

UNITED STATES PATENT OFFICE.

WILLIAM H. WALKER, OF NEWTONVILLE, MASSACHUSETTS, ASSIGNOR TO
TOWLE MANUFACTURING COMPANY, OF NEWBURYPORT, MASSACHU-
SETTS, A CORPORATION OF MASSACHUSETTS.

ALLOY OF SILVER.

SPECIFICATION forming part of Letters Patent No. 712,027, dated October 28, 1902.

Application filed April 28, 1902. Serial No. 104,980. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM H. WALKER, a citizen of the United States, residing at Newtonville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Alloys of Silver, of which the following is a specification.

My invention relates to annealed alloys of silver containing copper or other oxidizable metal.

Heretofore, so far as known to me, a workable annealed alloy of silver containing copper or other oxidizable metal and free from fire-surfaces during and after annealing has not been produced. This is because in the process of annealing as heretofore carried out in practice the oxygen of the air unites with the oxidizable component of the alloy during the process of heating to the required annealing temperature or during the process of cooling from said temperature. When copper is the oxidizable component, black oxid of copper is produced by this oxidizing process, forming what is technically known as "fire-surfaces."

A silver alloy affected by fire-surfaces, as just described, must usually be finished by removing the fire-surfaces by chemical, electrochemical, or mechanical means. This necessity for removal of the fire-surfaces has ever been a serious hindrance and source of loss to silversmiths.

The object of my invention is to provide as a new article of manufacture a workable annealed alloy of silver containing copper or other oxidizable metal and free from fire-surfaces during and after the completion of the process of annealing. By "the process of annealing" I mean to include the cooling from the annealing temperature as well as the heating to that temperature.

The process of annealing which I prefer to employ to produce my new annealed alloy of silver is as follows: The silver alloy to be annealed is heated to the annealing temperature (about 600° centigrade) in an atmosphere of gases mixed in such proportions that there

is present sufficient reducing-gas to prevent oxidation and at the same time enough inert gas to prevent the injurious absorption of the reducing-gas by the alloy. By absorption of reducing-gas the silver alloy becomes brittle and otherwise unworkable. I have found that good results are obtained when the proportion of reducing-gas to inert gas is about as one to two. After the annealing temperature has been reached the alloy may be cooled in such an atmosphere, or it may be transferred in a substantially unoxidized condition to some other air-excluding bath for the cooling process.

In the production of my new annealed alloy I prefer to use the apparatus described in the application for United States Letters Patent to Caleb Stickney, Serial No. 700,101, dated May 13, 1902. For the best results the muffle or container of the prepared gases must be maintained continuously at the annealing temperature, and as soon as a charge of silver alloy therein has reached this temperature it should be removed to some other air-excluding bath for the cooling process.

Ordinary producer-gas ($N+CO+CO_2$, with or without H , depending on the moisture in the fuel) may be successfully used for the artificial atmosphere when the apparatus is so controlled as to produce approximately two parts of inert gas ($N+CO_2$) to one part of reducing-gas, ($CO+H$). Methane (CH_4) and other gases made up of carbon and hydrogen may be used as a reducing-gas.

What I claim is—

As a new article of manufacture, a workable annealed alloy of silver containing copper, or other oxidizable metal, and free from fire-surfaces during and after the completion of the process of annealing.

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

WILLIAM H. WALKER.

Witnesses:

ARTHUR D. LITTLE,
EDWARD S. BEACH.