

UNITED STATES PATENT OFFICE.

LEO DAFT, OF RUTHERFORD, NEW JERSEY, ASSIGNOR TO ELECTRO-CHEMICAL RUBBER & MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

METHOD OF ATTACHING RUBBER TO METALS.

1,057,333.

Specification of Letters Patent.

Patented Mar. 25, 1913.

No Drawing.

Application filed February 17, 1912. Serial No. 678,362.

To all whom it may concern:

Be it known that I, LEO DAFT, a subject of the King of Great Britain, and a resident of Rutherford, in the county of Bergen, State of New Jersey, have invented a new and Improved Method of Attaching Rubber to Metals, of which the following is a specification.

In my pending application, Serial No. 678,361, filed concurrently with this, I have set forth a method of causing rubber to adhere to metals, provided said rubber contains an excess of sulfur over that required to produce vulcanization. I have, however, described in said application a method of producing an electrolyte for electroplating a surface upon the article to which the rubber is to be attached in the event that said article does not contain the proper constituents necessary to effect the chemical union between the rubber and the metal.

It is to this method of electroplating a surface with an alloy containing arsenic when combined with the method referred to that this application is more particularly directed.

Inasmuch as the alloy which is to be plated upon the article to which the rubber is to be attached should contain its metal constituents in certain definite proportions, (which, however, may be varied according to the composition of the rubber compound) and inasmuch as it is highly desirable to obtain a deposit containing these metals in these proportions with certainty, it is very important to so proceed in the making of the electrolyte that none of its constituent elements shall be precipitated out of solution, except to the extent of the excess over the particular quantity desired. To obtain these results I prefer to proceed as follows in the making of the electrolyte: I first thoroughly fuse together copper and zinc in the proportions of 65 parts of copper and 35 parts of zinc. This alloy I then dissolve in a strong oxidizing agent, preferably hot nitric acid (specific gravity 42 Baumé). I then neutralize the solution with ammonia or other alkali, and add thereto a sufficient quantity of finely pulverized arsenic tri-oxid, say about one per cent. This produces a dark blue, turbid liquid, which I clear by adding potassium cyanid, the result being a clear light yellow liquid. This liquid is diluted to form an electrolyte, in the pro-

portion of 40 parts of the liquid to 60 parts of water, which produces the electrolyte at a specific gravity of about 1.040. The article to be plated is then immersed in the electrolyte and is plated in any ordinary manner. I prefer to use a current of about .6 of an ampere for each square decimetre of surface to be covered, at a voltage of from 3½ to 6 volts. These values, however, are not absolute and may be varied within certain limits, as will be obvious to any one skilled in the art. The anode I prefer to use with this electrolyte is an alloy of copper, zinc and arsenic in the following proportions: Copper 64 parts, zinc 35 parts, arsenic 1 part. This alloy I prefer to make by first thoroughly fusing together the copper and zinc in the proper proportions, and then adding the arsenic thereto in a pulverized form, and thoroughly puddling the whole before pouring. The article thus coated is then cleaned to remove all foreign substances. The rubber is then applied to it under pressure and is heated to a vulcanizing temperature, say about 286 degrees it under pressure and is heated to a vulcanizer, and find that heating for about 40 minutes at a pressure of 40 pounds above atmosphere, is usually sufficient to produce vulcanization of the rubber, and to cause adhesion of the metal thereto.

While I have set forth above a method of practising my invention which gives good results in practice, I do not intend to confine myself to this particular method or to the particular ingredients and proportions I have set forth, as there are other equivalent methods of practising my invention, and doubtless still other equivalent methods to be discovered by those skilled in the art.

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

1. The method of attaching rubber to metals which consists in electroplating the article to which it is desired to attach the rubber in an electrolyte made from a plurality of metals one of which is arsenic, obtaining a deposit containing arsenic and attaching the rubber to the surface thus formed, by vulcanization.

2. The method of attaching rubber to metals which consists in electroplating the article to which it is desired to attach the rubber in an electrolyte made from a plurality of metals two of which are arsenic

and copper, obtaining a deposit containing arsenic and copper, and attaching the rubber to the surface thus formed, by vulcanization.

- 5 3. The method of attaching rubber to metals which consists in electroplating the article to which it is desired to attach the rubber in an electrolyte made from a plurality of metals, three of which are arsenic,
10 copper and zinc, obtaining a deposit con-

taining arsenic, copper and zinc and attaching the rubber to the surface thus formed, by vulcanization.

In witness whereof I have hereunto signed my name in the presence of two witnesses. 15

LEO DAFT.

Witnesses:

WALTER S. JONES,
MARGARET MACINTYRE.

Correction in Letters Patent No. 1,057,333.

It is hereby certified that in Letters Patent No. 1,057,333, granted March 25, 1913, upon the application of Leo Daft, of Rutherford, New Jersey, for an improvement in "Methods of Attaching Rubber to Metals," an error appears in the printed specification requiring correction as follows: Page 1, strike out line 81 and insert the words and syllable *Fahrenheit*. *I prefer to use a steam vul-*; and that the said Letters Patents should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of April, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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