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THE UTILIZATION OF TIN SCRAP.*

By Joseph Richards.

When first I turned my attention to the subject, I found that large quantities of tin scrap and galvanized iron were every day carted to the dumps. I found that the average coating on scrap tin, as tin on tin-plate, was 3 per cent.; that the iron, if properly cleaned, could be used in the nobbling furnace and in the puddling furnace; that the use of galvanized iron was a necessary part of the process; and it looked so encouraging that we decided to build a plant to work it on a commercial scale.

I procured a half-dozen of the larger beer casks used for storage, and which are about 6 ft. in diameter and 6 ft. deep. After removing the heads, they were placed in the ground in a semi-circle and a crane was rigged up that commanded all the tanks. In the first tank was charged hydrochloric acid; in the second water; in the third, water with a little lime; in the fourth, water; and in the fifth, a solution of copper sulphate.

The plan of work was to fill a large wooden cage that would hold loosely about 200 lbs. of the clippings. This was swung on the crane and placed in No. 1 tank. In 10 minutes' time the crane was raised and the clippings examined to see if the tin was dissolved. If so, the cage was then lifted out of the acid tank and another cage filled with clippings took its place. The cleaned scrap was washed in the water tank No. 2, lifted up and down to wash it well, and then immersed in the lime tank, No. 3. This neutralized all the residual acid that was left in the pores of the iron. The untinned and limed scrap was then moved to water tank No. 4 for a final washing, then plunged for a moment, just enough to submerge it, in the copper sulphate solution, then immediately removed. The object of this treatment was to form an exceedingly thin film on the iron, to prevent the rusting of the clean iron, which is so sensitive when exposed to the air that it will almost immediately cover itself with rust. The cleaned scrap was compressed in a drop press into balls, and in this form was shipped to the iron works and worked into blooms for sheets, commanding a price of from \$10 to \$12 per ton.

After the process had been continued for some time, all the acid in No. 1 tank would become neutralized and we would have a solution of chloride of tin.

The process of tin cleaning stopped here for a while. We then took a cage of galvanized iron scraps, filling the cage loosely. When the zinc came in contact with the tin solution the metallic zinc took the place of the tin, forming zinc chloride, and all the tin was precipitated as metallic tin, in a finely-divided state. We worked this plant successfully for some time, recovering, when melted into ingots, about 600 lbs. of tin from 10 tons of scrap. The recovered iron commanded \$10 per ton and the zinc chloride \$20 per barrel, for disinfectant purposes and for treating wood to make it fireproof.

We finally closed the works because the objectionable vapors that annoyed our neighbors, with the intention of rebuilding elsewhere; but other things prevented us doing so. I yet think it is the best and most profitable means of utilizing this scrap, especially if electricity is used for depositing the tin.