

W. BATTY.
Refining Iron and Steel.

No. 57,059.

Patented Aug. 7, 1866.

Fig. 1.

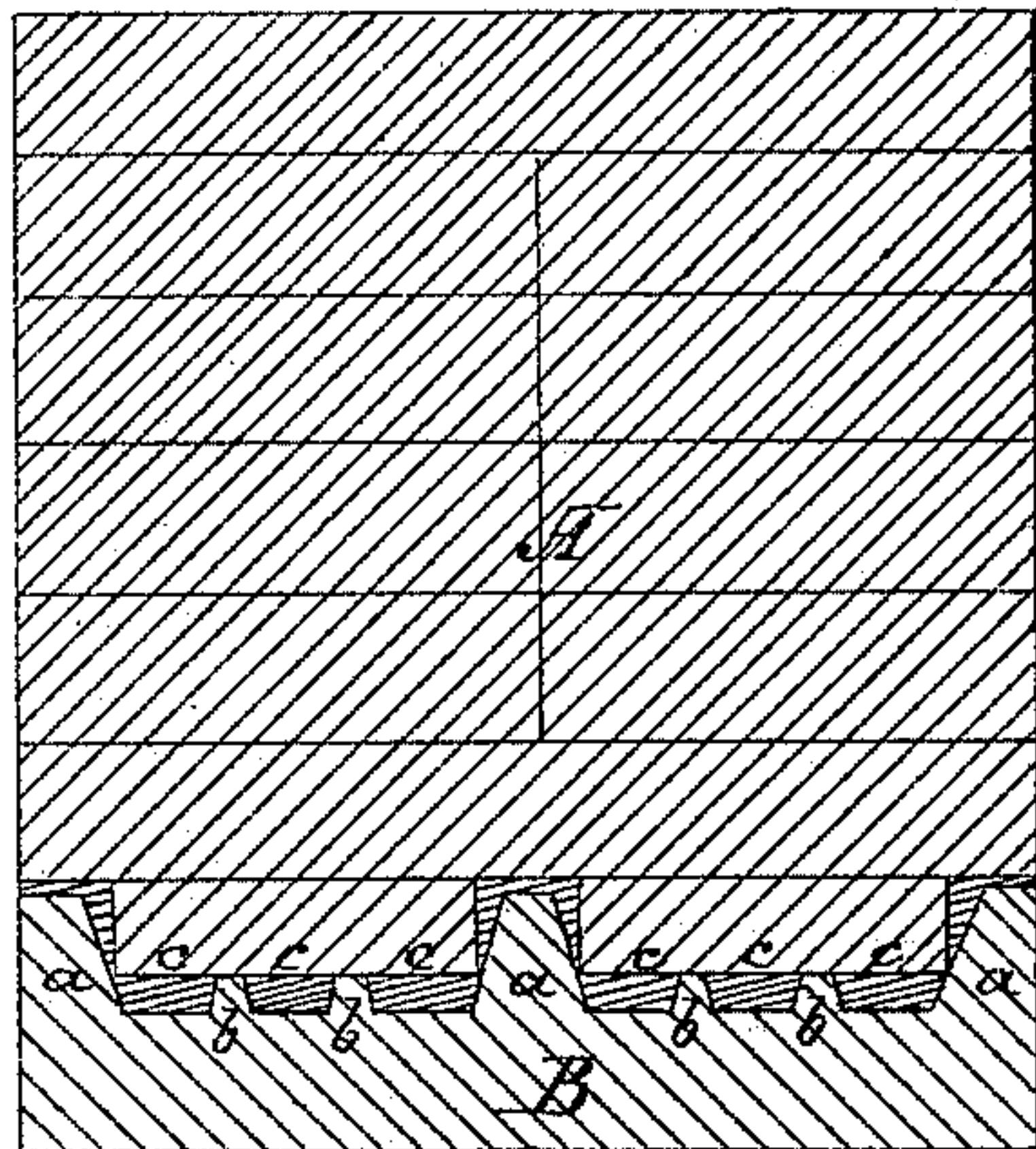


Fig. 2.

