

W. VON BOLTON.

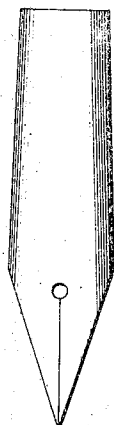
PEN,

APPLICATION FILED JUNE 8, 1907.

930,931.

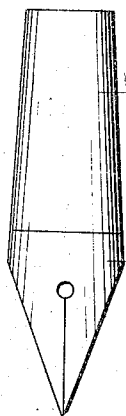
Patented Aug. 10, 1909.

Fig. 1.



Tantalum

Fig. 2.



Steel

Tantalum

Witnesses:

H. Alfred Faulk

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UNITED STATES PATENT OFFICE.

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PEN.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WERNER VON BOLTON, a subject of the Czar of Russia, and resident of Charlottenburg, near Berlin, Germany, have invented a certain new and useful Improvement in Pens, of which the following is a specification.

My present application constitutes divisional application "E" of my original application, filed February 17, 1905, serially numbered 246,189.

My invention relates to pens, by which I mean to indicate instruments adapted for writing, drawing and analogous uses.

More particularly the invention comprises a pen in which the nib, or flexible portion is composed of substantially pure tantalum, the shank being formed of any suitable material, such as steel, tantalum, or the like. Absolutely pure metal is rare, but for the purposes of this invention, a metal which is so nearly pure as to have substantially or practically the same properties as the pure metal and which is therefore substantially pure, may be employed. Heretofore such instruments have been made of other materials, such as steel, gold or other metals, or of glass, stone or the like. They should be very hard to enable them to resist the tendency to wearing out, but at the same time they should have considerable resilience or flexibility, and also be able to resist the attack of the writing fluids or other detrimental agencies.

According to my present invention, I employ in place of the heretofore used materials a substance which has the advantages of all the heretofore used substances, but lacks their disadvantages. Furthermore it has advantages which none of the materials heretofore employed for similar purposes possess. This material is substantially pure tantalum. It possesses like steel the property of being easily worked and hardened, and at the same time offers greater resistance to fracture and has greater elasticity or flexibility. Its hardness can be increased to such a degree as to greatly exceed that of the best kinds of steel, and even that of the usually employed stones. With regard to the greatest degree of hardness which it can attain, it is almost equal to the diamond. It has the further advantage over steel in being one of the precious metals which is not affected by the atmosphere and which at ordinary temperatures completely

resists the action of most acids. All this is of course of great importance in the article forming the subject matter of my invention.

In the accompanying drawing, I have shown by way of example two forms of pens constructed in accordance with my invention.

Figure 1 is a top plan view of a pen constructed of substantially pure tantalum, whereas, Fig. 2 is a top plan view of a pen having its nib of substantially pure tantalum with a shank of steel.

In order to be able to work the metal properly it must previously be well fused. By the fusing process the tantalum is freed from impurities and rendered homogeneous. The fusing is best accomplished by means of the electric current in a vacuum. After the metal has been thus melted it can easily be worked mechanically in any known manner. It can be hammered, rolled, drawn, filed and the like, and thereby brought into any desired form. When being mechanically worked, especially if it contains a small quantity of carbon or other hardening medium, the metal readily assumes so great a degree of hardness that further working is rendered impossible and it must then be carefully reheated or annealed in order to be rendered soft again. In this annealing process care must be taken that the temperature does not rise too high, as otherwise the metal is more easily attacked by the oxygen of the atmosphere. The metal will, however, even in the form of the finest drawn wires or thinnest rolled bands, stand a heating in the air up to a dark red heat temperature, without being appreciably affected. When so heated the metal shows a coloration similar to tempered steel. In order to prevent too great a heating, especially of fine parts of pure tantalum, it is preferable to effect the heating indirectly by bringing large plates or drums to the temperature to which the parts to be heated are required to be brought, and then to bring the objects of tantalum into contact with these plates or drums. If, on the other hand, it is desired to raise the objects of tantalum to high temperatures, without being materially affected on their surfaces, it is advantageous to effect the heating in a vacuum, as at very high temperatures, metallic tantalum combines with almost all known substances. The heating in the vacuum is preferably carried

out by electrical means, such as electrical resistance, or directly by passing the electric current through the objects to be heated. As metallic tantalum is at present very expensive, only those parts need be made of tantalum that are directly subject to wear and exposure, for instance, the writing point or flexible portion of the pens.

10 In my present application, I claim specifically pens composed of substantially pure tantalum, the other parts of my invention

being protected in applications divided from my original application, filed February 17, 1905, serially numbered 246,189, of which this application is also a division. 15

I claim:

A pen having a nib portion composed of substantially pure tantalum.

WERNER VON BOLTON.

Witnesses:

WOLDEMAR HAUPT,
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