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METHOD OF GALVANIZING

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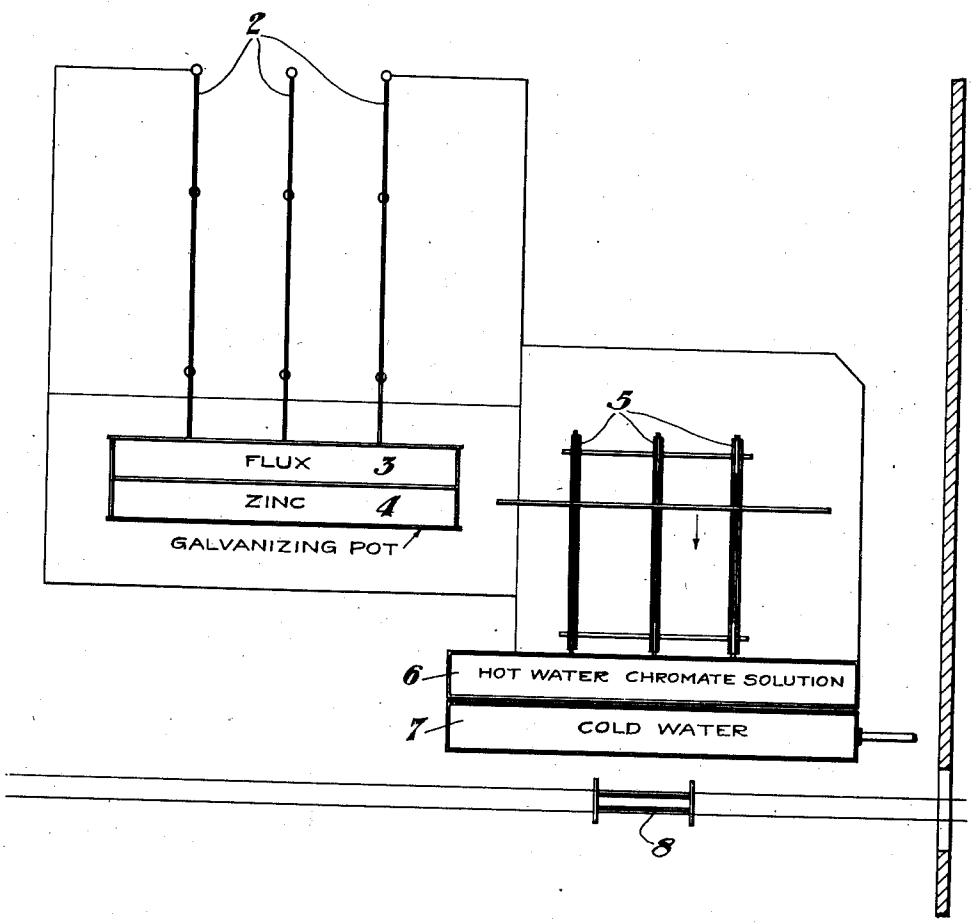

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UNITED STATES PATENT OFFICE

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METHOD OF GALVANIZING

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This invention relates to a method of producing a corrosion and chemically resistant surface on metal articles having a coating of unlike metal applied in the molten state, such as galvanized or tinned articles and the like, and has for its object the provision of such a method that can be carried out in combination with the commercial coating methods now in use.

While this invention may be carried out in connection with various metal coatings as applied in the molten state to sheets, pipes, shapes or, in fact, any article usually coated with molten metal, it will be particularly described as used in connection with hot galvanized pipe.

Galvanized pipe, when exposed to the air and particularly when exposed while moist, becomes coated with a white film of corrosion which is objectionable both from the standpoints of appearance and durability.

The present method contemplates the provision of a passive or resistant surface on the galvanized pipe or other articles by immersing the hot galvanized pipe, immediately after it is drawn from the zinc bath, in a hot water solution of a chromate salt.

The drawing shows a diagrammatic plan of a standard hot galvanizing plant for pipes.

