

UNITED STATES PATENT OFFICE.

ABRAHAM T. HAY, OF BURLINGTON, IOWA.

SPONGE FOR REDUCING GOLD AND SILVER AND OTHER ORES.

SPECIFICATION forming part of Letters Patent No. 399,527, dated March 12, 1889.

Application filed September 25, 1888. Serial No. 286,385. (Specimens.)

To all whom it may concern:

Be it known that I, ABRAHAM T. HAY, a citizen of the United States, residing at Burlington, in the county of Des Moines and State of Iowa, have invented certain new and useful Improvements in Sponges for Reducing Gold and Silver and other Ores; and I do 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.

The object of my invention is to provide a flux or semi-metallic sponge to be used in the reduction of various ores belonging to the gold and silver groups. For the greatest economy, the sponge should vary in composition according to the proportions of the negatives—that is to say, the salts or oxides of the metals in the ore to be operated upon.

The object of the sponge is to utilize the superior affinities of the metalloids for the more positive of any two metals belonging to the same isomorphous group, in neutralizing and overcoming the affinities of the metalloids severally or collectively for the less positive metals with which the metalloids are combined in the ore and which it is desired to separate. For instance, the well-known superior affinity of sulphur for sodium over its affinity for silver is utilized in separating the sulphur and silver; but by my invention this principle is applied in a different manner and with more advantageous results than heretofore.

In order to make my invention clearly understood, I will describe, by way of example, a practical means of carrying the same into effect for the reduction, in this instance, of an ore containing gold and silver, copper, and lead.

In the furnace described in my patent dated October 9, 1888, No. 390,964, I place a charge of about seventy-five (75) parts, by weight, of iron oxide—such, for instance, as the Pilot Knob ore of Missouri—five (5) parts of aluminous substance—such as scrap-brick—five

(5) parts of crude potash, five (5) parts of carbonate or other oxide or salt of soda, and ten (10) parts of baryta or heavy spar—and fuse the same by a pressure or fan-blast, using from twenty (20) to fifty (50) parts of fuel—such as coke or charcoal—to every one hundred (100) parts of the above stock. During this operation the electrical force is applied to the coils, using for about two miles of wire a generator—say from four to six gravity gallon cells—care being taken, by judicious changes in the proportions of the elements of the stock and in the electrical force applied, to meet varying barometrical and other atmospheric conditions, and secure the desired result—namely, the production of a semi-metallic ferruginous alkaline sponge.

This sponge is employed as a reagent in the proportion which will meet the requirements of the mineralized condition of the ore to be smelted—say in the proportion of one or one and a-half per cent. of the total stock—and is charged into the ore-reduction furnace with the rest of the stock. In its result it largely promotes the reduction of the stock and liquefies the cinder to a remarkable extent.

It will be understood that my invention may be practically used without following exactly the proportions given, though I consider said proportions to be ordinarily the most economical and practical, and I therefore do not confine my invention to said proportions or to the exact ingredients specified in the example given above of the isomorphous sponge alloy.

Having thus described my invention, what I claim is—

A ferruginous sponge containing iron and an alkali or alkalies, substantially as and for the purposes set forth.

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

ABRAHAM T. HAY.

Witnesses:

H. N. LOW,
E. K. STURTEVANT.