

UNITED STATES PATENT OFFICE.

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PROCESS OF HARDENING COPPER.

No. 845,606.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROSEMOND T. ANDERSON, a citizen of the United States, residing at Parkersburg, in the county of Wood, State of West Virginia, have invented certain new and useful Improvements in Processes for Hardening Copper; 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.

This invention relates to processes for hardening copper, the object of the invention being to enable the tempering of copper to various degrees of hardness, so that it may be employed for a variety of uses from which its natural qualities prohibit.

In carrying out the method or process embodied in the present invention a crucible of suitable dimensions and material is employed, and in the bottom thereof is placed a quantity of clean white sand to a suitable depth, but preferably covering the entire bottom of the crucible. Upon this layer of sand is placed chemically pure zinc, preferably in sheet form, although it may be granulated, the sheet or body of zinc, however, having preferably an area greater than that of the body of copper to be tempered. Upon the zinc is placed a second layer of clean white sand to a depth of about one inch, although the exact depth is not essential, and upon the second layer of sand is disposed the copper body to be tempered. More clean white sand is then packed closely over and around the copper to a depth of about one inch above the copper, and upon this sand is placed another sheet or other body of zinc having an area preferably greater than that of the copper body. A final covering of clean white sand is then supplied. When the crucible has been prepared as above described, it is subjected, with its contents, to a gradual heat until the crucible, when of iron, is a cherry red, and the heat is maintained for a period sufficiently long to heat the copper body uniformly through, after which the crucible and its contents is allowed to slowly cool.

During the process above described the zinc is volatilized and the resulting gas chemically unites with the copper, the degree of hardness of the copper depending upon the quantity of gas absorbed, and consequently upon the quantity of zinc volatilized.

It is desirable that the zinc shall have a continuous superficial area and also that the sheet-zinc be used to prevent access to the copper of any foreign gas or gases, such as might arise from the material of the crucible. During this process the zinc causes the copper to change from a soft condition to a hard condition.

It will be understood that in practice modifications in the specific process described may be made and that other material than sand may be employed for sustaining the copper in proper position for subjection to the zinc fumes or that any other means than that above described may be employed for subjecting heated copper to the action of zinc fumes.

Having thus described the invention, what is claimed is—

1. The process of hardening copper which consists in subjecting it in a heated state to fumes of zinc and out of contact with the zinc from which the fumes arise.

2. The process of hardening copper which consists in disposing the copper between bodies of zinc and then heating the zinc to the point of volatilization and simultaneously heating the copper to a temperature sufficient to cause it to combine with the volatilized zinc.

3. The process of hardening copper which consists in disposing the copper between bodies of zinc in spaced relation thereto and subjecting the entire mass to a temperature sufficient to volatilize the zinc.

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

ROSEMOND T. ANDERSON.

Witnesses:

FRANK C. HALL,
GEO. H. CHANDLEE.