

947,835.

Patented Feb. 1, 1910.

Fig. 1.

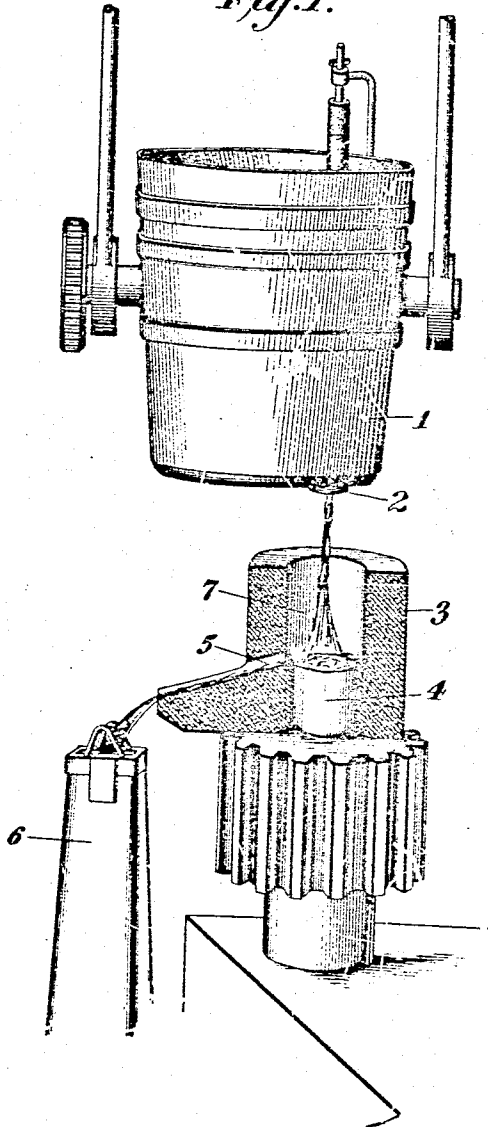
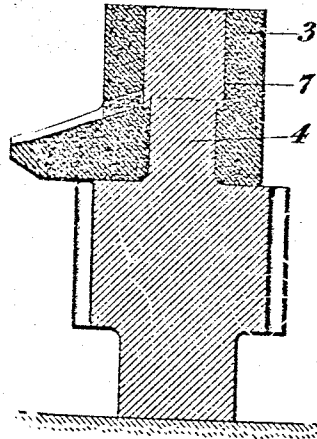


Fig. 2.



WITNESSES.

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FUSING PROCESS.

947,835.

Specification of Letters Patent.

Patented Feb. 1, 1910.

Application filed August 4, 1908. Serial No. 446,861.

To all whom it may concern:

Be it known that I, SCOTT MEISSNER, a citizen of the United States, residing in the city of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Fusing Processes; 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 a process of fusing metals and more particularly to a method of building up or fusing together parts of metal castings, forgings or similar articles which may have been fractured before the completion of the process of finishing, or after they have been put into use. This method is distinguished from those heretofore and now employed by the fact that an excess of material is used, such excess being utilized to wash away all trace of the slag and of the metal produced by the combination of the fusing compound with the steel or other metal of which the article to be fused is composed.

The object is the formation of a body of metal which shall consist exclusively, or substantially so, of the metal introduced after the removal of the foreign material, and which shall be of a composition corresponding, as nearly as may be, with that of the metal constituting the article to be repaired or added to.

Although it has been customary in many cases to speak of processes in which heat resulting from the reaction between aluminum and oxid of iron is made use of, as welding processes, such term is not in fact appropriate, inasmuch as the method is not a welding process in the ordinary meaning of that expression.

I wish to lay particular emphasis upon the fact that in my process the fusing compound is utilized solely for the heat which is produced thereby.

Heretofore it has been possible to repair, but not without some difficulty, castings of carbon steel, but great difficulty has been encountered in attempting to repair castings formed of special steel. These difficulties are obviated by the use of my process, and not only castings of carbon steel, but those of nickel-steel, or other materials may readily be repaired.

Although my process is applicable to cast-

ings, forgings or other articles made of various kinds of steel, iron or other materials, I will hereafter, for the sake of simplicity alone, confine my description to its application to a steel casting.

In the accompanying drawings,—Figure 1 shows a casting, one portion of which is in process of being fused and built up in accordance with my improved method. Fig. 2 shows a similar casting after being built up, in section, such a mold, also in section, in proper position, such mold being enlarged at the top for the purpose hereinafter indicated.

Referring to the drawings in detail, 1 indicates a ladle of suitable construction, provided with an opening 2 for the discharge of the molten steel into a sand mold 3, which is placed in position on the casting 4, the latter having been selected for the purpose of illustrating how a new end section may be fused on. The dry sand mold 3 has an internal portion 7 of a diameter greater than the diameter of the end of the casting, in order that there may be sufficient metal to permit of proper turning and finishing. An opening or gate 5 is provided in the mold, the metal issuing therefrom being discharged into an ingot mold 6.

In carrying out my process, a fusing compound, which may consist of aluminum and oxid of iron, is placed in the mold and ignited. A few seconds after the reaction is complete, the ladle is opened and molten steel run into the mold. The gate is then opened and all of the contents of the mold washed out, and the end of the casting thoroughly cleaned by the falling stream of molten steel, the excess of steel being run into ingot molds. The gate is then closed and molten steel of a character corresponding with that of the original casting is allowed to rise in the mold to the height desired. Shrinkage strains may be avoided by annealing the casting.

It has been found that if the slag were not entirely washed away in the manner indicated, it would not all rise to the surface of the molten mass but could be found in thin layers throughout the metal. Tests have proven conclusively that such inferior results have frequently been attained, notwithstanding the exercise of great care, and such tests have also proven, on the other hand, that new sections added in accordance with my improved method are firmly knit to the original casting, are free from imperfections

and are in every way as good as new. Many expensive castings, which must otherwise be discarded, can thus be repaired and made practically perfect.

5 It will be obvious that this process may be used in fusing together parts of a broken casting as well as for fusing on a new piece of metal, or that the adjoining ends of the rails of a track may be thus fused.

10 Although my process is as hereinbefore stated, applicable to castings, forgings or other articles made of various kinds of steel, iron or other materials or alloys, it is particularly useful in connection with nickel-
15 steel castings, as attempts made to fuse or weld these in other ways have proved unsuccessful, while it has been done with great success by my method.

20 I have described my invention in considerable detail but do not wish to be limited to the exact steps specified, reserving the right to make such changes, alterations and additions as fall within the scope of the appended claims.

25 Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

30 1. The process which consists in fusing a portion of a metallic object by subjecting the same to the heat resulting from the reaction

between aluminum and an oxygen-containing metallic compound, then adding molten metal from another source, allowing the same to flow over the surface of said metallic object and thence escape, thereby removing the slag and foreign material therefrom, then stopping the escape of said molten metal and continuing the addition thereof as desired, thereby forming a body of metal integral with the aforesaid object. 35

2. The process which consists in fusing a portion of a metallic object by subjecting the same to the heat of the reaction between aluminum and an oxygen-containing metallic compound, then adding, from another source, molten metal of approximately the same composition as said object, allowing the molten metal to escape thence, thereby removing the slag and foreign material, then stopping the escape of said molten metal and continuing the addition thereof as desired, thereby forming a body of metal integral with, and of approximately the same composition as the aforesaid object. 40 45 50

In testimony whereof I hereto affix my signature in the presence of two witnesses. 55

SCOTT MEISSNER.

Witnesses:

WM. J. FITZMAURICE, Jr.,
CYRUS E. BROWN.