

No. 667,367.

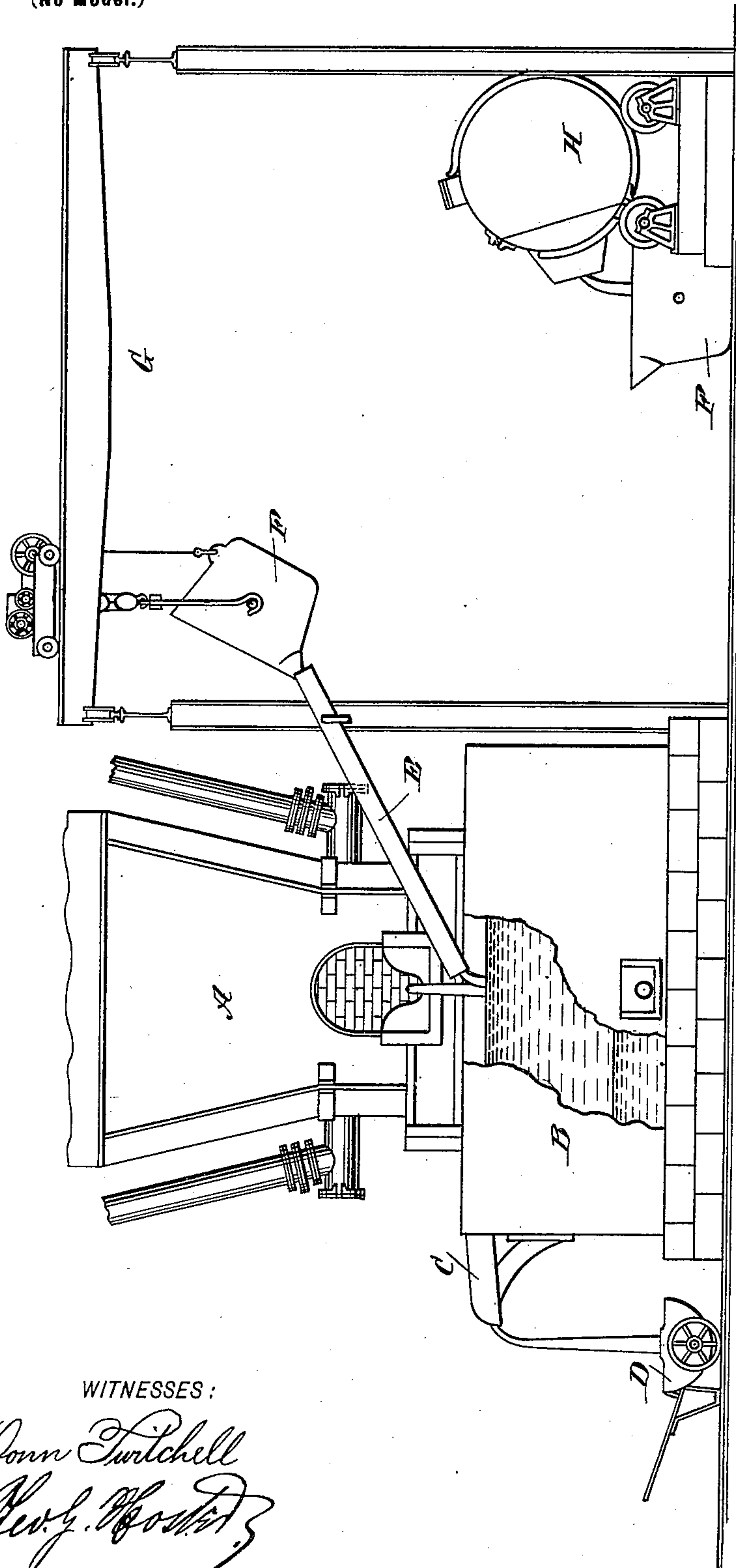
Patented Feb. 5, 1901.

G. MITCHELL.

METHOD OF TREATING CONVERTER SLAG PRODUCED IN BESSEMERIZING  
COPPER MATTES.

(Application filed Mar. 30, 1899.)

(No Model.)



WITNESSES:

*Donn Twitchell*  
*Rev. J. Hostet*

INVENTOR

*George Mitchell*

BY

*Mum*

ATTORNEYS.

# UNITED STATES PATENT OFFICE

GEORGE MITCHELL, OF JEROME, ARIZONA TERRITORY.