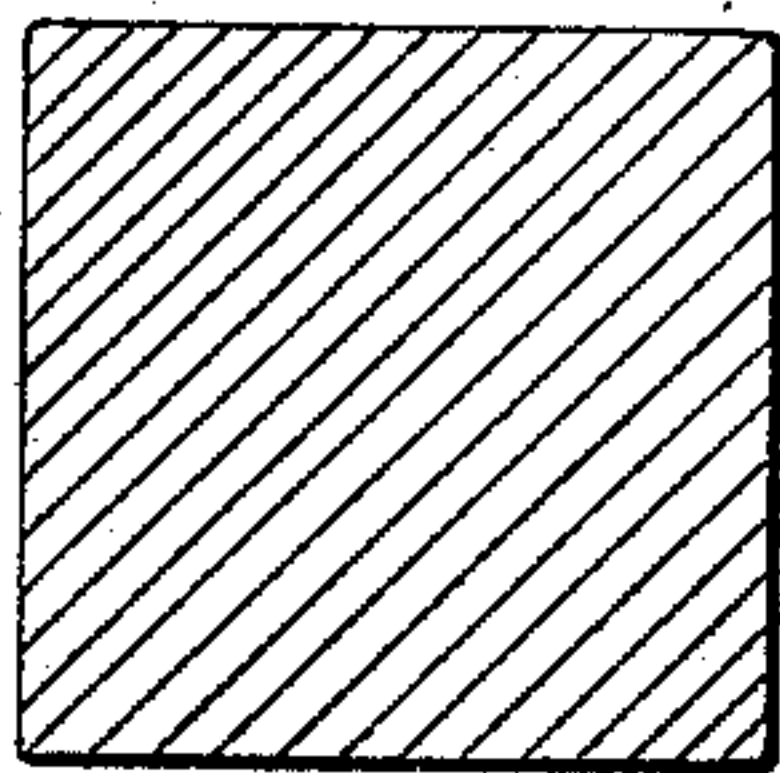


Fig. 3.

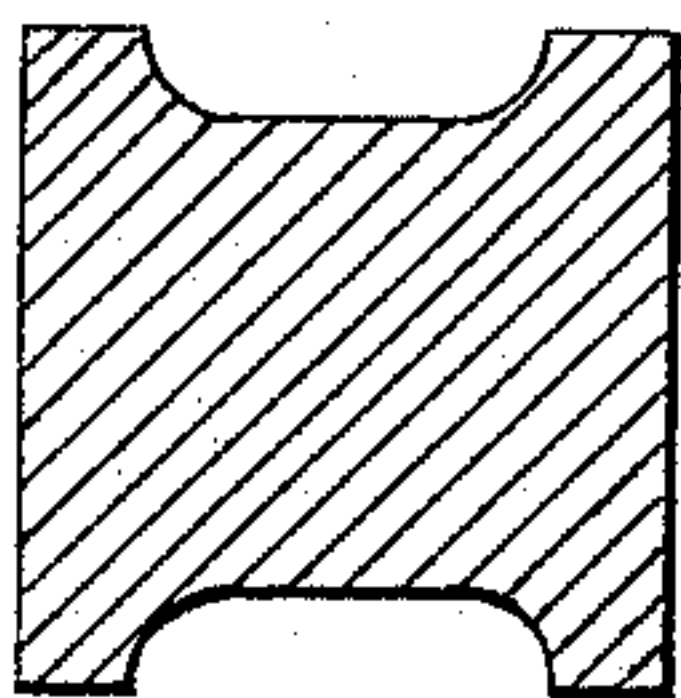


Fig. 4.

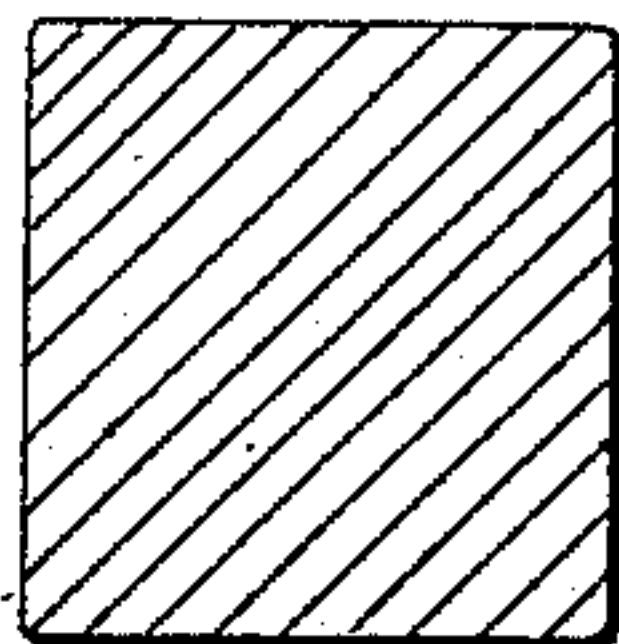


Fig. 5.

