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METHOD OF CLEANING GALVANIZING POTS

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INVENTOR

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This invention relates to a method of removing the segregated impurities from the useful metal in galvanizing pots, and consists in a series of steps whereby the impurities are removed from the galvanizing pot, separated from the galvanizing metal, and ultimately reduced to pig form.

In the operation of galvanizing pots or tanks, it is necessary, from time to time, to remove the impurities (dross) which are present in the galvanizing alloy. These impurities, one of which is lead, are heavier than the alloy, and they segregate in a layer at the bottom of the pot.

Included with the dross there is to be found an appreciable amount of the useful alloy, and before discarding the impurities, it is desirable to remove therefrom the useful metal.

The object of my invention is to remove the dross, by mechanical means, from a galvanizing tank, and to submit it to pressure to remove therefrom the useful galvanizing metal, prior to molding and cooling it in pig form.

In the accompanying drawings I have illustrated an organization of mechanical elements which may serve conveniently to conduct the method of my invention. Figure 1 is a plan view of such mechanical elements, showing them associated with a galvanizing tank; Figure 2 is a fragmentary sectional view taken on the plane 2—2 of Figure 1, showing in side elevation a portion of the apparatus in a position of operation within the tank; and Figure 3 is a view in side elevation, illustrating diagrammatically means to press the dross, and to form it into pigs.

Referring to the drawings the reference numeral 1 indicates a galvanizing tank containing the bath of molten galvanizing metal 2. Settled below the metal 2 in said tank lies a stratum of dross or impurities 3, which impurities are to be removed and dispersed with. By suitable means, such as an overhead crane, instrumentalities are positioned on the tank to conduct my process of removing the stratum of dross 3.

The instrumentalities shown in the drawings are simply indicative of one of several mechanical arrangements which may be evolved to serve in my method. They comprise a base-frame formed of the four angle-beams 4, and across two of these beams there extends a carriage 5, which is movable over the tank on the wheels 6—the wheels being trunnioned in the carriage to ride on the vertical flanges 7 of the beams.

The carriage 5 includes the angle members 7, and on these members there is borne the platform 8, which is adapted to move (its supporting wheels 9 rolling on the members 7) transversely of the tank. Operatively supported by the platform and arranged to extend downwardly through the metal 2 into the dross 3 is the endless bucket-chain 10. A motor 11 may be suitably connected to drive the bucket-chain in the direction indicated by the arrows in Figure 2.

The buckets of the chain move downwardly through the molten alloy 2 and, as they turn at the bottom of the tank to go upwardly, they fill with molten dross. The dross, being heavier than the metal 2 and being of spongy plastic characteristics, remains in the buckets during their upward movement through the metal. Because of these characteristics, the dross does not flow quickly toward the spot at which the chain-buckets are removing it, and for this reason it is expedient to move the bucket-chain over the entire bottom-surface of the tank to scavenge thoroughly the dross therefrom.

To effect such movement of the bucket-chain it is necessary that the supporting platform be adjustable both transversely and longitudinally of the tank. To accommodate the structure to such adjustability, two threaded rods 12 and 13 are fixed to the members 7, as shown, and the worm gears 14 fit with threaded engagement these rods.

Worm pinions 15 mesh with these worm gears, and connections may be completed to the motor 11 to rotate the said pinions and gears. Linear movement between the platform and gears 14 is prevented, and it is obvious that rotation of the worm-gears on the rods 12 and 13 will promote movement of the platform and bucket-chain transversely of the tank. Two threaded shafts 16 and 17
are intergeared, and are arranged to be rotated by connections to a motor 18. As shown in Figure 3, a nut-engagement may be had with the latter shafts by members, such as 19, which are fixed to the carriage 5. Rotation of the shafts effects longitudinal movement of the bucket-chain, platform, and carriage.

It will be noted in Figure 2 that the buckets deposit the dross in a ladle 20. As shown in Figures 1 and 3, there is pivotally mounted on the standard 21 a perforated container 22. Into this container the dross collected in the ladle 20 is deposited, and by means of a steam or air cylinder 23, a plunger 24 is caused to compress the dross. This action will force a great amount of the included galvanizing metal from the dross, and the metal will flow through the perforations of the container 22 to be conducted back into the tank 1.

The container is next swung outwardly to a position over a pig-machine hopper 25, and the clutch 26 is moved to complete connections to the motor 18 to operate the chain of pig-molds. The bottom 27 of the container 22 is then removed to allow the dross to fall into the hopper 25, whereby it is fed into the molds 28, as they move from right to left (Figure 3). A spray of water 29 cools the cast pigs of dross, as they approach the left end of the chain of molds, and as the molds round the sprocket 30 the pigs are dropped to the floor to be removed at convenience.

My method of handling the dross of galvanizing tanks saves more time, labor and expense than any method now employed. The method is further desirable because it includes the separating-operation—the operation of expressing the useful metal from the dross. Of course, the buckets of the chain 10 and the ladle 20 may be perforated to allow some of the metal to drain from the dross contained therein, but it is essential that the dross be subjected also to the positive expressing operation.

What I claim is:

1. In the maintenance of a molten bath of hot galvanizing metal, the method of eliminating dross which lies in a stratum beneath said galvanizing metal, which method comprises the steps of lowering an endless conveyor through the bath of galvanizing metal and into said stratum of dross, causing actuation of said endless conveyor and effecting a progressive removal of the dross with included galvanizing metal upwardly through said bath, and effecting, during such progressive removal of dross, movement of the lower terminus of said endless conveyor over the area of said stratum, conveying such progressively removed dross away from said bath and depositing it in a confined mass, and subjecting such confined mass, before the dross has cooled below a temperature at which the galvanizing metal ceases to be fluid, to an expressing action for separation of said included galvanizing metal from the confined dross.

2. The method of the next preceding claim, in which the expressed, fluid galvanizing metal is returned to said bath immediately after its separation from said confined mass of dross.

In testimony whereof I have hereunto set my hand.

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