

# UNITED STATES PATENT OFFICE.

SAMUEL WALKER, OF BIRMINGHAM, ENGLAND.

TREATING MOLTEN COPPER FOR MAKING CAST HOLLOW CYLINDERS AND OTHER CASTINGS.

SPECIFICATION forming part of Letters Patent No. 230,369, dated July 20, 1880.

Application filed April 15, 1880. (No specimens.) Patented in England December 2, 1879.

*To all whom it may concern :*

Be it known that I, SAMUEL WALKER, a subject of the Queen of Great Britain, residing at Birmingham, in the county of Warwick, England, (manufacturer,) have invented certain new and useful Improvements in Treating Molten Copper for Making Cast Hollow Cylinders and other Castings, (for which I have received Letters Patent in England, No. 4,926, dated December 2, 1879;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference principally to the manufacture of the cast hollow cylinders of copper from which copper tubes are made, but is also applicable to the production of other castings of copper—such, for example, as copper rollers used for printing fabrics.

I will describe my invention in connection with a cast hollow cylinder of copper.

In the ordinary method of casting hollow cylinders of copper the casting produced is porous or unsound. In order to prevent porosity or unsoundness in the casting I add to the melted copper, a short time before pouring it into the mold, cryolite, preferably crushed or powdered, or any compound, natural or artificial, having a similar composition—such, for example, as fluor-spar or artificial fluor-spar.

In pouring the copper into the mold the fused cryolite may be poured with it. This, however, is not necessary, and in cases where it is for any reason inconvenient or undesirable to pour the fused cryolite into the mold it may be retained in the melting-pot and the fused copper only be poured into the mold. By the action of the said cryolite on the melted copper a sound casting—that is, a casting free from the porosity of an ordinary copper casting—is produced. The copper casting so obtained is, however, harder or less ductile than is desirable for the manufacture of tubes. In order to correct this hardness or want of ductility, I add to the melted copper, in addition to the cryolite, acetate of lead, which gives the required ductility to the copper.

The mineral cryolite is a double fluoride of aluminium and sodium, and is an article of commerce.

I find in practice that somewhat less than one part, by weight, of cryolite to one hun-

dred parts, by weight, of copper and a quantity of acetate of lead equal to about one-third the quantity of cryolite produce satisfactory results—that is, to every one hundred pounds of copper I add about one pound of cryolite and one-quarter of a pound of acetate of lead. To these materials about one pound of borax may be added. The proportions of the ingredients may, however, be varied.

After the copper has been melted I add the mixture of cryolite and acetate of lead either with or without borax. After from ten minutes to a quarter of an hour, or soon after the mixture of cryolite, acetate of lead, and borax has thoroughly melted, I pour into the mold the melted copper.

Copper castings made according to my invention may be used for a variety of purposes to which copper cast in the ordinary way cannot be applied.

Where only freedom from porosity is required in the casting the cryolite alone may be used.

Where, in addition to freedom from porosity, ductility is required, acetate of lead may be used in addition to the cryolite.

Having now described the nature of my invention, and the manner in which the same is to be performed, I wish it to be understood that I claim as my invention—

1. The method of preventing porosity in cast hollow cylinders of copper and other castings of copper by adding to the melted copper, before pouring it into the mold, cryolite or other compound, natural or artificial, of similar composition, either alone or with the addition of borax, substantially as hereinbefore described.

2. The method of preventing porosity in cast hollow cylinders of copper and other castings of copper, and at the same time giving ductility to the said cast hollow cylinders and other castings of copper by adding to the melted copper, before pouring it into the mold, cryolite or other compound, natural or artificial, having a similar composition, together with acetate of lead, either with or without the addition of borax, substantially as hereinbefore described.

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Witnesses :

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