to 30 minutes or more. At the higher temperatures a relatively short time of treatment, that is, say from 1 to 5 minutes, suffices, 5 minutes being preferred at 200° C., which temperature corresponds to a vapor pressure of about

225 pounds per square inch. At lower temperatures, say about 110° to 150° C., the treatment should be more prolonged. After such treatment the article should be rinsed and dried. By the foregoing treatment there is produced upon the article an adherent coating, apparently integral with the article, yet sufficiently flexible to permit moderate bending without fracture. In addition, the coating possesses the property of being capable of being dyed and may be colored practically any desired shade by subjecting the so coated article to the dyeing action at the boiling temperature for about 1-5 minutes of water in which is dissolved from about 0.1 to 0.5 per cent of a soluble dye.

The following dyes are illustrative of those suitable for the dyeing operation, the number opposite the dye name being that of the "Color Index", 1st edition, January 1924, published by the Society of Dyers and Colourists, Assurance Buildings, Bradford, Yorkshire, England:

Dye	Color index No.
Pontacyl Light Green SF Yellowish	670
Malachite Green	657
Wool Green BS	737
Janus Green	133
Aniline Red	677
Methyl Red	211
Pigment Scarlet 3B	216
Fast Crimson 6BL	57
Eosine Yellow	768
Quinaldine Yellow	801
Indian Yellow G	146
Naphthol Yellow S	10
Nitrazine Yellow	640
Methyl Violet	680
Crystal Violet 6B	681
Methylene Blue 2BC	922
Aniline Blue	689
Alizarin Blue S	1067
Eosine Bluish	771
Benzo Blue 2B	406
Alizarin Blue GM	1066
Fast Acid Black 2B	304
Diazine Black "H" Extra	401
Niagara Sky Blue 6B	518
Acid Blue-Black	246
Diamine Black BH	401
Orange II	151
Orange GG	27
Methyl Orange	142
Alizarin	1040
Fluorescein	766
Rosolic Acid	724
Bismark Brown	331
Phenolphthalein	764
Acid Fuchsin	30
Azo Fuchsin 6B	154
Rhodamine B	749
Xylene Cyanol FF	715
Cochineal	1239
Alizarin Cyanine	1050
Bordeaux B	88
Safranin 6B	843
Lanafuchsin 6B	54
Dimethyl-amino-azo-Benzene (Butter Yellow)	19

By suitably selecting the dye articles of magnesium and its alloys can be thus provided with a protective coating of practically any desired color or shade. The coating is not only decora-

tive, but also affords excellent protection against corrosive attack and it is resistant to mechanical abrasion. These qualities are retained after the article is dyed.

- 5 Other modes of applying the principle of our invention may be employed instead of those explained, change being made as regards the steps herein disclosed, provided those stated by any of the following claims or their equivalent be employed.

10 We therefore particularly point out and distinctly claim as our invention:

1. An article formed of a metal selected from the class consisting of magnesium and magnesium alloys and having an adherent corrosion-resistant coating integrally bonded thereto formed by the action of a liquid aqueous solution of an alkali carbonate under pressure at a temperature above its normal boiling point, said coating being capable of being dyed.

2. An article formed of a metal selected from the class consisting of magnesium and magnesium alloys and having an adherent corrosion-resistant coating integrally bonded thereto formed by the action of a liquid aqueous solution of sodium carbonate under pressure at a temperature above its normal boiling point, said coating being capable of being dyed.

3. The method of producing a corrosion-resistant coating upon an article formed of a metal selected from the class consisting of magnesium and its alloys which comprises subjecting the article to the action of an aqueous alkali carbonate solution under pressure at a temperature above the normal boiling point of the solution.

4. A method of producing a corrosion-resistant coating upon an article formed of a metal selected from the class consisting of magnesium and its alloys which comprises subjecting the article to the action of an aqueous solution containing from 2 to 20 per cent of sodium carbonate under pressure at a temperature above the normal boiling point of the solution.

5. A method of producing a corrosion-resistant coating upon an article formed of a metal selected from the class consisting of magnesium and its alloys which comprises subjecting the article to the action of an aqueous solution containing a soluble alkali metal carbonate under pressure at a temperature above the normal boiling point of the solution and subsequently dyeing the article by immersion in an aqueous solution of a dye.

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