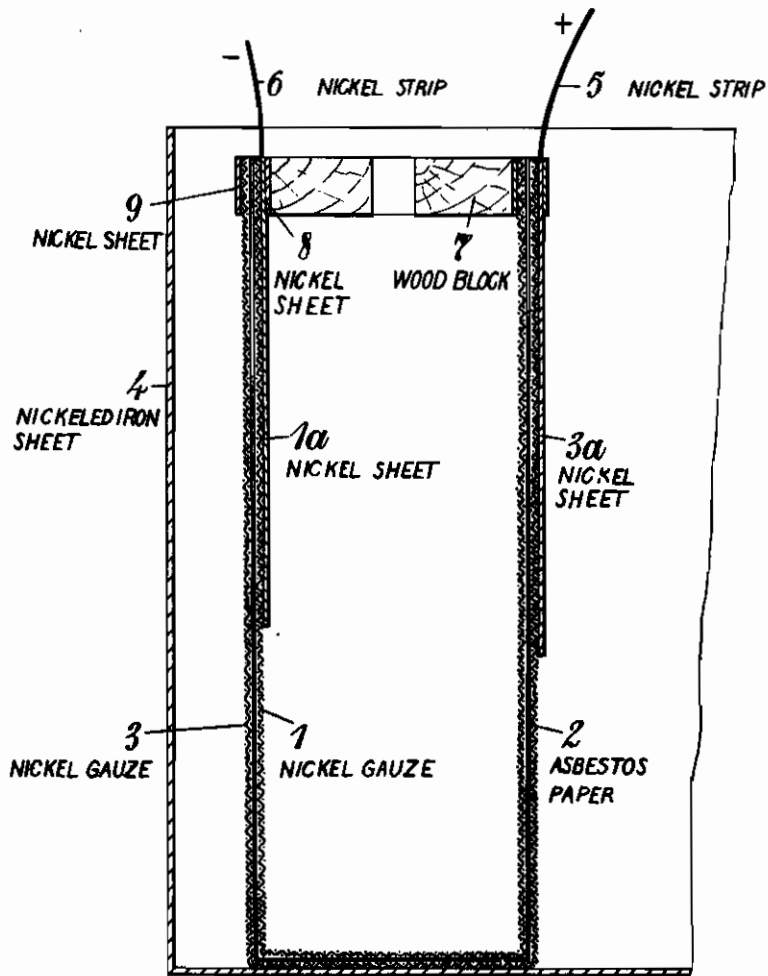


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PROCESS FOR PREPARING ARSENATES BY ANODIC
OXIDATION OF SALTS OF ARSENIOS ACID
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PROCESS FOR PREPARING ARSENATES BY ANODIC OXIDATION OF SALTS OF ARSENIOUS ACID

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vested in the Alien Property Custodian

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It has been found in the electrolytic preparation of arsenate solutions that the yield figures vary according to the nature of the arsenite employed. Thus for example in the case of the electrolytic production of sodium arsenate or potassium arsenate the yields are as low as up to 40% and less, according to the nature of the starting product. Even when heating, the tensions rise strongly up to round about one third of the total tension.

It has now been found that it is possible to operate with raw substances of any origin with obtention of almost theoretical current yields and employing relatively low tensions if operations are carried out in the following manner:

To the anolyte are added soluble compounds of metals which are capable of several oxidation stages. For example additions of chromium, iron, lead, manganese and the like may be used. These metals were present in a quantity of the order of 1 g. per 100 ccs. of solution, and even in smaller concentration. However, only those metals may be used which are not precipitated out by the anolytes coming into question.

It has also been found that these metals possess varying degrees of efficiency. It was found that for example chromium is particularly effective, whilst iron is less so, and lead still less.

Example.—In an electrolyser with diaphragms there is a 15% caustic soda solution in the cathode space whilst the anode space contains a 19% sodium arsenite solution. Electrolysis was carried out at a temperature of 60° C. No solid salt separates out. The sodium arsenite had been produced by dissolution of commercial arsenic in caustic soda solution. The current yield amounts to approximately 50%. Similar results are obtained if potassium arsenate is prepared in the same way from the same arsenic.

If now the electrolysis is carried out in the same way with addition of dichromate to the anolyte, so that there are 0.2 g. of dichromate in 100 ccs., then the yield amounts to more than 98%.

Whereas without this addition the tensions vary approximately from 2.7–3.1 volts, after the above addition of dichromate they amount at the same temperature to approximately 2.2–2.5 volts.

No dichromate was contained in the arsenate crystallising out on cooling down. The dichromate remained completely in the mother liquor, which was returned to the electrolysis.

It has been found that the apparatus shown

in the accompanying drawing is particularly suitable for carrying out the electrolysis.

Referring to the drawing the anode 3 and the cathode 1 consist of wire net of a suitable metal, more particularly nickel. These nets close off the anode space and cathode space and are separated from one another by means of a diaphragm, for which asbestos paper has proved to be the most suitable. The two nets are then pressed against some layers of asbestos paper 2 separating them. Electrolysis is now carried out in accordance with the example given above. The nickel sheets 1a and 3a serve for supplying the current. The anode lead consisting of nickel sheet is indicated by 5 and the cathode lead, likewise consisting of nickel sheet, is indicated by 6. 7 represents a wood block, e. g. disc-shaped. 8 represents a nickel sheet running round the interior in the form of a ring, whilst 9 indicates a nickel sheet running round the exterior in the form of a ring.

It has been found that after fairly prolonged use some arsenic salt solution also reaches the cathode and is there reduced to metallic arsenic. This floats in the cathode space in the form of dark particles and can be readily removed from this space by circulation of the catholyte. It may be avoided if a continuous small flow of catholyte into the anode space is provided for by having a somewhat higher level for the catholyte, amounting approximately to about 1 cm. This also has the effect that on crystallising out the arsenate this comes out further than in the less alkaline solution.

A cylindrical form for the cell has proved to be very advantageous. On a wire cylinder first of all several layers of asbestos paper are wound and then a further wire cylinder is slipped thereover. One end of the two cylinders is closed, e. g. by means of a round disc of gauze or wire netting, between which end pieces there is a disc of asbestos. A suitable number of such cells (10, 16, 20 or more connected in parallel) are placed closely together in a box 4 (electrolyser) of nickled iron sheet.

In a cell of this kind for 100 amperes with which the inventor has worked, the inner gauze cylinder was 75 cm. high and the outer gauze cylinder 73.5 cm. high. The internal diameters of the inner and outer cylinders amounted to 20 and 20.5 cm. respectively. Each cylinder had a gauze bottom. The current lead 1a was 5 cm. wide, 48 cm. long and 0.5 mm. thick; the current lead 3a had the same dimensions. The leads 5 and 6 were each 5 cm. wide and 1 mm. thick, the

nickel sheets 8 and 9 each 4 cm. wide and 1 mm. thick. In between the two cylinders there were several layers of asbestos paper. The current yield of practical continuous working with such a cell was not below 98%, the voltage 2.2. The dichromate in the anolyte was maintained at 1.6%. The dichromate in the anolyte coming from the electrolyser did not in the crystallising

vessel go into the crystallising arsenate but remained wholly in the mother liquor.

Whilst in the foregoing dimensions have been given of a cell which the inventor has himself used, it is to be distinctly understood that the invention is not limited to cells of these particular dimensions.

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