

UNITED STATES PATENT OFFICE.

LUDWIG WEISS, OF BARMEN, GERMANY.

PROCESS OF PRODUCING SOUND METAL CASTINGS.

982,326.

Specification of Letters Patent.

Patented Jan. 24, 1911.

No Drawing.

Application filed September 15, 1910. Serial No. 582,225

To all whom it may concern:

Be it known that I, LUDWIG WEISS, citizen of Germany, residing at Barmen-Rittershausen, Germany, have invented certain new and useful Improvements in Processes for Producing Sound Metal Castings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

For attaining sound metal castings it has been recommended to use strongly deoxidizing elements, among others, titanium. It has, however, been found difficult to dissolve the same in metal baths and further considerable loss through waste is occasioned. Also, titanium possesses a relatively low combustion point, so that it does not extract the oxygen contained in the metal baths with sufficient energy. Further, the specific gravity of titanium is comparatively low, so that its suitability for forming alloys is decreased. Finally, alloys of titanium containing more than 2 to 3% of titanium are difficult to work in the hot state. Investigations have proved that all these disadvantages can be avoided by using zirconium or combinations of zirconium with other deoxidizing or inactive substances, for instance, zirconium-carbid, zirconium-silicid, ferric zirconium, cupriforous zirconium, or with the further addition of nickel, molybdenum, chrome or wolfram.

The zirconium or the above-mentioned combinations and alloys can be added with the greatest ease to the molten metal, for instance, iron, gunmetal, brass, copper, aluminum-bronze or the like, and are totally dissolved in them.

It is advisable to prepare alloys of zirconium with a high percentage of zirconium, for instance, with 10 to 35% zirconium, and then to add small quantities of this alloy to the molten metal. If it is only desired to attain a sound casting, very small additions of zirconium, less than 1%, are sufficient; these are enough to greatly increase the tenacity and strength of the metal. Greater additions of zirconium to the abovementioned metals and alloys will further in-

crease the strength and toughness of the products, and will further render them more insensible to chemical agents

Metals alloyed with zirconium, apart from the advantages already mentioned, have greater strength than those alloyed with titanium and are more proof against acids. Further, many of the alloys with zirconium possess great hardness and elasticity and are especially adapted for castings and also for constructive or engineering work.

From the above it will be seen that my invention in all cases consists in the addition of zirconium to the molten metal, the said addition being attended with the best results when such zirconium is introduced as the ingredient of an alloy or a mixture with other metals.

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

1. The process of producing sound metal castings, which consists in adding zirconium to the molten metal.

2. The process of producing sound metal castings, which consists in adding zirconium to the molten metal in the minimum amount of one per cent.

3. The process of producing sound metal castings, which consists in adding zirconium mixed with other metals to the molten casting metal.

4. The process of producing sound metal castings, which consists in adding zirconium mixed with other metals to the molten casting metal, the minimum quantity of the zirconium added being one per cent.

5. The process of producing sound metal castings, which consists in adding a zirconium alloy to the molten casting metal.

6. The process of producing sound metal castings, which consists in adding a zirconium alloy to the molten casting metal, the minimum amount of zirconium added being one per cent.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

LUDWIG WEISS. [L. s.]

Witnesses:

OTTO KÖNIG,
WALTER VONNEGUT.