# UNITED STATES PATENT OFFICE.

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## METHOD OF COATING METALS WITH MERCURY.

1,324,835. Specification of Letters Patent. Patented Dec. 16, 1919.

No Drawing. Application filed April 12, 1915. Serial No. 20,751.

*To all whom it may concern:*

Be it known that I, JAMES P. A. McCOY, a subject of the King of Great Britain, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of Coating Metals with Mercury, of which the following is a specification.

My invention relates to methods of coating metals wth mercury, and it has for its object to provide a method of causing mercury to adhere to other metals with which it ordinarily has no affinity.

Certain metals, such as iron and steel, have little or no surface attraction for mercury and, consequently, it is difficult to "wet" the surfaces of such metals with mercury except by plating methods. It is, however, sometimes very desirable to produce such an intimate contact between mercury and iron or steel, and my invention is directed to methods for effecting this result.

According to my present invention, I apply the mercury to the surface to be coated in the form of an amalgam of tin or other metal with which mercury easily amalgamates. In one modification of my method, I use sufficient mercury to give the amalgam a semi-liquid consistency, and this semi-liquid amalgam is then rubbed over the surface of the metal to be coated, to which it readily adheres, the mercury in its amalgamated condition not being able to form itself into globules and run off from the surface of the metal, as is the case when mercury alone is applied to iron or steel. The iron, steel or other metal to be coated should preferably be slightly heated before the application of the amalgam.

A suitable acid, such as hot, concentrated hydrochloric acid is next poured over the coated metal to perform the double function of cleaning the metal and of setting up a galvanic action which results in the deposition of the mercury upon the clean surface of the metal. The hydrochloric acid also dissolves a portion of the tin. The excess of tin and mercury is then wiped off, and the surface of the iron or other metal is found to be thoroughly coated with mercury. This coating contains only a trace of the tin, and the mercury coating appears not to be amalgamated with the metal but only to wet it. The mercury coating will, however, readily pick up fresh supplies of mercury.

In carrying out another modification of my method, I rub mercury upon the surface of a piece of tin, thereby forming a surface amalgam upon the tin. I then heat slightly the coated tin and also the iron or other metal to be coated and place the amalgamated surface of the tin, wet with a little concentrated hydrochloric acid in contact with the iron. The coated side of the tin is then rubbed upon the iron, conveniently with cotton waste, and the surface of the iron becomes coated with mercury, presumably through galvanic deposition. The tin is then removed, and all acid removed by washing, leaving a coating of almost pure mercury adhering to the iron.

The foregoing process is particularly useful in the preparation of mercury seals for use in vapor electric apparatus such as mercury-vapor rectifiers, in which it is necessary to wet with mercury either an iron or steel container or a porcelain container, the surface of which is coated with a film of silver or other metal. When porcelain is coated with silver, as is customary in constructing certain types of mercury-vapor apparatus, it is found that the silver coating cannot be amalgamated with mercury by ordinary means. By my method, however, mercury coatings may readily be applied to metal-coated porcelain.

My invention may be applied to many uses other than those specifically set forth and any metal may be used for making the preliminary amalgam which will unite with mercury to form plastic amalgams. It is to be understood that my invention comprehends all such modifications and adaptations as fall within the scope of the appended claims.

I claim as my invention:

1. A process of coating metallic and metal-coated surfaces with mercury that comprises coating with mercury the surface of a piece of a metal that readily amalgamates with mercury and transferring the mercury from the said metal to the surface to be coated.

2. A process of coating metallic and

metal-coated surfaces with mercury that comprises coating the surface of a piece of tin with mercury and transferring the mercury from the tin to the surface to be coated by placing the coated surface of the tin, wet with hydrochloric acid, upon the surface to be coated, rubbing together the tin and the surface to be coated, and removing the tin and the acid.

In testimony whereof I have hereunto subscribed my name this 30th day of March 1915.

JAMES P. A. McCOY.