

UNITED STATES PATENT OFFICE.

JAMES E. ATWOOD, OF PITTSBURG, ASSIGNOR OF ONE-HALF HIS RIGHT TO
HOWARD TILDEN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PROCESSES OF DECARBONIZING OR ANNEALING IRON AND STEEL.

Specification forming part of Letters Patent No. **154,438**, dated August 25, 1874; application filed
June 25, 1874.

CASE B.

To all whom it may concern:

Be it known that I, JAMES E. ATWOOD, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Process of Decarbonizing or Annealing Iron and Steel, of which the following is a specification:

My invention relates to a new and improved process of decarbonizing or annealing refined iron and highly-carbonized steel, by means of which I am enabled to dispense with much of the labor and apparatus that has heretofore been necessary in the decarbonizing or annealing process, and can produce a finished article which will be ready for use without further treatment. My invention consists in decarbonizing or annealing metal castings, such as the mold-boards of plows, and machinery castings in general, said castings being placed upon a bed of fire and raised to a cherry-red heat, and then covered with a suitable fuel until the whole mass becomes thoroughly ignited; then the fire is "banked," by the use, preferably, of slag, cinder, ashes, sand, earth, or other suitable "banking" agents capable of shutting off all draft, for the purpose of retaining the heat for the desired length of time, so as to burn out the carbon or oxidize the same, and thus render the iron tough and malleable. The material from which the castings are made is composed of wrought and cast iron, and steel may be substituted for either or added to the union of the same. The iron, after being thus treated, will be perfectly malleable, and may be readily welded and tempered. In carrying out my invention, I select, preferably, old or waste iron, which I melt and cast into mold-boards for plows, or castings of machinery in general, as per a process described in my application filed simultaneously herewith, for a compound or mixture of metals. The castings thus produced are ready to be decarbonized or annealed. To effect such without the employment of cans or oxides, I place the same upon a bed of fire in any common furnace, and raise the same to a cherry-red heat. The bed of fuel and the castings in their highly-heated state are covered with suitable fuel and the furnace let run until the whole mass of fuel

becomes thoroughly ignited. The fire is then banked, using for such any of the usual banking agents—for instance, slag, cinder, ashes, sand, earth, or other suitable material capable of preventing a draft—the object being to prevent any further combustion of the material, so as to retain the bed of fire and the castings in the high heat to which they are raised, and in such condition the fire and the castings are permitted to remain for a space, say about twelve or forty-eight hours, substantially as herein-after specified.

The length of time to which the castings are treated will depend upon the nature and object for which they are to be ultimately used. When designed for hammering, or working like ordinary wrought-iron, the heating will have to be extended through a space of forty-eight (48) hours; but in the case of articles that have only to be tempered to be rendered fit for use the heating will only have to be continued for twelve (12) hours, or a little more or less. In the latter case, or when the articles have only to be tempered, it will not be necessary to thoroughly decarbonize the same, and hence the heating will occupy less time. Heretofore, in preparing castings, and decarbonizing the same to be annealed and tempered, it has been necessary to subject them to the action of heat in the presence of various oxides in closed vessels or cans, for the purpose of decarbonizing the same, or oxidizing the carbon contained therein. This has been always attended with much labor, and requires the use of expensive apparatus, which has often to be renewed, as it readily burns out and becomes useless.

What I claim is—

The process herein described of converting refined or cast iron and highly-carbonized steel into malleable metal, by heating the same in an open or common fire, substantially as herein described.

In testimony that I claim the foregoing I have hereunto set my hand.

JAMES E. ATWOOD.

Witnesses:

JAMES L. NORRIS,
ALBERT H. NORRIS.