

UNITED STATES PATENT OFFICE.

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PROCESS OF CASE-HARDENING TANTALUM.

974,835.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, OTTO ARCHIBALD SIMPSON, a subject of the German Emperor, and residing at Charlottenburg, near Berlin, Germany, have invented a certain new and useful Improved Process of Case-Hardening Tantalum, of which the following is a specification.

The subject-matter of my invention is a process of case-hardening articles composed of tantalum.

According to my invention I treat the surfaces of such articles with a hardening agent, *e. g.* oxygen, which is made operative either electrolytically or by heating in the air. By treating such articles with oxygen or other hardening agents an exceedingly hard surface layer can be obtained. In order that this layer may penetrate deeper into the body than would be the case otherwise and simultaneously to enlarge the surface itself and with it the area on which the hardening agent can act, I roughen the surface, *e. g.* by means of a sand blast, before it is treated with the hardening agent. In order then to make this hard surface resting on a softer, more ductile basis of tantalum cohere better and to work the hard mass rather more into the upper layers of the soft material, I may treat the roughened hardened surface in addition with presses or rollers. If unhardened parts of the lower layer become exposed during this treatment the surface may be hardened afresh when a materially improved result can be obtained.

By treating the hardened surface with presses or rollers the surface can simultaneously be given the nature adapted for its later use; for example, by treating it with rough matrices or rollers bodies can be obtained which may serve as substitutes for

diamond or emery disks or be used in the manner of files or the like. In this manner exceedingly thin disks, a fraction of a millimeter in thickness, can be made, for example, which have a rough, very hard surface and can be employed, for example, as separating disks for dental purposes.

I claim:—

1. The hereindescribed process of case-hardening a body composed of tantalum, which comprises the steps of roughening the surface of the body and subsequently treating it with a hardening agent.

2. The hereindescribed process of case-hardening a body composed of tantalum, which comprises the steps of roughening the surface of the body and subsequently oxidizing the roughened surface.

3. The hereindescribed process of case-hardening a body composed of tantalum, which comprises the steps of roughening the surface of the body, treating the roughened surface with a hardening agent and subjecting the roughened hardened surface to pressure.

4. The hereindescribed process of case-hardening a body composed of tantalum, which comprises the steps of roughening the surface of the body, treating the roughened surface with a hardening agent, pressing the roughened hardened surface and subsequently again treating the surface with a hardening agent.

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

OTTO ARCHIBALD SIMPSON.

Witnesses:

HENRY HASPER,

ARTHUR SCHROEDER.