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UNITED STATES PATENT OFFICE.

ALEXANDER CLASSEN, OF AACHEN, GERMANY.

PROCESS FOR THE PRODUCTION OF GLOSSY METALLIC COATINGS ON METALS.

No Drawing. Application filed October 21, 1922. Serial No. 596,148.

To all whom it may concern:

Be it known that I, ALEXANDER CLASSEN, a citizen of Germany, residing at Aachen, Germany, have invented certain new and useful Improvements in Processes for the Production of Glossy Metallic Coatings on Metals, of which the following is a specification.

In my United States appl. Ser. No. 513,658 I have described a process for the production of glossy metallic coatings upon metals, for instance of zinc upon iron by a galvanic process which consists in adding to the electrolytic bath, besides colloids or substances furnishing colloids, substances which prevent under the given conditions the generation of hydrogen at the cathode.

Further searches have shown that specially good results are obtained if, instead of the separate application of colloids on the one hand and of hydrogen binding substances on the other hand, such substances are added to the electrolyte bath which possess at the same time colloidal character and the capability of binding hydrogen. It has been found out that such colloids can be produced by various methods. If for instance gelatine is dissolved in warm water in such a quantity that the solution when cooling solidifies to a solid jelly and if this mass is covered with hydrogen peroxide (perhydrol), the jelly is transformed gradually into a liquid state capable of being filtered and of forming a solution which does not give up oxygen even if allowed to rest for a long time. The effect of the perhydrol upon the jelly can be assisted by catalyzers, as for example, the sulphates of aluminum.

By the addition of such a hydrogen-binding colloid, which contains apparently the hydrogen peroxide chemically bound or in very fixed condition, to a galvanic bath technical effects can be produced which could hitherto never be realized. At the electrolytic zincification of iron for instance, white, glossy, silver-like coatings of specially great density and high gloss are produced which on polishing acquire a remarkably beautiful and intense gloss.

Other organic or anorganic colloids as for instance gum, albumen, starch, dextrin, and others can be transformed in a similar manner into hydrogen-binding products.

Instead of hydrogen peroxide other oxidized substances could be used for this purpose, specially such substances which are genetically related with hydrogen peroxide as for instance persulphates, perborates, percarbonates, persilicates, perphosphates, pyroperphosphates, persulphuric acid, sulfomonoperacid and the like. These compounds are preferably made to act upon the colloids under conditions in which they give up hydrogen peroxide. From solutions for instance of perborates, persulphates and the like the hydrogen peroxide can be set free and bound to the colloid by addition of sulphuric acid or the like.

The process is carried out for instance in the following manner:

A bath for galvanizing iron is prepared containing 10 kilograms of zinc sulphate, 2.5 kilograms of ammonium sulphate and 120 cubic centimeters of sulphuric acid (1.8° Bé.) per 100 liters. To this bath is added the quantity of the product obtained by the interaction of 5 grams of gelatine and 15 grams of hydrogen peroxide (30%ig) in the presence of 15 grams of aluminum sulphate. The zincification of the iron is then conducted in the usual manner.

I claim:

1. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding colloids and in conducting the galvanic process in the usual manner.

2. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and oxidizing means, and in conducting the galvanic process in the usual manner.

3. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and oxidizing means in the presence of catalyzers and in conducting the galvanic process in the usual manner.

4. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and hydrogen proxide, and in con-

ducting the galvanic process in the usual manner.

5. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and hydrogen peroxide in the presence of catalyzers and in conducting the galvanic process in the usual manner.

6. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and substances furnishing hydrogen peroxide, and in conducting the galvanic process in the usual manner.

7. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloids and substances furnishing hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

8. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide, and in conducting the galvanic process in the usual manner.

9. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide in the presence of catalyzers and in conducting the galvanic process in the usual manner.

10. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide-furnishing substances, and in conducting the galvanic process in the usual manner.

11. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide furnishing substances in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

12. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by overlaying gelatine with hydrogen peroxide, and in conducting the galvanic process in the usual manner.

13. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by overlaying gelatine with hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

14. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloid furnishing substances and oxidizing means, and in conducting the galvanic process in the usual manner.

15. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloid furnishing substances and oxidizing means in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

16. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and hydrogen peroxide, and in conducting the galvanic process in the usual manner.

17. A process for the production of glossy metal coatings on metals galvanically consisting in adding to the electrolytic bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and hydrogen peroxide-furnishing substances, and in conducting the galvanic process in the usual manner.

18. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding colloids and in conducting the galvanic process in the usual manner.

19. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and oxidizing means, and in conducting the galvanic process in the usual manner.

20. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and oxidizing means in the presence of catalyzers and in conducting the galvanic process in the usual manner.

21. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and hydrogen peroxide, and in conducting the galvanic process in the usual manner.

22. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

23. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and substances furnishing hydrogen peroxide, and in conducting the galvanic process in the usual manner.

24. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloids and substances furnishing hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

25. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide, and in conducting the galvanic process in the usual manner.

26. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

27. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide-furnishing substances, and in conducting the galvanic process in the usual manner.

28. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of gelatine and hydrogen peroxide-furnishing substances in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

29. A process for the production of glossy zinc coatings on iron which consists in overlaying gelatine with hydrogen peroxide, adding the product thus obtained to the electrolytic zinc bath, and conducting the galvanic process in the usual manner.

30. A process for the production of glossy zinc coatings on iron galvanically which consists in overlaying gelatine with hydrogen peroxide in the presence of catalyzers, adding the product thus obtained to the electrolytic zinc bath, and conducting the galvanic process in the usual manner.

31. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by overlaying gelatine with hydrogen peroxide in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

32. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and oxidizing means, and in conducting the galvanic process in the usual manner.

33. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and oxiding means in the presence of catalyzers, and in conducting the galvanic process in the usual manner.

34. A process for the production of glossy sinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and hydrogen peroxide, and in conducting the galvanic process in the usual manner.

35. A process for the production of glossy zinc coatings on iron galvanically consisting in adding to the electrolytic zinc bath hydrogen-binding substances which have been produced by the action upon one another of colloid-furnishing substances and hydrogen peroxide-furnishing substances, and in conducting the galvanic process in the usual manner.

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

ALEXANDER CLASSEN.

Witnesses:

LUISE AUGUSTE WEISS,

MARIA BLEESEN.