UNITED STATES PATENT OFFICE.

M. FISHER AND WM. MARTIN, JR., OF NEWPORT, MAINE.

IMPROVED PROCESS FOR WELDING CAST TO WROUGHT IRON OR STEEL.

Specification forming part of Letters Patent No. **6,054**, dated January 23, 1849.

To all whom it may concern:

Be it known that we, M. FISHER and WM. MARTIN, Jr., of Newport, in the county of Penobscot and State of Maine, have invented an Improvement in Welding Cast-Iron with Steel or Wrought-Iron; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same.

The nature of our invention consists in properly heating the steel or wrought-iron before the cast-iron is poured upon it, as described in a patent granted to us dated the 16th October, 1847, upon which this is an improvement.

For small pieces of steel—that is, when the surface is small and the pieces thin—we find no difficulty in welding by our process as patented; but for welding large surfaces of steel to cast-iron we have found that process to be uncertain and expensive, on account of the great quantity of cast metal it was necessary to pass over the steel before it became hot enough to enter into combination with the iron. To obviate this uncertainty and expense, in addition to our former process, we heat the steel to a bright red heat before pouring the iron upon it, and instead of running off the surplus iron necessary to use by the old process into a recess or cavity in the mold, we allow it to run off through a hole or runner into a ladle, and repour it through the same gates as at first, thereby having to use little more metal for welding the largest surfaces than would be required to cast such pieces when no steel is welded upon them. During the time necessary to heat the steel in a furnace in the ordinary way, place it, close the flask, and to get all things ready to pour the iron, the steel becomes much oxidized, cooled, and the sand around it dried, and the result is thereby rendered uncertain. We therefore adopt the following mode: We form a cavity in the sand, which surrounds the steel either under or against one side of the steel or iron, which is opposite the surface to be welded, said cavity being of such a depth or thickness as we judge will hold a sufficient quantity of melted iron to heat the steel to a bright red heat by the time we get ready to pour the iron which is designed to be welded to and form a part of the piece. We then place the steel over or against this cavity, the steel being somewhat larger than the pattern by which the cavity is made, so as that the steel may have sand to rest its edges upon, and to keep apart the metal which is poured onto the two sides of the steel. After having thus proceeded, we pour by a separate sprue or gate into the recess or cavity above named, underneath or against the side of the steel, a quantity of melted iron, until the iron has entirely filled the cavity and touched the steel on the lower or back surface, as the case may be. This we do after the flask is closed, when the form of the work will admit of it. When it will not we first so pour and close the mold afterward, and when the steel becomes sufficiently heated we then pour and repour the melted iron upon it over the surfaces which are to be welded, as before described.

We do not claim heating wrought-iron in a furnace and then placing it in a mold and casting iron around it, so as to inclose it therein, that having before been done; but,

Having thus fully described our improvement, what we claim therein as new, and for which we desire to secure Letters Patent, is—

1. Heating the steel or wrought-iron to which the cast-iron is to be affixed, before casting the melted iron upon it, by means of a portion of melted iron poured against that side of the steel which is not to be attached to the finished article, substantially in the manner, and for the purpose set forth.

2. Repouring the metal upon the steel, as described, by which much saving in the cost of melting more iron than is required for the casting is saved.

M. FISHER.
WM. MARTIN, JR.

Witnesses:
H. L. DUNCKLEE,
JOHN H. MORRIS.