

UNITED STATES PATENT OFFICE.

GIDEON BOERICKE, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF REDUCING METALLIC OXIDS OR OTHER COMPOUNDS OF VANADIUM, MOLYBDENUM, TUNGSTEN, OR SIMILAR METALS AND OF PRODUCING ALLOYS OF THESE METALS.

993,338.

Specification of Letters Patent.

Patented May 30, 1911.

No Drawing.

Application filed October 9, 1908. Serial No. 456,926.

To all whom it may concern:

Be it known that I, GIDEON BOERICKE, a citizen of the United States, residing at Philadelphia, in the State of Pennsylvania, have invented certain new and useful improvements in processes of reducing metallic oxids or other compounds of vanadium, molybdenum, tungsten, or similar metals and of producing alloys of these metals, of which the following is a specification.

My invention has particular relation to those alloys in which vanadium, molybdenum, tungsten or similar metals are combined with iron, copper, or other metals.

Various processes have been heretofore used for the production of ferro-vanadium and other alloys, and among such processes there are some in which silicon, ferro-silicon, or aluminum is largely used as a reducing agent, and in carrying out certain of the said prior processes it has been found that the resulting product contains an objectionable quantity of silicon or other like reducing agent. Substantially similar difficulties have been encountered in connection with the reduction of vanadium and other metals where the reducing agent employed is of a character, which, if it remains in the resultant product in a percentage greater than a practically allowable amount, renders said product inferior.

One of the primary objects of my invention is the provision of a process in which the above enumerated difficulties will be overcome, that is to say, in which a reducing agent will be employed which would remain in the resultant product only in small percentages, and which is of a character that is not objectionable in the percentages in which it occurs.

A further object of my invention is the use of steps and materials which will produce a product of uniformity and at a reduced cost.

In carrying out my invention I employ any suitable oxid or compound of vanadium, molybdenum, tungsten or similar metals, such for example, as vanadate of iron, which oxid or compound I mix with manganese metal or other metallic compound or alloy of manganese, and also some form of flux, as for instance, silica or common sand, the

same being put in a suitable vessel and subjected to sufficient heat to effect a reduction of the vanadium and iron, or other metals, which it is desired to combine with the vanadium; the resultant product in the above example where vanadate of iron is used being ferro-vanadium and a slag composed chiefly of oxids of silicon and manganese. In carrying out the process referred to, I prefer to use some carbon.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. The process of producing vanadium, tungsten, molybdenum and similar metals, and their alloys which consists in reducing oxids or compounds of vanadium, tungsten, molybdenum and similar metals in the presence of heat by the use of a compound containing manganese together with a suitable flux.

2. The process of producing vanadium, tungsten, molybdenum and similar metals and their alloys which consists in reducing oxids or compounds of vanadium, tungsten, molybdenum and similar metals in the presence of heat by the use of a compound containing manganese together with carbon and a suitable flux.

3. The process of producing vanadium, tungsten, molybdenum and similar metals and their alloys which consists in reducing oxids or compounds of vanadium, tungsten, molybdenum and similar metals in the presence of heat by the use of ferro-manganese and a suitable flux.

4. The process of producing vanadium, tungsten, molybdenum and similar metals, and their alloys which consists in reducing oxids or compounds of vanadium, tungsten, molybdenum and similar metals by the use of ferro-manganese, together with carbon and a suitable flux.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

GIDEON BOERICKE.

Witnesses:

WALTER M. STEIN,
R. S. DAVIS.