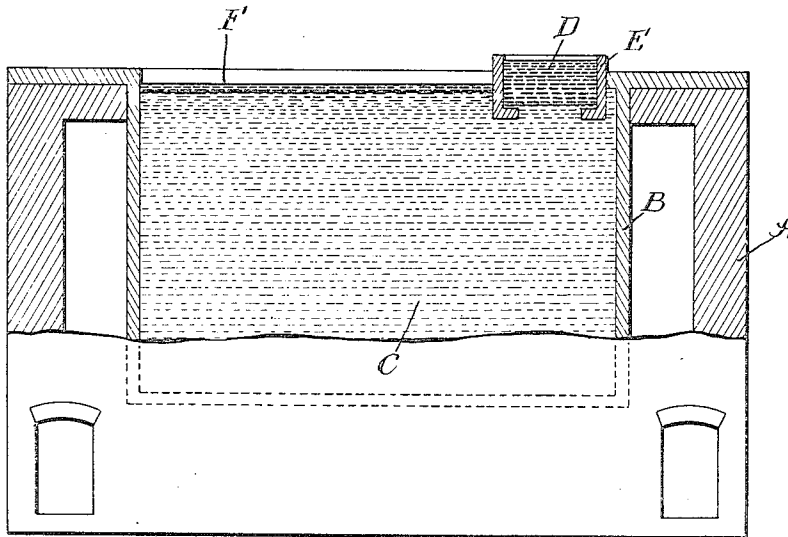


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METHOD OF COATING METAL ARTICLES.
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1,276,977.

Patented Aug. 27, 1918.



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METHOD OF COATING METAL ARTICLES.

1,276,977.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROBERT J. SHOEMAKER, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Methods of Coating Metal Articles, of which the following is a specification.

My invention relates to the art of coating or plating metal articles with a metal of a different kind, and the object of the invention is to provide certain improvements in this art whereby the operation in question is performed more economically, conveniently and efficiently than has been possible heretofore.

A more specific object of the invention is to improve upon the method of lead-plating metal articles disclosed in the patent to McClintock and Shoemaker, No. 1,195,376, patented August 22, 1916, although the improvements of my present invention are not necessarily limited to the lead-plating process described and claimed in the patent referred to. It will be convenient, nevertheless, to describe the present invention as a development of or improvement upon the patented process.

In employing the process described in the above mentioned patent in the lead-plating of boiler flues and other articles, I have made the discovery that if, instead of using zinc chlorid alone as a flux, a certain amount of common salt (sodium chlorid) is mixed with the zinc chlorid, a flux is obtained which has a melting point approximately fifty to seventy degrees Fahrenheit lower than a flux composed of pure zinc chlorid. The fact that these two salts, when mixed and subjected to heat, have a lower melting point than either of them alone (the melting point of zinc chlorid is about 540° Fahrenheit and the melting point of common salt about 1500° Fahrenheit) is of considerable importance in the matter of the choice of a flux for the treatment of the metal article preliminary to submerging in the bath of plating metal, in a process, such as that disclosed in the patent, where the flux floats on the bath of plating metal. At the ordinary working temperatures the flux composed of zinc chlorid and sodium chlorid, due probably to its lower melting point, is thinner and more oily in its character than a flux composed of zinc chlorid alone. Melting at a lower temperature, the flux can be

more easily kept from scaling and hardening. As a result, the plating metal adheres more firmly to the article being plated and the coating is more certain to be free from imperfections and porosity.

The accompanying drawing shows diagrammatically a preferred form of apparatus for practising my improved process. A is a furnace of any suitable description having a retort B which contains a body of plating metal C. Supernatant on the plating metal is a body of flux D composed of zinc chlorid and common salt. Preferably I use eighty per cent. of zinc chlorid, by weight, and twenty per cent. of common salt.

In describing the flux as composed of zinc chlorid and sodium chlorid I do not mean to imply that the ingredients of the flux remain chemically unchanged when the point of fusion is reached. At this temperature there may be some dissociation and possibly a combination of the chemical elements of the two salts. As to this I express no opinion. The important fact, so far as my present invention is concerned, is that the melting point of the two salts, when mixed together, is considerably lower than the melting point of either of them separately. The body of flux is retained to any suitable depth on the bath of plating metal C by means of a suitable frame E.

The metal article to be plated is first preferably pickled in muriatic acid, particularly if the article be composed of steel or iron, to remove oxids from its surface, and is then immersed in the body of flux D. It is then lowered into the body of coating metal C. I have found by experiment that with lead as a coating metal the best results are obtained when the temperature of the bath is maintained at about 700° Fahrenheit.

Some difficulty was experienced in the lead-plating operation above described due to the formation of lead oxids on the surface of the bath not covered by flux D. The bath had to be continually skimmed and the loss of the plating metal on this account was considerable. If the oxids are not removed they are likely to adhere to the plated article to the detriment of the coating thereon. This difficulty has been overcome by covering the portion of the surface of the bath outside of the frame E with a thin film F of the flux. This flux, when made of a mixture of zinc chlorid and sodium chlorid, is so thin and oily that when the plating

bath is covered with a stratum of the flux of a thickness of half an inch, for example, it will not adhere to the plated article when the latter is withdrawn from the bath. This
5 thin film of the flux protects the plating metal from contact with the air and prevents the oxidation thereof.

I claim:

10 1. Improvement in the method of plating metal articles which consists in immersing the article in a flux composed of zinc chlorid and common salt in a molten state and thereafter in a bath of molten plating metal.

15 2. Improvement in the method of plating metal articles which consists in immersing the article in a flux composed of substantially eighty per cent., by weight, of zinc chlorid and twenty per cent. of common salt in a molten state, and thereafter immersing
20 the article in a bath of molten plating metal.

3. Improvement in the method of plating metal articles which consists in introducing the article into a bath of molten plating metal through a supernatant body of flux
25 containing zinc chlorid and common salt in a molten state.

4. Improvement in the method of lead-plating metal articles which consists in immersing the article in a flux composed of
30 zinc chlorid and common salt in a molten state and thereafter introducing the same into a bath of molten lead.

5. Improvement in the method of lead-

plating metal articles which consists in introducing the article into a bath of molten
35 lead through a supernatant body of flux containing zinc chlorid and common salt in a molten state.

6. Improvement in the method of lead-plating metal articles which consists in introducing the article into a bath of molten
40 lead through a supernatant body of flux composed of substantially eighty per cent., by weight, of zinc chlorid and twenty per cent. of common salt in a molten state. 45

7. Improvement in the method of plating metal articles which consists in introducing the article into a bath of molten plating metal through a supernatant body of flux containing zinc chlorid and common salt in
50 molten state, said body of flux covering only a portion of the surface of the plating metal and covering the remaining surface of the plating metal with a relatively thin film of the flux. 55

8. Improvement in the method of lead-plating metal articles which consists in introducing the article into a bath of molten lead through a supernatant body of flux containing zinc chlorid and common salt which
60 covers only a portion of the surface of the body of lead, and covering the remaining surface of the body of lead with a relatively thin film of the flux.

ROBERT JAY SHOEMAKER.