

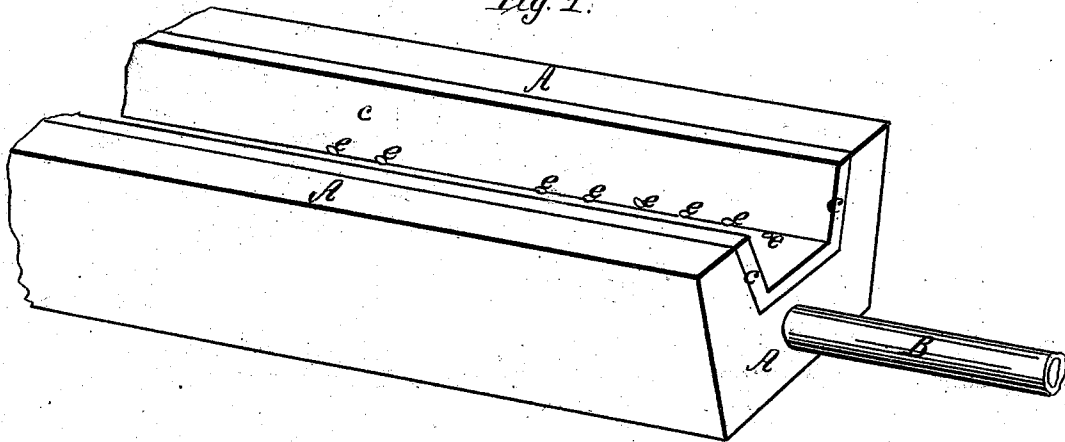
*S. M. Wickersham.*

*Refining Iron.*

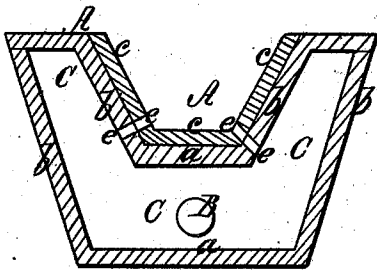
*N<sup>o</sup> 97,844.*

*Patented Dec. 14, 1869.*

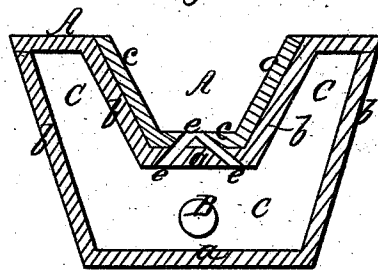
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Witnesses;*

*J. H. Sypher*  
*Edmund Masson.*

*Inventor;*

*Saml M Wickersham*  
*By Atty. A B Sloughton,*

# United States Patent Office.

SAMUEL M. WICKERSHAM, OF ALLEGHENY, PENNSYLVANIA.

Letters Patent No. 97,844, dated December 14, 1869.

## IMPROVED APPARATUS FOR PURIFYING IRON.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, SAMUEL M. WICKERSHAM, of the city of Allegheny, in the county of Allegheny, and State of Pennsylvania, have invented certain new and useful Improvements in a Channel, Gutter, or Run, for passing molten metal through, for the purposes of purification of the metal in its transmission from the blast-furnace or cupola to the moulds or pig-bed, and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, and in which—

Figure 1 represents, in perspective, a portion of the run or gutter in question, and

Figures 2 and 3 represent vertical cross-sections through the same, to show the interior thereof.

Similar letters of reference, where they occur in the separate figures, denote like parts of the gutter or run in all of the drawings.

I am aware that a gutter or channel, having a hollow bottom, into which atmospheric air is driven, and thence passes through openings into the molten metal passing through it, has been used, the jets of air being let in, in a direction corresponding with that of the flow of metal, or against the flow. To such a gutter or channel, and to such introduction of jets of air, namely, with or against the flow of molten metal, I lay no claim. Having practically tested it, I find it inoperative for the purpose.

My invention consists in a channel, gutter, or run, made with hollow sides and bottom, for making more air-space, and heating-surface, with air-openings extending therefrom to the surface of the gutter or run, in a direction across the flow of the molten metal, by which means I can and do mix atmospheric air with the particles of iron, while by the other heretofore-admitted plan of admitting the air, it flowed with the molten mass, but did not thoroughly mix with its particles.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents a channel, gutter, or run, by preference made of cast-iron, and the bottom *a* and sides *b* of which are hollow.

Into the enclosed space *c*, between the bottom and

sides of this gutter or run, is introduced, through the tube or pipe B, atmospheric air, either heated or cold, and the gutter, or that portion of it against which the melted metal flows, is lined with fire-clay, *c*, or other fire-resisting material.

From the enclosed air-chamber, within the sides and bottom of the gutter or run, a series of openings or air-passages, *e e*, &c., is made, so that the jets of air passing through them shall be directed across the flow of the molten metal, and not with or against its flow.

I have ascertained, by practice, that if the jets of air flow in, in the direction in which the molten metal flows through the gutter, it will not mix with, though it will be carried along with the metal.

So, too, if it be admitted against the flow of the metal, it will enter in a body but a short distance in the metal, and without being disseminated through it, will simply be deflected from its course, turned, and in column flow along with, without being mixed in among the particles of molten metal. But, by forcing in the air in jets across the current or flow of metal, it is broken up, disseminated, and brought in contact with all of the particles of molten iron, and much purify and improve its quality.

This gutter, channel, or run, is placed so as to convey the metal from the tap-hole of a blast-furnace or cupola to the moulds or pig-bed, and may be connected with the hot or cold blast of the furnace or cupola, so as to receive its supply of air and introduction into the flowing mass of molten metal passing through it. A stop-cock may be put in the pipe B, to regulate the admission of air to the gutter and the metal flowing therethrough.

Having thus fully described my invention,

What I claim therein as new, and desire to secure by Letters Patent, is—

A gutter or run, having both bottom and sides hollow, lined with fire-clay, and furnished with a series of holes inclined in a direction across that in which the metal flows, as and for the purpose herein described and represented.

SAMUEL M. WICKERSHAM.

Witnesses:

ARCHIE CUMMINS,  
ALGERNON S. BELL,