

# UNITED STATES PATENT OFFICE.

JOSEPH POPPING, OF NEW YORK, N. Y., ASSIGNOR OF TWO-THIRDS HIS RIGHT TO HERMANN SCHIERLOH, OF JERSEY CITY, NEW JERSEY, AND HENRY SCHIERLOH, OF NEW YORK, N. Y.

## IMPROVEMENT IN WELDING IRON AND STEEL.

Specification forming part of Letters Patent No. **142,939**, dated September 16, 1873; application filed September 9, 1873.

*To all whom it may concern:*

Be it known that I, JOSEPH POPPING, of the city of New York, in the county of New York and State of New York, have invented an Improved Process of Combining Pieces of Iron and Steel, and iron with iron, and steel with steel, and malleable or other iron with cast-steel, and a compound to be used therein, of which the following is a specification:

The object of my invention is to combine iron and steel; and it consists in making a compound of borax and iron filings to be used for the purpose, and in the process of applying the same.

In carrying out my invention take hard borax and melt it in an iron pan over fire. When perfectly melted, let it get cold. Then crush it to powder. Then mix one part in weight of this powder with one part in weight of clear filings of iron. Then take the pieces to be combined; warm one of them slightly, so that the mixture will stick to it; then, both pieces being in iron-clean condition, sprinkle the warm piece with the mixture till it is fairly covered; then place the other piece on this covering, and, while the two pieces are firmly held together, heat them red hot and then hammer them well together.

My compound more firmly unites the two metals together and, in fact, unites them so that they form one solid body, which cannot again be separated into its original parts; and this process, further, makes a combination

which preserves, in greater degree than could otherwise be done, the original hardness and tenacity of the steel, because not heated to so high a degree, and at the same time a combination which, by the connection of the two pieces, strengthens them and prevents all possibility of break.

By my process of combining iron and steel, I have only to use cherry-heat, and do away entirely with welding-heat, and therefore save not only a great deal of fuel and time, but need not have the steel to undergo the welding-heat, which very often spoils all of the durability and tenacity of the steel.

Having described my invention, what I claim is—

1. The within-described welding compound consisting of calcined borax and iron filings, substantially as described.

2. The process herein described of uniting iron to steel—that is to say, first heating one or more pieces of metal slightly, then applying the compound, and then joining the two metals and subjecting them to a red-hot heat, and then hammering or rolling them well together.

Dated September 11, 1873.

JOSEPH POPPING.

Witnesses:

CHARLES H. VOORHIS,  
WILLIAM W. SANDERSON.