

## UNITED STATES PATENT OFFICE

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MANUFACTURE OF METAL ARTICLES BY  
ELECTRODEPOSITION

William Soby, Hayes End, England, assignor to  
Electric & Musical Industries Limited, Hayes,  
England, a British company

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5 Claims. (Cl. 204—5)

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This invention relates to the manufacture of metal articles by a method of the kind involving electro-deposition of metal on to an electrode and subsequent separation of the deposited metal from said electrode. An example of the use of this method is the manufacture of matrices employed for pressing phonograph records. In the manufacture of such matrices metal is electro-deposited to a suitable thickness on to a master matrix forming said electrode and this deposited metal, which forms the pressing matrix, is then separated from the master matrix.

Various proposals have been made for facilitating the separation of the deposited metal from the electrode, but such proposals do not provide reliable and consistent results.

An object of the invention is to provide an improved method of the kind referred to such that the separation of the deposited metal from said electrode can be effected more easily than hitherto.

A further object of the invention is to provide an improved method of making a pressing matrix for use in making phonograph records.

A further object is to provide an improved method of making a phonograph record.

According to the invention there is provided a method of manufacturing a metal article, said method including the steps of coating an electrode for a period of at least five seconds with an aqueous solution of albumen in proportions equivalent to at least 0.5 grammes per litre, said solution including borax and an alkylated aromatic sulphonate, rinsing said electrode with water to remove said solution and to leave an adsorbed film of albumen on said electrode, electro-depositing metal through said film on to said electrode to form said article, and then separating said article from said electrode.

In applying the invention to the manufacture of a phonograph record pressing matrix in accordance with the invention, the master matrix is thoroughly cleaned, and is then immersed in a freshly prepared medium comprising a hydrophilic colloid which is not an electrolyte, a stabilising agent, for example borax or sodium citrate, and a wetting agent. A suitable medium consists for example of 2 gm. of egg albumen, 2 gm. of borax which serves as a stabilising agent, 1 gm. of the wetting agent known as "Permal W" (an alkylated aromatic sulphonate), and 1 litre of water. After immersion in said medium the master matrix is rinsed in running water leaving an adsorbed film of said colloid on the surface thereof, and metal is then electro-de-

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posited on to it. Said metal may be nickel, silver gold or copper where the master matrix is made from nickel. If the master matrix is made from copper, the deposited metal may be nickel or copper. When the desired thickness of metal has been deposited, the periphery of the master matrix and deposit is trimmed by turning, and the master matrix is separated from the pressing matrix constituted by the deposited metal. For this purpose a knife is inserted between the two matrices at the edges thereof to loosen them, whereupon the matrices can be easily separated by hand. By virtue of the ease of separation of the pressing matrix and master matrix, the pressing matrix is less liable to become damaged during the separating step, and phonograph records made from the pressing matrix are less liable to inaccuracies.

The method described can be employed where the master matrix comprises two different metals, for example a nickel matrix which is of smaller diameter than required, due for example to repeated trimming of the edge as above mentioned and around which a copper ring has been soldered to provide a master matrix of the required diameter.

It is found that temperature variations between 10 and 30° C. of the medium in which the master matrix is immersed have no effect on the efficiency of the medium. The quantities of the substances used in said medium may vary from those given in the above example. The minimum concentration of albumen which can be employed with satisfactory results is 0.5 gm. per litre. The time of immersion of the master matrix should be at least 5 seconds.

If desired the film may be applied by electrophoresis instead of by the method described above.

What I claim is:

1. A method of manufacturing a metal article, said method including the steps of coating an electrode for a period of at least 5 seconds with an aqueous solution of albumen in proportions equivalent to at least 0.5 gramme per litre, said solution including, borax and an alkylated aromatic sulphonate, rinsing said electrode with water to remove said solution and to leave an adsorbed film of albumen on said electrode, electro-depositing metal through said film on to said electrode to form said article, and then separating said article from said electrode.

2. A method of making a metal article, said method including the steps of coating an electrode for a period of at least 5 seconds with an

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aqueous solution of egg albumen, borax and an alkylated aromatic sulphonate in proportions equivalent to two grammes of egg albumen, two grammes of borax and one gramme of alkylated aromatic sulphonate in one litre of water, rinsing said electrode to remove said solution and to leave an adsorbed film of egg albumen on said electrode, electrodepositing metal through said film on to said electrode to form said article, and then separating said article from said electrode.

3. A method of making a pressing matrix for phonograph records, said method including the steps of coating a master matrix for a period of at least 5 seconds with an aqueous solution of albumen in proportions equivalent to at least 0.5 gramme per litre, said solution including borax and an alkylated aromatic sulphonate, rinsing said electrode with water to remove said solution and to leave an adsorbed film of albumen on said master matrix, electrodepositing metal through said film on to said master matrix to form said pressing matrix, and then separating said pressing matrix from said master matrix.

4. A method of making a pressing matrix for phonograph records, said method including the steps of coating a master matrix for a period of at least 5 seconds with an aqueous solution of egg albumen, borax and an alkylated aromatic sulphonate, in proportions equivalent to two grammes of egg albumen, two grammes of borax and one gramme of alkylated aromatic sulphonate in one litre of water, rinsing said electrode to remove said solution and to leave an adsorbed film of egg albumen on said master matrix, electrodepositing metal through said film on to said master matrix to form said pressing matrix, and then separating said pressing matrix from said master matrix.

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5. In a method of making a phonograph record, the steps of coating a master matrix for a period of at least 5 seconds with an aqueous solution of egg albumen, borax and an alkylated aromatic sulphonate in proportions equivalent to two grammes of egg albumen, two grammes of borax and one gramme of alkylated aromatic sulphonate in one litre of water, rinsing said master matrix to remove said solution and to leave an adsorbed film of egg albumen on said master matrix, electrodepositing metal through said film on to said master matrix to form a pressing matrix, and then separating said pressing matrix from said master matrix.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

| Number    | Name           | Date          |
|-----------|----------------|---------------|
| 454,381   | Reinfeld       | June 16, 1891 |
| 528,042   | Stouls         | Oct. 23, 1894 |
| 560,533   | Perreur-Lloyd  | May 19, 1896  |
| 880,484   | Edison         | Feb. 25, 1908 |
| 1,249,414 | Kaiser         | Dec. 11, 1917 |
| 1,807,875 | Robinson       | June 2, 1931  |
| 1,846,697 | Stout          | Feb. 23, 1932 |
| 1,925,339 | Ralston        | Sept. 5, 1933 |
| 2,285,762 | Tuwiner et al. | June 9, 1942  |

##### FOREIGN PATENTS

| Number | Country | Date          |
|--------|---------|---------------|
| 63,838 | Germany | Aug. 23, 1892 |

##### OTHER REFERENCES

- Metal Industry, November 22, 1935, pages 519-521; August 14, 1936, pages 165-168; September 4, 1936, pages 239-242.  
Ind. and Eng. Chemistry, vol. 33, No. 1, January 1941, pages 16-22.