

# UNITED STATES PATENT OFFICE.

ASAHIEL J. SEVERANCE, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JOHN D. BROWN, OF SAME PLACE, AND WINFIELD M. CLARK, OF ALBANY, NEW YORK.

## WELDING COMPOUND.

SPECIFICATION forming part of Letters Patent No. 429,777, dated June 10, 1890.

Application filed October 11, 1889. Serial No. 326,719. (No specimens.)

*To all whom it may concern:*

Be it known that I, ASAHIEL J. SEVERANCE, a citizen of the United States, residing in New York, in the county and State of New York, have invented a certain new and useful Welding Compound, of which the following is a description.

The compound which I have produced is made up as follows: Borax, thirty-three parts; pumice-stone, eight parts; salt, one part; sal-ammoniac, three parts; dolomite, one part; and spathic-iron ore, one part. Proportions by weight.

The above-named substances when combined in substantially the proportions stated produce the best and most effective compound for welding, toughening, and refining iron and steel of which I am aware; but I do not limit myself to the exact proportions of the several ingredients given, as these may be considerably varied in making up compounds which produce results of the same general character.

To produce this compound, I thoroughly dry the component elements either together or separately and mix them together as perfectly as possible, and pulverize them by grinding or otherwise, in which condition the material is put up in suitable quantities or packages, as may be best adapted to the uses to which the material is to be applied.

This compound is used in the same manner and for the same purposes as other so-called "welding compounds" heretofore made—that is to say, a given quantity of the powder may be sprinkled upon the surface of the iron or steel to be welded, worked, or forged while the latter is red-hot or at a sufficiently high temperature to absorb the compound. It may also be added to soft or rain water and the solution used for tempering steel or case-hardening iron or steel that has not been previously treated with the compound.

Another and more important use discovered by me is in manufacturing a high-grade steel by adding to or associating with the steel while in a molten state a given quantity of the compound.

In any and all of the above applications I

have found better results to follow from the use of this compound than it is possible to obtain by any other material prepared for a like purpose of which I am aware.

While I do not attempt to give the true action upon the metal of this compound, nor the functions which each element performs, I would state that the observed results are superior to those obtainable by the use of any other like compound known to me, and that the apparent chemical and mechanical effects of the several ingredients are directly traceable to the following characteristics of the same: Dolomite and spathic-iron ore possess peculiar qualities for toughening and refining iron and steel. Pumice-stone and borax are strong welding agents, while sal-ammoniac and salt are cleansing agents and give iron or steel a clean surface and also assist in hardening the same. Moreover, pumice-stone, borax, dolomite, and spathic-iron ore are all strong fluxing agents and refine iron or steel.

Experience has demonstrated the correctness of these conclusions from the effects observed in the use of certain known equivalents for some of the above ingredients. For example, I have employed in place of the spathic-iron ore the ordinary Venetian red of commerce or carbonate of iron generally. In lieu of dolomite I have used ordinary limestone, and "silica sand" or any of its compounds in the form of silicates may be substituted for the pumice-stone.

The elements which I regard as indispensable are the borax, sal-ammoniac, pumice-stone, and dolomite, or their described equivalents, for in place of the salt an equivalent proportion of sal-ammoniac may be used, and carbonate of iron or spathic-iron ore may be replaced by its equivalent of dolomite.

I am aware that welding compounds have been produced containing sal-ammoniac, borax, and carbonate of iron; but such compounds do not produce, either alone or in conjunction with other substances which have been combined with them, as good results as that above described.

What I claim is—

1. A compound for treating iron and steel, containing borax, pumice-stone, sal-ammoniac, and dolomite, or their described equivalents, in substantially the proportion set forth.
2. A compound for treating iron and steel, composed of borax, pumice-stone, salt, sal-

ammoniac, dolomite, and spathic-iron ore, or their described equivalents, as set forth.

ASAHEL J. SEVERANCE.

Witnesses:

WINFD. M. CLARK,  
JOHN D. BROWN.