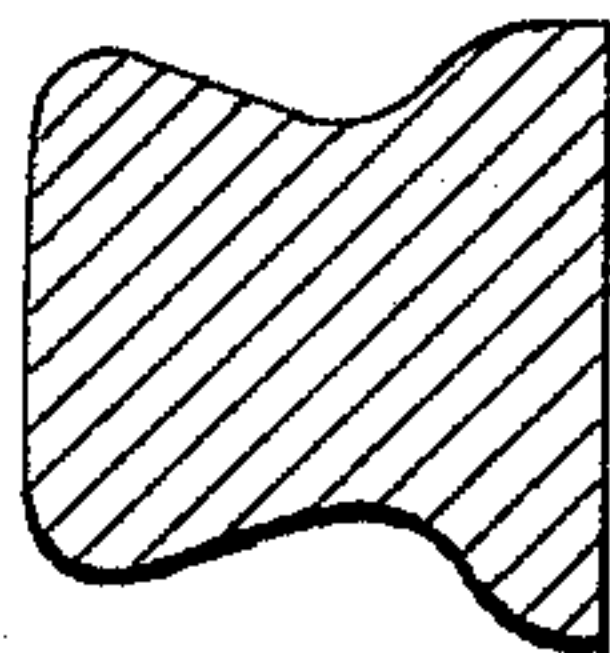


Fig. 6.

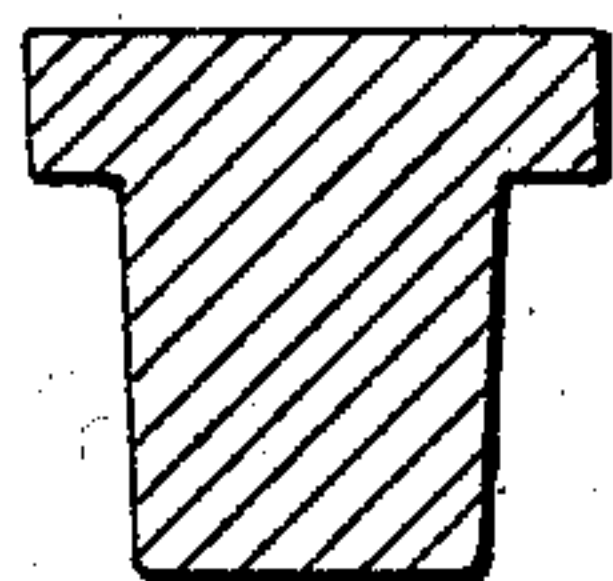


Fig. 7.

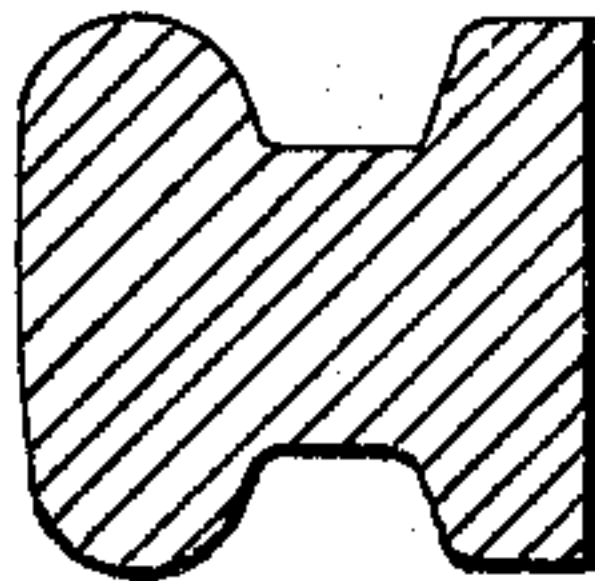


Fig. 8.

