

# UNITED STATES PATENT OFFICE.

JOHN HOLLAND, OF CINCINNATI, OHIO.

## PROCESS OF FUSING AND MOLDING IRIIDIUM.

SPECIFICATION forming part of Letters Patent No. 241,216, dated May 10, 1881.

Application filed November 4, 1880. (No specimen.)

*To all whom it may concern:*

Be it known that I, JOHN HOLLAND, of Cincinnati, county of Hamilton, State of Ohio, have invented or discovered a new and useful Process for Fusing and Molding Iridium, of which the following is a specification.

The object of this invention is to fuse and mold iridium in order that this metal may be used in the mechanic arts wherever a hard, non-corrosive, non-wearing substance is needed. Iridium is rarely found pure, and only in dust and very small grains or scales. By reason of its non-fusibility by the ordinary processes it is practically useless, except for pointing gold pens, and as found there is but a small proportion of it large enough to be used with advantage for even this purpose. I have also used it in its natural state, and, as usually found, alloyed with osmium, (iridosmium, which is much softer than pure iridium,) for pointing my fountain-pens, and have experienced much difficulty in obtaining grains or scales large enough for this purpose, and many of these were imperfect, having cracks or fissures in them that rendered them worthless for drilled fountain-pen points. The pieces as obtained are also of irregular shape. A large portion of the metal must therefore be wasted, as the dust which results from grinding the grains to the proper shape was of little use.

By my present invention I am enabled to fuse the dust as found in its natural state, whether pure or combined with other metals, into a molten mass, and mold the metal into ingots of any desired shape or size. I accomplish this result by the following process: The metal (preferably the dust, which, being of little use in the arts, is comparatively inexpensive) is put into a sand-crucible and subjected to a high heat in an ordinary furnace. When it has attained a high temperature I add to the metal about one-fourth its weight of phosphorus. After the addition of the phosphorus the metal quickly fuses, when it may be poured into molds of any shape or size. I find it best to have the molds highly heated, as the metal chills and sets quickly. So soon as the metal is set I place it in a crucible with chalk or lime, return it into the furnace, and again subject it

to a high heat. This eliminates the phosphorus, leaving the metal pure, hard, and non-fusible, as in its natural state.

The skilled workman will readily determine the best size and shape of ingot for the particular purpose for which he intends to use the metal.

I prepare the metal for my fountain-pen points by casting it upon a flat metal plate the surface of which is crossed by fine ribs, resembling lattice or net work. I pour the molten metal on this plate, filling the interstices between, and covering the ribs. The metal is thus cast in a thin sheet or plate having one of its faces grooved the reverse of the ribs upon the mold. Through these grooves the plate is broken into small cubes the proper size to be drilled and formed into fountain-pen points. The same plan may be adopted with advantage in preparing journal-bearings for watches, to be used in place of the jewels now commonly used.

For pointing my gold pens I mold the metal into the form of wire or small rods. These I break into pieces of a size to make strong substantial nibs. The metal may also be cut by using a copper wheel or disk and diamond-dust.

As the metal is exceedingly hard, non-fusible, practically non-corrosive, and capable of receiving a high polish, it will now be seen that I have discovered a mode of working it, supplying a great need long felt in many branches of the arts.

The metal is made much tougher by eliminating the phosphorus, but it may be used for many purposes without so doing.

The ingot produced by the above-described process is not claimed herein, as I intend to make the same the subject of a separate application.

I claim—

1. The art of fusing iridium, which consists in subjecting the same to the action of heat and then adding phosphorus, substantially as before set forth.

2. The method, substantially as hereinbefore set forth, of fusing and molding iridium for use in the arts by first raising the metal to a high heat, then adding to it phosphorus in

about the proportion specified, and after the metal is cast releasing the phosphorus by subjecting the metal to heat in a chalk bath.

3. The method, substantially as hereinbefore  
5 set forth, of fusing and molding iridium for use in the arts, which consists, first, in raising the metal to a high heat, then adding to it

phosphorus in about the proportion specified, and finally pouring the fused mass into suitably-shaped molds.

JOHN HOLLAND.

Witnesses:

WM. L. DUDLEY,  
GEO. J. MURRAY.