

# UNITED STATES PATENT OFFICE.

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## PROCESS OF TREATING MATTE.

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To all whom it may concern:

Be it known that I, JOSEPH SAVELSBERG, doctor of philosophy, a subject of the King of Prussia, German Emperor, residing at Papenburg-on-the-Ems, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in a new Process for Treating Matte; 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.

My invention relates to the treatment of matte, and has for its object to remove the iron in an economical and practical manner.

The blowing of matte containing iron in the presence of silica, in order to cause the iron to enter the slag, is already known; but the process has the following drawbacks: First, practically all the sulfur contained in the matte is burned to sulfuric acid ( $\text{SO}_2$ ) and escapes into the air; second, the silica is taken from the lining of the Bessemer converter, thereby destroying the lining.

The method of first roasting the matte and then smelting it with sand in a shaft-furnace in order to slag the iron oxidized by the roasting also has drawbacks. Besides being very costly, due to the large fuel consumption, the roasted product is in a pulverulent condition, requiring briquetting before smelting. Moreover, the roasting must proceed with care in order to leave sufficient sulfur in the mass for the subsequent smelting.

According to the present invention the above-described objections are obviated. I treat the matte containing iron as follows: The matte is finely divided and mixed with the necessary percentage of slag-forming ingredients, such as sand and lime, requisite for the subsequent slagging of the iron. This mixture is then brought onto a bed of glowing material, as coal, coke, ore, &c., in a suitable apparatus and a suitable blast passed through the mixture from below. The mass, due to the heat of reaction, becomes red hot without completely melting, so that the mass sinters together. The blowing is completed when the red-hot mass cools down, which it does very rapidly. During the blowing practically all the sulfur com-

combined with the iron has combined with the nickel, copper, &c., while practically all the iron has been oxidized by the action of the air-blast. The mixture after cooling is preferably broken into pieces of suitable size for subsequent smelting in a shaft-furnace, which will yield a matte practically free from iron, yet containing substantially all the sulfur of the previous matte, while the slag is quite fluid and contains only a small percentage of nickel, copper, &c., and nearly all the iron in the matte previously employed.

A matte containing fifty per cent. nickel, fourteen per cent. sulfur, and thirty-six per cent. iron contained after treatment in accordance with this invention—*i. e.*, blasting and subsequent smelting—seventy-seven per cent. nickel, twenty to twenty-one per cent. sulfur, and one-half per cent. iron, from which it will be seen that hardly any sulfur was lost, since the proportion of nickel to sulfur in the resulting matte is the same as in the matte treated.

I claim—

1. The method of treating matte preparatory to smelting, which consists in mixing matte with suitable fluxes, charging the mixture in a suitable apparatus on a layer of glowing material and forcing an air-blast through the charge to sinter it, substantially as and for the purpose set forth.

2. The method of treating matte preparatory to smelting, which consists in mixing matte with a suitable quantity of fluxes, charging the mixture in a suitable apparatus on a bed of glowing material, forcing an air-blast through the charge to sinter it and then cooling and breaking up the charge, substantially as set forth.

3. The method of producing matte free from iron, which consists in mixing matte with a suitable quantity of flux, charging the mixture into a suitable apparatus on a bed of glowing material, blowing the charge to cause it to sinter by the heat of reaction, and finally smelting the matte in a shaft-furnace, to cause the iron therein to enter the slag, substantially as set forth.

4. The method of producing matte free from iron, which consists in mixing matte with fluxes, charging it into a suitable appa-

ratus onto a bed of glowing material, forcing  
a blast through the charge, cooling and break-  
ing up the resulting product and finally  
smelting said product in a shaft-furnace to  
5 cause the iron to enter the slag and form a  
matte substantially free from iron, substan-  
tially as set forth.

In testimony that I claim the foregoing as  
my invention I have signed my name in pres-  
ence of two subscribing witnesses.

JOSEPH SAVELSBERG.

Witnesses:

BESSIE F. DUNLAP,  
LOUIS VANDORY.