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UNITED STATES PATENT OFFICE.

LOUIS HACKSPILL AND CHARLES STAEHLING, OF STRASBOURG, FRANCE.

PROCESS FOR OBTAINING ALKALI METALS.

No Drawing. Application filed July 7, 1920. Serial No. 394,600.

To all whom it may concern:

Be it known that we, LOUIS HACKSPILL and CHARLES STAEHLING, both citizens of France, and residents of Strasbourg, Bas Rhine, France, have invented certain new and useful Improvements in Processes for Obtaining Alkali Metals (for which applications have been filed in France, November 5, 1913, No. 464,469; in Switzerland, December 24, 1919; in Sweden, January 8, 1920, and in Norway, January 7, 1920), and of which the following is a specification.

The invention relates to the method of obtaining metals of the alkalies from their salts, and consists in heating halogen salts of the metals of the alkalies with a salt of a metal of the alkaline earths whose acid radicle or equivalent will not combine during the reaction with the alkali metal set free.

Among the reactions that may be carried out may be mentioned an alkali metal halide with calcium carbide, calcium hydride and calcium silicide.

When using calcium carbide the reaction may be indicated as follows:

$$2MCl+C_2Ca=CaCl_2+2C+2M$$

wherein M indicates an alkali metal.

In this reaction there is obtained, besides the alkali metal, also a lamp black of very superior quality.

In order to carry out this reaction most advantageously, i. e., in order to obtain the alkali metal, the operation must be carried out under conditions such that the vapor pressure of the alkali metal in the cold portions of the apparatus will cause condensation, and thus the metal be distilled and prevented from coming into contact with the calcium chloride formed, and producing an inverse reaction, and re-formation of alkali-metal chloride.

To this end the operation is carried out in vacuo, and by this means a very high yield will always be obtained, even reaching 95%, with reference to the weight of the alkali-metal salt employed. It is to be understood, however, that the reaction will proceed without requiring the use of a vacuum, provided the temperature is sufficiently high, and that the operation is carried out in a closed vessel.

By the process, according to this invention, alloys of alkali metals may be obtained from their chlorides.

The following is an example of a method of carrying the present process into effect:

Into a cylindrical container is introduced 50 grammes of NaCl in a finely powdered state, and 50 grammes of C_2Ca in dry powder. A good vacuum is produced in the vessel, then heating is effected to approximately 350° C., for instance, when a considerable amount of gas will be given off. The temperature is then raised to about 800° C., for three or four hours, and the sodium will distill off to the cold portions of the apparatus.

We claim—

1. A process for obtaining the alkali metals or alloys of such metals, which consists in heating in vacuo a halide of an alkali metal or a mixture of halides of alkali metals with compounds of the metals of the alkaline earths and maintaining the vacuum throughout the duration of the reaction.

2. A process for obtaining the alkali metals which comprises placing the chloride of an alkali metal and compounds of the metals of the alkaline earths in a closed vessel and in a good vacuum, heating the vessel to cause reaction, and maintaining the vacuum during the whole operation so that the vapors of the alkali metals will condense upon the cold parts of the vessel.

3. A process for obtaining the alkali metals which consists in heating in vacuo a chloride of an alkali metal with calcium carbide whereby lamp-black and the alkali metal are separated and maintaining the vacuum during the entire time of reaction.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

LOUIS HACKSPILL.
CHARLES STAEHLING.