C. A. CATLIN & G. F. WILSON.

PROCESS OF UTILIZING TIN SCRAP.

No. 190,550. Patented May 8, 1877.

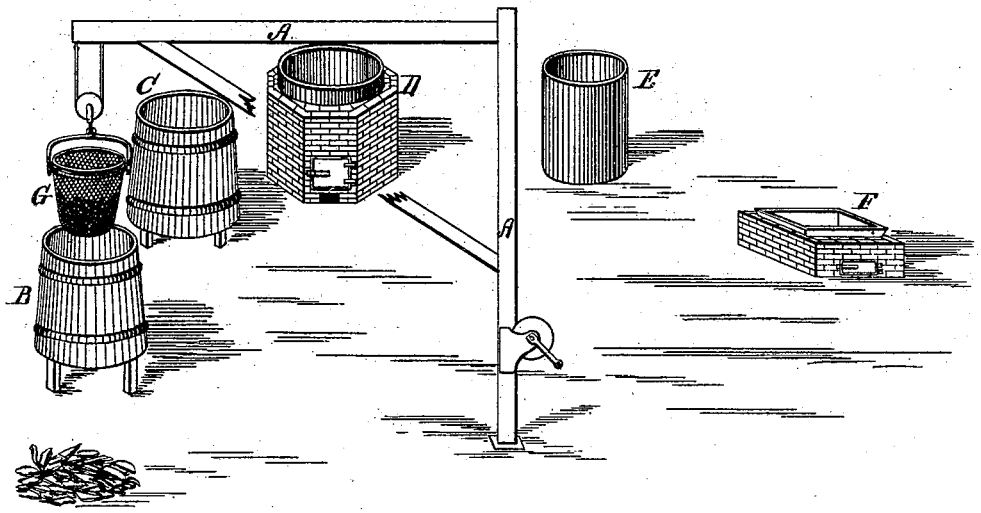

FIG. 1.

WITNESSES.

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IMPROVEMENT IN PROCESSES OF UTILIZING TIN SCRAP.

Specification forming part of Letters Patent No. **190,550**, dated May 8, 1877; application filed June 7, 1876.

To all whom it may concern:

Be it known that we, CHARLES A. CATLIN and GEORGE F. WILSON, of Providence, in the county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Process of Utilizing Tin Scrap, or other tinned metallic surfaces; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention consists in providing an effective and economical process for the utilization of waste tinner's scrap, "old tin," or other tinned metallic surfaces, whereby the tin is recovered, either as a valuable salt of that metal, or in the metallic form, and the iron or other metal is left as a scrap at once available for reworking, and thereby that which is now a cumbersome waste is rendered a valuable source of industry and revenue.

Our process consists in subjecting the scrap or tinned material to be operated upon, having previously been sprinkled or treated with common salt or other chloride and nitrate of soda or other nitrate, to immersion in a hot or boiling solution of caustic soda of potash, and then washing the same in water, by which process the tin is removed, and the scrap left free for use in any manner, or for any purpose to which the material is adapted, and the tin which has been removed by the immersion and washings is recovered by evaporation of the liquids holding it in solution, or by supercharging the caustic solution with the stannic salt.

The apparatus which we have found most convenient in practice we describe as follows:

We erect in any suitable building or locality a common crane, A, and place in the sweep of that crane, in any convenient order, a boiler, D, and two tanks, B and C. We place in any convenient position, but not necessarily in the sweep of the crane, an evaporating-pan, F, and an additional tank, E. From the crane we suspend a wire basket, or any suitable vessel to contain the scrap to be treated, so perforated as to admit of the ready entrance of the liquid when submerged in, and its ready escape when withdrawn from, the boiler D, in which boiler we put a sufficient quantity of the solution of caustic soda or potash to allow of a complete submersion therein of the basket and its contents. We then fill the basket G with the material to be treated, sprinkling in during the filling the requisite quantity of common salt or other chloride and nitrate of soda or other nitrate, using these dry, not in solution, either previously mixed or shaken in together in the proportion of from three to five pounds each to every hundred pounds of scrap, the requisite quantity depending upon the thickness of the tin plate to be removed. The loaded basket being elevated by the crane A is then swung round, and, by lowering, submerged in the hot or boiling solution of caustic soda or potash in the iron boiler D, which may hold in solution a further proportion of the chloride and nitrate used, the heat of which solution is maintained by a fire beneath the boiler, or in any other and ordinary way. In the ensuing reaction the oxygen of the nitrate combines with the tin to form stannic acid, and this, in turn, combining with the alkali present forms a stannate of that base, which, entering into solution, leaves the before-plated metal tin free, the chloride present assisting in the reaction. A further and more complex reaction takes place, by which copious fumes of ammonia are evolved, which may be utilized by proper appliances. When the reaction is complete the basket containing the now tin-freed scrap is withdrawn from the boiler, and suspended above it long enough to drain. It is then swung over the tank C containing water, in which it is washed by submerging and withdrawing several times, and in like manner the washing completed in the water of the tank B. The contents of the basket being now discharged, it is again filled with fresh scrap, in the manner already described, and the process repeated. The loss by evaporation from the boiler D is supplied by the wash-water in the tank C, this, in turn, being supplied by the wash-water in the tank B, to which fresh water is supplied, as required. When the caustic solution is sufficiently charged with the tin-salt it is allowed to deposit the impure crystals, which, being removed and drained, are redissolved in water in the iron tank E. This solution in the iron tank E after filtra-

tion or decantation is again concentrated in the evaporating pan F, the crystals of stannate being removed from time to time, drained, and dried; or the impure crystals obtained in the boiler D may be mixed with fine charcoal, or other reducing agent, and subjected to the requisite heat for the reduction of the tin to the metallic form.

What we claim as our invention, and desire to secure by Letters Patent, is—

The process of utilizing tinned scrap or of separating adherent tin from other metals, which consists in sprinkling the scrap with dry chloride of sodium or potassium and nitrate of sodium or potassium, and then immersing it in a caustic alkaline solution until the tin is entirely dissolved, whereby the two metals previously united are separated from each other, and can afterward be used in the arts, substantially as herein set forth.

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Witnesses:
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