

# UNITED STATES PATENT OFFICE.

J. LEE FLOYD, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 91,324, dated June 15, 1869.

*To all whom it may concern:*

Be it known that I, J. LEE FLOYD, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Iron and Steel, and for the smelting of iron, gold, silver, and copper ores, and for the manufacture of brass.

My discovery is of an improved flux and purifier, to be composed and used in the manner and in the quantities particularly set out in the following specification, which I give to enable others to use my invention.

I use in the blast-furnace from five to seven pounds of fluor-spar (broken to the size of hickory-nuts) to each ton of iron ore. If the ore is very dirty, eight pounds of fluor-spar may be used, and if the fuel is anthracite coal eight pounds of willow or other wood are to be added, (the willow being best,) to be thrown in among the ore when being charged.

In the puddling or boiling furnace I use, to each ton of iron, two or three pounds of fluor-spar, together with sixty pounds of fresh horse-manure, the ingredients to be added while the iron is being raked in, and until its cinder is obtained. After the cinder is obtained, use from a pound and a half to two pounds of the fluor-spar with the same quantity of horse-manure as before. If anthracite iron is used instead of the horse-manure, eighty pounds of willow or other wood, (preferring the willow,) cut to the size of a man's arm, may be used, the wood to be put in at the stopper-hole, after the iron is all melted, and raked to the bottom.

In piling iron for the heating-furnace, sprinkle among the layers of iron, while being piled, two pounds of pulverized fluor-spar to the ton of iron.

In the cupola-furnace, use from two to three pounds of fluor-spar, broken to the size of Indian-corn grains, and two pounds of carbon—the deposit found in retorts used in the manufacture of illuminating-gas, and commonly thrown away as useless.

In the manufacture of steel in the puddling or boiling furnace, to every ton of iron use six pounds of fluor-spar, pulverized, with sixty pounds of fresh horse-manure or eighty pounds of willow or other wood, preferring the willow.

I can dispense entirely with the use of lime, if desired.

In the manufacture of brass, use the fluor-spar instead of zinc and salt, using about from four to five pounds of pulverized fluor-spar to the ton of the mixture to be converted into brass.

In extracting gold from the ore, use in the smelting-furnace one-third, in weight, of the fluor-spar to two-thirds gold ore, both pulverized, and thrown together in the furnace, raking over often while the mixture is melting. When all is melted, throw in ten pounds of common salt to the ton of the mixture.

The same course is to be pursued in the smelting of silver and copper ores.

I claim—

The use of fluor-spar and horse-manure, or their respective chemical equivalents, and wood and carbon, in the manner and in the quantities and in the combinations and for the purposes substantially as above set forth, for the smelting of iron, gold, silver, and copper ores and other ores, and in the manufacture of iron, steel, and brass.

J. LEE FLOYD.

Witnesses:

M. BAILEY,  
A. POLLOK.