

UNITED STATES PATENT OFFICE.

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PROCESS OF DETINNING TIN SCRAPS.

981,775.

Specification of Letters Patent.

Patented Jan. 17, 1911.

No Drawing.

Application filed September 9, 1910. Serial No. 581,233.

To all whom it may concern:

Be it known that I, CARL VON DER LINDE, a citizen of the German Empire, residing at St. Tönis, near Crefeld, in said Empire of Germany, have invented certain new and useful improvements in Processes of Detinning Tin Scraps, of which the following is a specification.

This invention relates to an improved process of detinning tin-scraps by means of chlorine.

In the detinning of tin-scraps by chlorine gas, certain difficulties are experienced which are due to the uneven influence of the chlorine on the scraps due to local overheating. For removing this objection, a process is known which consists in subjecting the gases of the reaction-medium either alone or in combination with inert gases at the interior of a reduction vessel to a lively agitation so as to obtain a uniformity of temperature in the different parts of the vessel and eventually, the quicker cooling off of the contents of the same.

The object of this invention is to supply an improved process, by which the local overheating of the tin-scraps is overcome in an entirely different manner. It was found that the overheating of the scraps took place only when the uninterrupted introduction of chlorine is continued for more than a fixed period of time, independently of the quantity of chlorine admitted. This period of time is controlled not only by the temperature at the interior of the detinning vessel, but also by the concentration of the chlorine gas which is employed. Generally, the uninterrupted introduction of chlorine gas should not be longer than fifteen minutes.

When, therefore, the heat produced by the reaction on some portion of the material to be detinned, has not had time to affect the remaining contents of the vessel, then a new portion of gas is supplied in a short but strong current, after which the process is again uninterrupted for a shorter or longer duration and so on. Experience has shown that when the entire quantity of chlorine, which is necessary for the proper detinning of a certain quantity of tin-scraps, is divided into five approximately equal parts, the distribution of the chlorine over the entire contents of the vessel takes place the better, the quicker each divisional quantity is introduced into the detinning vessel. The peri-

odically interrupted introduction of chlorine can also be advantageously accomplished in such a manner that the chlorine is alternately introduced at different points into the detinning vessel. By the interrupted introduction of the chlorine or its introduction at different parts of the vessel, a perfectly uniform and equal detinning of the scraps, without the use of any mechanical means, is accomplished.

An especially favorable effect is obtained with the new process when it is carried out *in vacuo*. In this case the vessel which is filled with the tin-scraps, is first evacuated, for instance, to an under-pressure of 70 cm. mercury-column. Then one quantity of chlorine-gas is introduced into the vessel in a short, strong current, whereby the under-pressure is reduced in a few minutes to say 50 cm. of the mercury-column. In the same manner as the chlorine is absorbed by the tin, the under-pressure is raised gradually to about 68 cm.—which is a special indication of the partial completion of the reaction. Then a longer intermission is made until the reaction temperature becomes gradually lowered to about 40 or 50 degrees C. A second quantity of the chlorine is then introduced, the under-pressure is lowered again to about 50 cm. of the mercury-column and rises again by the absorption of the chlorine to the former height. The same process repeats itself with the successive introduction of the remaining quantities of chlorine into the detinning vessel. Tin chloride, free from water, is obtained by the reaction and condensed on the walls of the vessel on which it gradually descends into a receptacle which is connected with the bottom of the detinning vessel. In consequence of the tension of the non-condensed vapors of stannic chloride, the original under-pressure of 70 cm. of the mercury-column is not reached quite fully during the detinning process, but is about 2 or 3 cm. below the original under-pressure according to the temperature present in the vessel. The temperature on the walls of the vessel should not rise above the limit of 50 or 60° C.

The end of the detinning process is readily observed by the fact that the absorption of chlorine naturally becomes slower and slower and that, in consequence thereof, the mercury-column rises only gradually to the height before referred to. After the reac-

tion is completed, previously dried air is admitted into the detinning vessel and atmospheric pressure established therein.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The process herein described of detinning tin-scrap by means of chlorin, which consists in dividing the quantity of chlorin-gas required for the proper detinning into a number of approximately-equal parts and introducing these quantities at approximately equal intervals of time quickly to the material to be detinned, but in such a manner that the same is subjected for not longer than fifteen minutes of time to the uninterrupted action of the introduced gas-current.

2. The process herein described of detinning tin-scrap by means of chlorin, which consists in introducing chlorin-gas successively in approximately-equal quantities alternately at different points to the interior

of the detinning vessel and subjecting them for not longer than fifteen minutes of time to the uninterrupted action of the gas.

3. The process herein described of detinning tin-scrap by means of chlorin, which consists in dividing the quantity of chlorin-gas required for the proper detinning into a number of approximately-equal parts and introducing these quantities at approximately-equal intervals of time quickly *in vacuo* to the material to be detinned, so that the same is subjected for not longer than fifteen minutes at a time to the uninterrupted action of the introduced gas-current.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

CARL VON DER LINDE.

Witnesses:

CARL WOLLSEIGM,
OTTO HOFER, Jr.