UNITED STATES PATENT OFFICE.

THOMAS BURNS McGHIE, OF LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO THOMAS BARTON, OF LONDON, ENGLAND.

PROCESS OF SEPARATING SALTS OF COBALT AND NICKEL.

No. 888,839. Specification of Letters Patent. Patented May 26, 1908.

Application filed September 9, 1907. Serial No. 392,050.

To all whom it may concern:

Be it known that I, THOMAS BURNS McGHIE, metallurgist, a subject of the King of Great Britain, residing at 9 Gracechurch street, in the city and county of London, England, have invented a new and useful Process of Separating Salts of Cobalt and Nickel, of which the following is a specification.

The present invention relates to an improved method for the separation of salts of cobalt and nickel.

By comparatively simple and well known methods the metals cobalt and nickel can be readily obtained together from their minerals in aqueous solution in the from of chlorids. The separation, however, of the two metals when mixed together in this way has hitherto presented considerable practical difficulty. Under ordinary circumstances the solution when evaporated will give a crop of mixed crystals of cobalt and nickel chlorids.

The present invention depends upon the discovery that it is possible to cause the solution to deposit first nearly all the cobalt in the crystalline form, retaining in the mother liquor concentrated nickel chlorid with a little remaining cobalt. This residual cobalt may be completely eliminated from the nickel liquor by the oxidation or other suitable method.

By cautiously evaporating the solution of the mixed chlorids to a suitable degree of concentration in the presence of a slight excess of hydrochloric acid, the desired result may be obtained, namely, the crystallizing out of the cobalt as practically pure chlorid which can be fished out of the solution and after washing to remove adherent mother liquor can be further treated for obtaining other cobalt salts or metallic cobalt therefrom.

Obviously any of the known methods for effecting evaporation and crystallization may be employed in carrying out this invention, and naturally the details of the process will vary according to the nature of the material operated upon and the desired degree of purity in the products obtained by the process. A specific instance may be given as an example of the manner in which the invention is to be carried into effect, but variations from this example will be readily understood and made by those acquainted with the art without further explanation.

Where the initial material comprised mixed salts in the proportion of two of cobalt to 1 of nickel, separated products of cobalt chlorid with a proportion of .5 of nickel to 20 of cobalt and nickel chlorid with the proportion of 1 of cobalt to 10 of nickel, have been obtained by effecting the crystallization in six pots after the manner of the ordinary Pattinson process for the separation of silver from lead. The solution of mixed salts is introduced into one of the metal pots and heated to the boiling temperature of the solution at which it is maintained until the solution becomes saturated at that temperature. That saturation is reached is shown by the formation of thin films of crystals on the surface of the liquor wherever a current of air strikes it. At this stage the pot is allowed to cool to atmospheric temperature or thereabout, and the crop of crystals produced during cooling is removed and put in the other middle pot. This leaves in the first pot a solution of mixed chlorids saturated at atmospheric temperature and of course containing a larger proportion of nickel than the original material. This liquor is removed to the next pot on the other side. In each pot the process above described is repeated, the liquor being concentrated to saturation at the boiling temperature and cooled again at atmospheric temperature to effect crystallization. The resulting products were as above stated, though it may sometimes be possible to obtain better results than those given. As before mentioned a greater degree of purification may be obtained by continuing the process further.

What I claim is:—

1. Process of separating nickel and cobalt from solutions containing these metals as mixed chlorids, consisting in making the solution slightly acid, concentrating it by evaporation and then allowing crystallization to take place whereby the cobalt chlorid is crystallized out first.

2. Process of separating nickel and cobalt from solutions containing these metals as mixed chlorids, consisting in making the solution slightly acid, concentrating it by evaporation, allowing the cobalt and nickel chlo-

rids to largely separate one from the other by fractional crystallization, and repeating the process until salts of the desired degree of purity are obtained.

3. Process of separating nickel and cobalt from solutions containing these metals as mixed chlorids, consisting in making the solution slightly acid, concentrating it by evaporation, testing the mother liquor repeatedly by means of samples taken out and cooled, and allowing the cobalt chlorid to become separated from the nickel by fractional crystallization as soon as the samples tested show the desired degree of concentration.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

T. BURNS McGHIE.

Witnesses:
HUBERT A. GILL,
A. E. ODELL.