The pipes to be galvanized are first pickled to remove the scale and clean their surfaces in the usual manner. The cleaned or pickled pipes are then deposited on the skids 2 and allowed to roll, or travel by gravity, down and into the flux tank 3 where they are coated with a suitable flux. The flux coated pipes are then withdrawn from the flux tank 3 and dipped into the zinc bath in the tank 4 where they are allowed to remain until a suitable coating or galvanize is formed. The pipes are drawn slowly from the tank 4 with a coating of molten zinc thereon and are then deposited on the conveyer 5 which delivers them quickly into a tank of hot water in the tank 6, which is maintained at approximately 185 degrees Fahrenheit. After the pipes are partially cooled in the hot water of tank 6, they are withdrawn from the tank 6 and deposited in a bath of cold water in the tank 7 where they are completely cooled. The finished and cooled pipes are removed from the tank 7 and deposited on a suitable truck 8 to be conveyed to stock or other departments of the mill.

In carrying out the present method, the only change necessary in the above standard galvanizing method is to maintain a concentration of approximately 0.05 per cent. of a chromate salt in the hot water tank 6.

Many variations in the above method may, of course, be carried out, that is, the novel feature of dipping the hot coated article into a chromate solution may be used with various coating methods as used for coating different articles such as sheets, large objects, shapes, etc.

While we have described the dipping or immersing of the coated articles in the chromate solution while the coating metal is still molten, it will be understood that this is not absolutely essential, since quenching the hot article while it is at a temperature above 212 degrees Fahrenheit will result in the formation of the novel resistant surface at least to a degree.

The concentration of the chromate solution at approximately 0.05 per cent. is important when forming a resistant surface on pipe, although the method is not limited to the use of a 0.05 per cent. solution since the resistant surface may be formed, at least to a degree on pipe and other articles, by the use of solutions varying in concentration over a wide range.

It has been found, however, that with galvanized pipe, when less than 0.04 per cent. concentration of chromate is used, the surface is not so effective, and that when more than 0.05 per cent. concentration of chromate is used, there is danger of yellow stains forming on the pipe.

The chromate salt used with the best results in practice is sodium dichromate ($Na_2Cr_2O_7 2H_2O$), but any soluble chromate or dichromate may be used, since they will all give the chromate ion CrO_4 in solution which is the necessary condition.

The method is not particularly limited to the use of a chromate salt solution since other oxidizing salts besides the chromates, including perchlorates and permanganates, phos-

phates and silicates, (the last two named salts are not generally thought of as oxidizing salts but are really in effect oxidizing salts) may be used to some effect.

The above salt solutions all are of a pacifying nature and produce a passive surface on the coated article heretofore thought impossible with coated articles.

While we have described my novel method somewhat in detail, it will be understood that we do not wish to be limited thereto since various modifications may be practiced without departing from the scope of my invention as defined in the appended claims.

We claim—

1. The method of producing a corrosion and chemically resistant surface on galvanized ferrous metal which consists in coating said ferrous metal with molten zinc, and then cooling the zinc coated metal while still hot by immersing said metal in a solution of a chromate salt.

2. The method of producing a corrosion and chemically resistant surface on a zinc coated metal article which consists in immersing said article in molten zinc and then cooling the zinc coated article while still above 212 degrees Fahrenheit in a hot solution of a chromate salt of approximately 185 degrees Fahrenheit and having a concentration of at least 0.05 per cent. chromate salt.

3. The method of producing a corrosion and chemically resistant surface on a zinc coated ferrous metal article, which consists in immersing said article in molten zinc and then immediately cooling said article while still hot from the immersion in the molten zinc by immersing said article in a hot solution of a chromate salt having a concentration of at least 0.05 per cent. of chromate salt.

4. The method of producing a corrosion and chemically resistant surface on a zinc coated ferrous metal article, which consists in immersing said article in molten zinc and then immediately cooling said article while the coating is still molten in a hot solution of a chromate salt of approximately 185 degrees Fahrenheit and having a concentration of approximately 0.05 per cent. chromate salt.

In testimony whereof, we have hereunto set our hands.

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