July 12, 1960

C. R. LYNCH

2,944,925

METHOD OF COATING HOT-DIP GALVANIZED PIPE

Filed May 1, 1957

INVENTOR
CARL R. LYNCH

By: Donald M. Dalton
his Attorney.
METHOD OF COATING HOT-DIP GALVANIZED PIPE

Carl R. Lynch, Lorain, Ohio, assignor to United States Steel Corporation, a corporation of New Jersey

Filed May 1, 1957, Ser. No. 656,271

2 Claims. (Cl. 148—18)

This invention relates to the manufacture of galvanized steel pipe and, in particular, to the treatment of pipe lengths as they emerge from the spelter bath in which they are immersed for coating.

In coating steel pipe lengths with zinc by the hot-dip method, the lengths are usually tilted at an acute to the horizontal and withdrawn from the bath by longitudinal movement along an upwardly inclined plane. Ash floating on the bath enters the leading ends of the lengths and adheres to the interior thereof. Such non-metallic material adhering loosely to the pipe wall is objectionable for obvious reasons. While steam jets have been used in an attempt to blow out such material before the coating metal freezes, it has been found that they remove too much of the zinc coating as well.

I have discovered a method which easily and effectively clears out ash adhering to the interior of pipe lengths as they emerge from the coating bath. In a preferred practice, I let the trailing ends of the lengths leaving the bath on an upward incline, fall into a quenching bath while the leading ends are supported above the level of the bath, and while the lengths are still hot, i.e., at a temperature of about 600 or 650°F. As a result, quenching liquid rising through the length from the trailing end toward the leading end is vaporized to some extent and the vapor thus generated produces a blast through the leading end which removes all foreign deposits adhering to the interior of the pipe without reducing the amount of zinc coating thereon.

Apparatus for performing my method includes extension means on a conveyor discharging pipe lengths sidewise into a quenching tank, which means serve to hold the leading ends of the lengths above the level of liquid in the tank until after the trailing ends have fallen thereinto. Preferably the extension means comprises short supplemental helically grooved roller coaxial with the uppermost roller of a discharge conveyor including several such rollers spaced along an upwardly inclined plane leading from the coating bath.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings:

Figure 1 is a plan view of the apparatus; and
Figure 2 is a section through the quench tank, taken along the plane of line II—II of Figure 1, showing the discharge conveyor in elevation.

Reverting now in detail to the drawings, a galvanizing kettle indicated diagrammatically at 10 is provided with means (not shown) for removing pipe lengths 11 therefrom by lifting one end and moving the length longitudinally along an upwardly inclined plane. Such removal means starts the lengths into a discharge conveyor 12. This conveyor comprises a plurality of helically grooved rollers 13 journalled in a structural frame 14 and driven in any convenient manner. Rollers 13 move the lengths longitudinally and sidewise in close-order succession and eventually discharge them sidewise into a quench tank 15 containing water or a solution for applying a chemical protective coating to the length.

2 The uppermost roller designated 13a has a short extension 16 at the discharge end thereof projecting over the edge of tank 15 beyond the ends of the other rollers. Thus, when the lower end of a pipe length is discharged into tank 15 by rollers 13, the upper end of the length will still be supported by extension 16. As the lower end of the length falls into the tank as shown in Figure 2, it slides down a guide plate 17 into the bath. The liquid thereon, preferably a dilute water solution of sodium dichromate, rises through the interior of the length and some of it is vaporized into steam since the pipe lengths are still at a temperature of 600 or 650°F. From their immersion in molten spelter in tank 10. The quenching liquid is preferably maintained by any suitable means at a temperature between 150 and 200°F.

While the leading end of the lengths remains supported above the level of the quenching liquid, the rise of the latter through the length and the steam generated as a result, produce a blast or jet through the upper end of the length to the extent of a minor explosion. This affords a wiping action on the interior of the pipe wall sufficient to remove any loosely adherent foreign material without reducing the amount of zinc coating remaining thereon. The upper end of the length is then discharged from the end of extension 16 and falls into tank 15 for complete immersion in the bath therein. After quenching the pipe lengths are removed from tank 15 in any convenient way.

A vapor shield 18 at the upper end of conveyor 12 partially confines the steam blasts from the ends of the pipe lengths and a bottom plate 19 therein serves to collect particles blown from the interior of the lengths. Vapor condensing on the shield runs down onto plate 19 and back into tank 15.

It will be evident from the foregoing that my invention provides a simple yet effective method of removing from the interior of pipe lengths, deposits of ash picked up thereby on emerging from the spelter bath used for hot-dip coating. The apparatus used is also simple and automatic, requiring only casual supervision.

Although I have disclosed herein the preferred practice and embodiment of my invention, it is to be understood that any change or modification therein may be made without departing from the spirit and scope of the invention.

I claim:

1. A method of coating pipe lengths which consists in immersing them in a galvanizing bath, withdrawing each length axially from the galvanizing bath upwardly along a plane inclined at a small angle to the horizontal and moving it sidewise toward a tank which contains a quenching bath, dropping one end of each length into said quenching bath while continuing to support the other end of each length above the level of said quenching bath for a predetermined time, thereby permitting blow-through of vapor from the quenching bath generated by the heat of the pipe and removing from the interior of the pipe foreign matter picked up from the galvanizing bath, and subsequently dropping said other end of each length into the quenching bath for complete immersion.

2. A method as defined in claim 1 in which the trailing end of each length is first dropped into said quenching bath while the leading end is supported above the quenching bath.

References Cited in the file of this patent

UNITED STATES PATENTS

737,361 Daniels Aug. 25, 1903
1,086,621 Rogers Feb. 10, 1914
1,919,136 Smith July 18, 1933
2,240,019 Quarnstrom et al. Apr. 29, 1941
2,547,053 Somes et al. Apr. 3, 1951