M. M. MERRITT.

ELECTROLYTIC PROCESS AND PRODUCT.

APPLICATION FILED NOV. 2, 1917.

1,282,265. Patented Oct. 22, 1918.

Fig. 1.

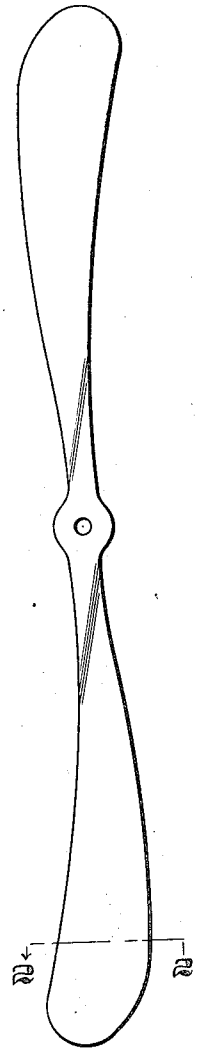
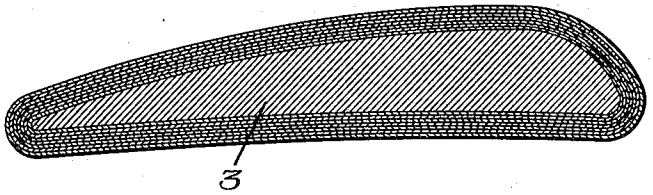


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTROLYTIC PROCESS AND PRODUCT.

1,282,265. Specification of Letters Patent. Patented Oct. 22, 1918.

Application filed November 2, 1917. Serial No. 199,809.

To all whom it may concern:

Be it known that I, MATTHEW M. MERRITT, a citizen of the United States, and a resident of South Middleton, county of Essex, Commonwealth of Massachusetts, have invented an Improvement in Electrolytic Processes and Products (B), of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention pertains to improvements in electrolytic processes and products, and more particularly, though not exclusively, to improvements in the manufacture of articles, such as aeroplane propellers formed of non-conductive materials and coated with electrolytically deposited metal.

In the drawings that show one form of an illustrative embodiment of my invention:

Figure 1 shows an aeroplane propeller coated with copper;

Fig. 2 is a diagrammatic section therethrough on the line 2—2 of Fig. 1.

I have found in electrolytically depositing metal on the surface of non-conductive bodies that the usual method of applying a paint of granular electrically conductive particles and a binder to the surface of the article to be coated, and subsequently electrolytically depositing metal such as copper on the surface of the electrically conductive coating, the deposited metal, partaking of the structure of the electrically conductive coating, is coarsely crystalline, very brittle, and of apparently slight tensile strength. I have found that the texture of the deposited copper may be greatly improved, its brittleness decreased and its tensile strength increased, by interposing between the initial electrically conductive coating and the copper deposit a film or strata of foreign substance such as grease. I believe that this improved result is due to the equalization of attraction of the entire surface of the cathode. Where the deposit is made directly on the granular coating, each particle of the coating exerts a considerably greater attraction for the ions in the bath than is exerted by the interstices between the grains, thereby separating the copper deposit in coarsely crystalline formation. When, on the other hand, a film of grease is interposed between the entire surface of the granular electrically conductive coating and the electrolyte, the attraction exerted by an exterior projecting point of each individual grain of the initial coating is considerably reduced, and the attraction exerted by the cathode as a whole rendered much more uniform so that the electrolytically deposited metal not only is deposited on a smoother surface, but is more uniformly deposited because of the more uniform attraction.

If it is desired to provide laminations in the deposited metal, I may do so by interrupting the electrolytic deposit at any desired time and coating the surface of the copper theretofore deposited with the grease. I believe this to be of advantage in articles which are flexible, notably aeroplane propellers. It is also of advantage because any tendency of the metal to become crystalline as deposit continues becomes checked. Thus if, for any reason, a portion of the surface of a layer of copper has accumulated occluded hydrogen and has thereby been rendered more cyrstalline in structure, a film of the grease will prevent subsequent deposits of metal from partaking of the coarsely crystalline structure of the underlying surface.

