

## UNITED STATES PATENT OFFICE.

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80-90% HNO<sub>3</sub> will not  
etch al plate

## PROCESS OF PREPARING SURFACE-PRINTING PLATES.

SPECIFICATION forming part of Letters Patent No. 522,719, dated July 10, 1894.

Application filed June 13, 1893. Serial No. 477,482. (No specimens.)

*To all whom it may concern:*

Be it known that I, JOHN MULLALY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Processes of Preparing Surface-Printing Plates, of which the following is a description, sufficient to enable others skilled in the art to which the invention appertains to use the same.

My improvements relate especially to the class of surface printing plates set forth in the patents issued to John Mullaly and Lathrop L. Bullock, No. 459,239, of September 8, 1891, No. 476,759, of June 7, 1892, and No. 483,498, of September 27, 1892, in which the essential feature consists in forming the plate mainly of aluminium. In order to attain the best results with these aluminium surface printing plates it is desirable that the aluminium be practically free from impurities, especially those which oxidize readily, and difficulty has been experienced in procuring sufficiently pure metal, certain impurities developing specks upon the plate during its manipulation which were apt to take the ink and so mar the impression taken from the surface of the plate. After careful investigation and experiment I have devised a method of obviating this difficulty, and my invention consists essentially in removing the impurities at the surface of the plate, prior to the imposition of the design to be printed therefrom, by means of an acid against which the aluminium itself is proof. By this means I am enabled to prepare and use successfully and continuously in surface printing an aluminium plate that would otherwise be useless for the purpose on account of impurities. Absolutely pure aluminium is an article difficult to obtain commercially, so that by overcoming the objection to the use of the inferior or contaminated aluminium obtainable in the market, I not only perfect but also cheapen the surface printing plate, while attaining results that are more certain and uniform in so far as the prints are concerned. Thus by my process an inferior grade of aluminium may be used in the formation of a surface printing plate and made to give as good results as a plate made from practically pure aluminium, which latter would cost several times the price of the

former. In fact the difficulty of procuring sufficiently pure aluminium commercially, and the cost of the same, render my process of eliminating the impurities from the surface of a plate in which aluminium predominates of especial importance in the art.

In carrying out my invention I form the surface printing plate from a suitable quantity of aluminium, procured commercially or otherwise, in the usual manner. After the plate is in shape I treat the surface upon which the design is to be imposed to a wash or bath of a dilute acid having little or no affinity for aluminium, as nitric, or other acid, which will attack the iron and other impurities ordinarily permeating common aluminium, combining with them so that they may be washed out and away without affecting the pure aluminium. This treatment with acid may be resorted to either before or after the graining of the plate, but must be prior to the imposition of the design otherwise the latter will be injured by the acid. I prefer however to grain the surface of the plate before eliminating the surface impurities since the operation of graining exposes the surface impurities more effectually to the action of the acid without impairing the grained surface.

I am aware that acids have heretofore been used in connection with printing surfaces for the purpose of etching the stone or plate itself. The object sought and attained by my invention is just the reverse of this. I purposely employ an acid that will not affect the aluminium, but that will attack various impurities exposed in the surface of commercial aluminium and remove them without disturbing or impairing the surface of the aluminium on which the design is to be imposed. There is no etching of the plate itself; by my invention I have simply rendered what is known as commercial aluminium, as distinguished from laboratory or chemically pure aluminium, suitable for surface printing by quickly and cheaply removing from the surface thereof the exposed impurities that would otherwise take the ink and impair the prints taken therefrom.

In carrying out my invention I have found that nitric acid, diluted with ten to twenty per cent. of water, is convenient and effective in treating the plates. The strength of the solu-

158 x 100  
211

101



tion, and the length of time in which the plate is subjected to the action of the acid solution vary with the grade of aluminium under treatment, there being several commercial  
5 grades of the metal. The purification of the printing surface is effected by either spreading the acid solution over such surface or by immersing the plate bodily in the solution, the surface being exposed to the action for  
10 several hours, sometimes for twenty-four, if the plate is of low grade.

What I claim as my invention, and desire to secure by Letters Patent, is—

The process herein set forth of preparing aluminium plates for use in surface printing, 15 consisting in subjecting the surface upon which the design is to be imposed to the action of an acid which will not affect the aluminium but which will attack the exposed impurities so that they may be removed prior to the im- 20 position of the design substantially in the manner and for the purpose described.

JOHN MULLALY.

Witnesses:

GEORGE WILLIAM MIATT,  
D. W. GARDNER.