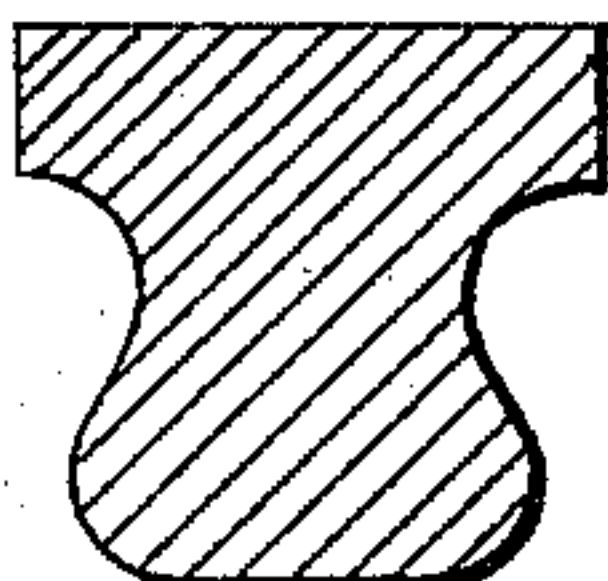


Fig. 9.

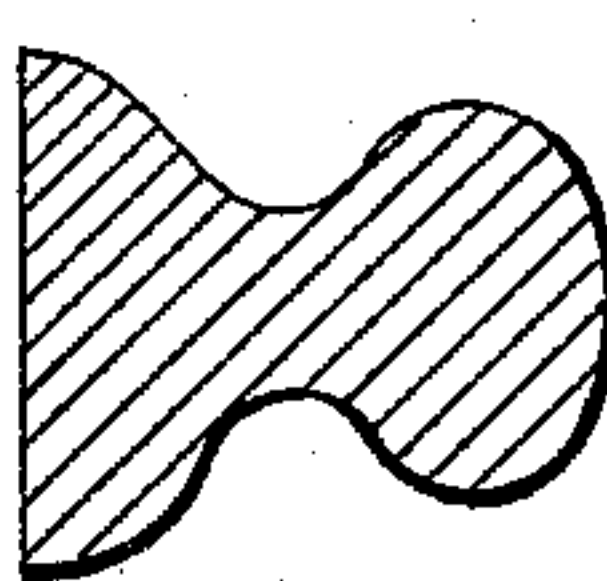


Fig. 10.

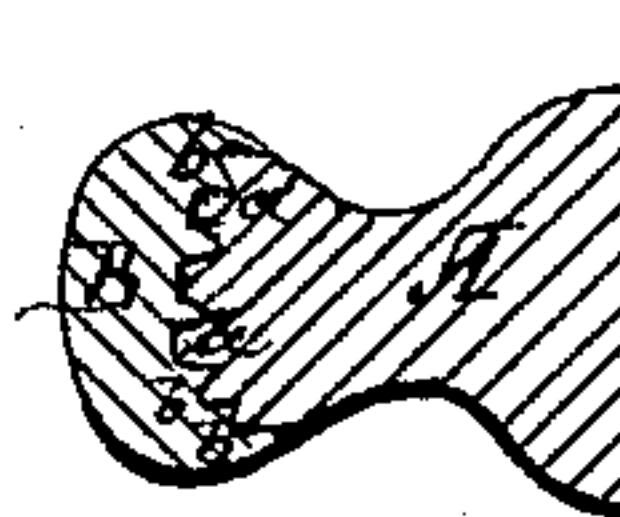
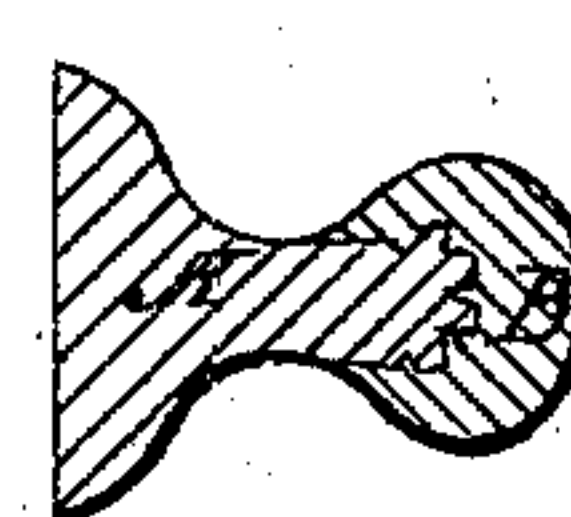


Fig. 11.