I have described in a co-pending application a method of utilizing mercury to secure strong, close-grained metallic deposit on non-conductive cathodes. The present invention may be advantageously combined with the invention disclosed in said co-pending application by coating with grease or similar substance the initial application of electrically conductive paint, electrolytically depositing the first layer of metal thereon, coating said layer of metal with the mercury and then electrolytically depositing the second layer of metal either with or without a film of grease on top of the mercury deposit. For some purposes, if the deposit of successive laminations is to be continued, I prefer from this point on to secure the lamination by means of grease rather than by means of the mercury.

It will be understood that I have used the word "grease" throughout the specification and claims in a generic sense to include any non-conductive substance capable of forming a film over the conductive surface of a cathode.

While I have shown and described one embodiment of my invention and a preferred method of practising the same, it

will be understood that great changes may be made therein without departing from the scope of my invention, which is best defined in the following claims.

Claims:

1. An article having a non-conductive core, a layer of granular electrically conductive material exterior to said core, a layer of non-conductive foreign substance exterior to said coating of granular electrically conductive material, and a layer of electrolytically deposited metal exterior to said foreign substance.

2. An article having a non-conductive core, a layer of granular electrically conductive material exterior to said core, a film of grease exterior to said coating of granular electrically conductive material and a layer of electrolytically deposited metal exterior to said grease.

3. A flexible article having a non-conductive core, a layer of granular electrically conductive material exterior to said core, a film of grease exterior to said coating of granular electrically conductive material and a layer of electrolytically deposited metal exterior to said grease.

4. An aeroplane propeller having a non-conductive core, a layer of granular electrically conductive material exterior to said core, a film of grease exterior to said coating of granular electrically conductive material and a layer of electrolytically deposited metal exterior to said grease.

5. An article having a core of non-conductive material, a coating of granular electrically conductive material exterior to said core, a coating of electrolytically deposited metal exterior to said granular coating, a film of grease exterior to said electrolytically deposited metal, and a second coating of electrolytically deposited metal exterior to said grease.

6. A flexible article having a core of non-conductive material, a coating of granular electrically conductive material exterior to said core, a coating of electrolytically deposited metal exterior to said granular coating, a film of grease exterior to said electrolytically deposited metal, and a second coating of electrolytically deposited metal exterior to said grease.

7. An aeroplane propeller having a core of non-conductive material, a coating of granular electrically conductive material exterior to said core, a coating of electrolytically deposited metal exterior to said granular coating, a film of grease exterior to said electrolytically deposited metal, and a second coating of electrolytically deposited metal exterior to said grease.

8. An aeroplane propeller coated with a plurality of layers of electrolytically deposited metal, with grease interposed between said layers.

9. An aeroplane propeller coated with a plurality of layers of electrolytically deposited metal with non-conductive material interposed between said layers.

10. An aeroplane propeller coated with a plurality of layers of electrolytically deposited metal with a lubricating material interposed between said layers.

11. An article electrolytically coated with a plurality of electrolytically deposited metallic laminæ, said laminæ being separated by a substance having relatively slight adhesive or cohesive properties.

12. A flexible article electrolytically coated with a plurality of electrolytically deposited metallic laminæ, said laminæ being separated by a substance having relatively slight adhesive or cohesive properties.

13. A flexible electrolytically non-conductive article coated with a plurality of electrolytically deposited metallic laminæ, said laminæ being separated by a substance having relatively slight adhesive or cohesive properties.

14. An aeroplane propeller electrolytically coated with a plurality of electrolytically deposited metallic laminæ, said laminæ being separated by a substance having relatively slight adhesive or cohesive properties.

15. An article covered with a granular electrically conductive surfacing material, having a layer of metal electrolytically deposited exterior to said granular surfacing material, said layer of metal having an exterior application of a foreign substance and a second coating of electrolytically deposited metal exterior to said foreign substance.

16. An aeroplane propeller coated with a plurality of layers of electrolytically deposited metal with a foreign substance interposed between said layers.

17. An article coated with a plurality of layers of electrolytically deposited metal with a foreign substance interposed between said layers.

18. An article having a shell composed of a plurality of layers of electrolytically deposited metal with a foreign substance interposed between said layers.

In testimony whereof, I have signed my name to this specification.

MATTHEW M. MERRITT.