UNITED STATES PATENT OFFICE.

THOMAS PARKER AND ALFRED EDWARD ROBINSON, OF WOLVERHAMPTON, ENGLAND.

PROCESS OF MAKING IODINE BY ELECTROLYSIS.

SPECIFICATION forming part of Letters Patent No. 448,541, dated March 17, 1891.

Application filed February 21, 1889. Serial No. 300,758. (No specimens.) Patented in England August 9, 1888, No. 11,479.

To all whom it may concern:

Be it known that we, THOMAS PARKER and ALFRED EDWARD ROBINSON, citizens of the United Kingdom of Great Britain and Ireland, and both residents of Commercial Road, Wolverhampton, county of Stafford, England, have invented new and useful Improvements in the Manufacture of Iodine by Electrolysis, (for which we have obtained Letters Patent in Great Britain, No. 11,479, dated August 9, 1888,) of which the following is a specification.

This invention relates to the manufacture of iodine by electrolysis.

In proceeding with the manufacture of iodine according to these improvements we first prepare an acid solution of an iodide. The iodide may have any convenient base—as, for example and by preference, one of the alkalies or of the alkaline earths or one of the metals. It will be obvious that certain of the iodides cannot be employed, either because they are too costly, or because they are decomposed by water, (iodide of antimony, iodide of bismuth, &c.,) or because they are insoluble in water, (cuprous iodide Cu_2I_2, iodide of sulphur, &c.) The selection of the best iodide for use will therefore be governed by conditions of local price and solubility in water without decomposition. Iodide of soda or of potassium are, however, in all cases preferred to be employed. The solution should be made to a moderate degree of concentration; but it is not necessary to provide for any precise degree of strength of the solution, because this may vary within comparatively wide limits. Indeed, it will be evident that when the solution is being operated on for the purpose of our invention, the strength of the solution is constantly varying. The solution of the iodide is placed in a suitable electrolyzing-vessel, in which are also placed suitable electrodes. Of these electrodes the anode must be of carbon, platinum, or other suitable inoxidizable material. The cathode may consist of iron or other suitable metal. The electrodes are respectively connected to the positive and negative terminals of a galvanic battery or of a continuous-current dynamo-electric machine or other suitable source of electricity capable of transmitting a current of about two ampères for each square decimeter in area of the anode through the solution to be electrolyzed. The electrodes are separated in the electrolyzing-vessel by a porous partition or diaphragm. The acid iodide solution is placed in that division of the vessel containing the positive electrode. In the division containing the negative electrode is placed a solution (preferably caustic) of an alkali. Before commencing electrolysis the iodide solution is acidified by the addition of a sufficiency of hydrochloric or (preferably) sulphuric acid. This addition of acid is made in order to prevent the loss of iodide owing to the formation of the salts of the oxy-acids of iodine which are not themselves readily decomposed by the current alone. The action of the acid and of the quantity required is shown thus:

$$10KI+5H_2SO_4=5K_2SO_4+10HI$$

and

$$2KIO_3+H_2SO_4=K_2SO_4+2HIO_3$$
$$2HIO_3+10HI=6H_2O+12I$$

Under the action of the current the iodine is set free at the positive pole and the metal, alkali, or alkaline earth which formed the base of the iodide at the negative pole. When an iodide of a depositable metal is employed, no secondary action takes place. The iodine which is the product of the electrolysis is drained and washed with cold water, and is subsequently dried in a current of warm air.

Having thus described our invention, what we claim is—

The herein-described process for producing iodine, consisting of electrolyzing an acid solution of an iodide in contact with the positive electrode, an alkaline solution being in contact with the negative electrode, the two solutions being separated by a porous diaphragm, and then draining off and washing the iodine, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 22d day of November, 1888.

THOMAS PARKER.
ALFRED EDWARD ROBINSON.

Witnesses:
WM. E. HEYS,
GEO. HEYS.