Witnesses:

Charles D. Kellum
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Inventor:

His
William + Batty
Mark

UNITED STATES PATENT OFFICE.

WILLIAM BATTY, OF TROY, NEW YORK.

IMPROVEMENT IN UNITING IRON AND STEEL FOR THE MANUFACTURE OF RAILROAD-RAILS.

Specification forming part of Letters Patent No. 57,059, dated August 7, 1866.

To all whom it may concern:-

Be it known that I, WILLIAM BATTY, a British subject, residing at Troy, in the county of Rensselaer and State of New York, have invented a new and useful Improved Process for the Manufacture of Rails for Railroads; and I do hereby declare that the following is a true and exact description of the said process, reference being had to the accompanying drawings, which are hereby declared to be a part of this specification.

My invention relates to wrought-iron rails with steel heads or faces. Heretofore attempts have been made to manufacture rails of wrought-iron with a head or face of steel; but that object was never successfully accomplished, as it was found that the iron and steel would not weld or adhere sufficiently to prevent the steel face from being loosened by the weight and friction of the cars when in actual use, and the same, when so loosened, was not only useless but dangerous.

The purpose of my improved process is to obviate this difficulty and to produce an iron rail with a steel face, in which the steel is perfectly welded to the iron, so that there is no possibility of loosening or slipping.

It consists in the employment of a compound of borax, sal-ammoniac, common salt, potash, and charcoal as a flux to promote the perfect welding of the iron and steel, substantially as hereinafter described and set forth.

Having set forth the general nature of my said invention, and to enable others skilled in the art to which it relates to use the same, I will proceed to describe my improved process, which is as follows:

Figure 1 of the drawings represents a pile of iron and steel prepared according to my process and ready for the heating-furnace.

I first pass the steel plate which is designed to form the head or face of the rail through a roll specially constructed and adapted for that purpose, which causes it to take the shape shown in Fig. 1, in which B represents the said steel plate after passing through the roll above mentioned. This plate may be of puddled steel or Bessemer metal.

a a a are ridges at the sides and in the mid-

dle of the said steel plate, and *h h* are smaller ridges, while *c c* are grooves in the steel between the ridges. This steel plate forms the bottom of the pile, and upon it I place the wrought-iron which forms the bottom and web of the rail. These may consist of rolled-iron plates or of old rails or other pieces of wrought-iron, which may be placed in the pile and rolled as in manufacturing the common rail. The pile so prepared is then taken to the heating-furnace and heated in the usual manner. For the purpose of promoting the adhesion of the iron and steel plates and causing them to form a perfect weld, I use a compound or mixture of four parts, by weight, each of borax, sal-ammoniac, and common salt, with one part each of potash and charcoal, all powdered and thoroughly mixed and combined. At the moment when the pile is sufficiently heated and is about to be taken out of the furnace I throw about two ounces of the above mixture into the grooves *c c* of the steel plate B, which acts as a flux and enables the steel and iron, when pressed together in the rolls, to adhere and weld in the most complete and perfect manner.

After the application of the mixture, as above stated, the pile is removed from the furnace and passed through the rollers in the usual manner of making wrought-iron rails. The different stages of this process are shown in Figs. 2 to 11, inclusive, but it does not need a more particular description than there shown.

The pressure of the rolls forces the soft iron into the grooves and around the ridges of the steel, and causes the completed rail to assume the form substantially shown in Figs. 10 and 11. The outside ridges, *a a*, of the steel plate B lap down on both sides of the iron web A of the rail, and the smaller ridges *h h* are forced into the substance of the iron, while the particles of the steel and iron adhere with the greatest possible force.

In a rail made by my process the steel face will not slip or loosen by any amount of use, and it is found that the steel and iron cannot be separated, even by the application of sufficient force to break the rail. They are equally durable with rails made entirely of steel, and

are believed to be better able to bear any cold weather, while they are, of course, much more economical.

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

The employment as a flux of the compound or mixture herein mentioned and described, substantially in the manner and for the purposes hereinbefore described and set forth.

In testimony whereof I have hereunto set my hand this 2d day of June, A. D. 1866.

WILLIAM ^{his} × BATTY.
mark.

Witnesses:

CHARLES D. KELLUM,
R. W. REILLE.