METHOD OF TREATING CONVERTER-SLAG PRODUCED IN BESSEMERIZING COPPER MATTES.

SPECIFICATION forming part of Letters Patent No. 667,367, dated February 5, 1901.

Application filed March 30, 1899. Serial No. 711,099. (No specimens.)

*To all whom it may concern:*

Be it known that I, GEORGE MITCHELL, of Jerome, in the county of Yavapai and Territory of Arizona, have invented a new and Improved Method of Treating Converter-Slag Produced in the Bessemerizing of Copper Mattes, of which the following is a full, clear, and exact description.

The object of the invention is to utilize the heat of the matte and slag as it comes from the cupola-furnace in the smelting of copper sulfids, pyrites, and other copper ore to extract the copper remaining in the converter-slag and so avoid the remelting of converter-slag or its treatment in any furnace.

The method consists, essentially, in first smelting the ores and allowing the matte and slag of the cupola to flow into the forehearth of the furnace, then in bessemerizing the mattes of the cupola-furnace, and then in heating the converter-slag by mixing it in the forehearth of the cupola-furnace with the molten mattes and slags of the cupola-furnace. The result of this is that the prills and mattes of the converter-slag settle to the bottom of the forehearth and are saved with the mattes of the cupola-furnace.

To accomplish this, I prefer an ordinary cupola or blast furnace, used in smelting copper, which discharges its matte and slag in the usual manner into a forehearth B, provided with a slag-outlet C for the slag to overflow through into a suitable vessel D, held below the end of the outlet, as indicated in the drawings. A spout E discharges into the forehearth B at or near the point where the matte and slag of the cupola A pass into the forehearth, and into the upper end of this spout E is discharged the converter-slag from a converter-ladle F, supported on and carried by a suitable overhead crane serving to carry the ladle F from the converter H to said spout E and back again to the converter, as will be readily understood by reference to the drawings.

Now by the arrangement described the slag from the converter H is discharged in the usual manner into the ladle F and is then transferred by the overhead crane G to the upper end of the spout E, into which the converter-slag is poured, so that it passes into the forehearth B at or near the point where

the matte and slag from the cupola pass into the hearth. The converter-slag thus passed into the forehearth mixes with the matte and slag from the cupola, and is thus highly heated by the cupola matte and slag, and consequently a quick separation of the metal contained in the converter-slag takes place, and becoming mixed with the matte of the cupola the matte-prills in the converter-slag owing to their specific gravity settle to the bottom of the forehearth B, while the slags readily overflow through the outlet C. Thus it is evident that the usual resmelting of the converter-slag for obtaining the metal is completely avoided, and the metal in the converter-slag is obtained without the expensive process of resmelting referred to.

I prefer to discharge the converter-slag into the forehearth at or near the point where the furnace-matte passes into the forehearth, as at this point of the forehearth the cupola matte and slag are hottest, and consequently the converter-slag is subjected to this high temperature and insures a ready separation of the metal in the converter-slag.

It is understood that the matte accumulating in the forehearth is drawn off in the usual manner from time to time through the forehearth tap-hole.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of producing copper, which consists in smelting the copper ore in a cupola-furnace, continuously drawing off the slag and matte produced, into the forehearth of the furnace, allowing the matte to settle in the forehearth and removing portions of it from time to time, bessemerizing the portions so removed and pouring the slag resulting from the bessemerizing in a stream into and through the body of the cupola slag and matte in the forehearth and thereby raising its temperature, without the use of additional fuel, to a point where the converter-slag is resmelted, thus causing the matte-prills contained therein to settle to the bottom of the forehearth.

2. The method of producing copper, which consists in smelting the copper ore in a cupola-furnace, continuously drawing off the slag and matte produced, into the forehearth



of the furnace, allowing the matte to settle  
in the forehearth and removing portions of  
it from time to time, bessemerizing the por-  
tions so removed and pouring the converter-  
slag resulting from the bessemerizing into  
5 the molten matte and slags as they come from  
the cupola, so that the matte and slag of the  
cupola and the converter-slag will flow into  
the forehearth at substantially the same spot,

thereby raising the temperature of the con- ro  
verter-slag, without the use of additional  
fuel, to a point where the matte-prills con-  
tained in the converter-slag are liberated and  
settle to the bottom of the forehearth.

GEORGE MITCHELL.

Witnesses:

MICHAEL J. BRADLEY,  
ALBERT VON SCHRILTZ.