

UNITED STATES PATENT OFFICE.

CHARLES BURGESS, OF PORTSMOUTH, OHIO.

IMPROVEMENT IN THE MANUFACTURE OF CAST-IRON FOR CAR-WHEELS, &c.

Specification forming part of Letters Patent No. 143,874, dated October 21, 1873; application filed September 9, 1873.

To all whom it may concern:

Be it known that I, CHARLES BURGESS, of Portsmouth, Scioto county, Ohio, have invented an Improved Manufacture of Cast-Iron for Car-Wheels and other chilled articles, of which the following is a specification:

This invention relates primarily to the production and use of a superior and cheap article of iron for chilling purposes.

One mode of carrying out my invention may be described as follows: I put through my refining process, as described in my patent of August, 1873, hot-blast iron, (stone-coal pig or hot-blast charcoal-pig,) and produce an article of hard white iron far superior for the purpose named, and of less than two-thirds the cost of the cold-blast white iron, which is now used for this purpose as a component in metal for car-wheels and for other purposes. With the refined iron thus produced, I combine the ordinary cold-blast charcoal (soft gray) pig-iron, or hot-blast (soft gray) pig-iron, or both, in suitable proportions, according to the quality of the metal and the depth of chill required or desired. The soft-gray iron is employed for its toughness, and gives the required strength. The refined iron imparts the chilling properties to the composite metal. The refined iron is equally adapted for malleable-iron casting, in place of a high-priced cold-blast iron, and for casting into plows and agricultural implements, where a hard, good wearing iron is required. It is also highly adapted to be manufactured into bells, owing to its clearness; also, for the manufacture of chilled rolls. In combining the refined metal with soft-gray iron, no specific proportions can be observed, owing to the variation in the quality and properties of such iron; but, in determining the proper proportions in individual cases, the ordinary skill of foundrymen is all that is required.

I do not claim to make by my process part-steel castings. My refined cast-iron is not steel, or wrought-iron, or semi-steel, but a "fined" or partially-refined cast-iron that can be charged with the pig in a cupola or air or gas furnace of any kind, such as is ordinarily used for melting iron for casting. The fined cast-iron will fuse regularly with the pig-iron, or the fined cast-iron may be melted separately

and at the same temperature that will melt ordinary pig-iron. With my refined iron I combine the usual strong soft-gray iron in suitable proportions, as explained.

I have found the following mixtures to produce satisfactory results: Hot-blast strong cast-iron, two-tenths; cold-blast strong cast-iron, three-tenths; refined cast-iron, five-tenths; hot-blast strong iron, three-tenths; cold-blast strong iron, three-tenths; hot-blast strong iron, four-tenths; hot-blast strong iron, three-tenths; cold-blast strong iron, two-tenths; old wheels, two-tenths; stone-coal strong iron, one-tenth; refined cast-iron, two-tenths; cold-blast strong, four-tenths; refined cast-iron, six-tenths; hot-blast strong iron, four-tenths; refined cast-iron, six-tenths; hot-blast soft iron, five-tenths; refined cast-iron, five-tenths; cold-blast soft, five-tenths; refined cast-iron, five-tenths.

There is no more waste where I use six-tenths of the refined cast-iron than where I only use three-tenths or one-tenth, as it melts or fuses equally and regularly with the other iron, and mixes thoroughly. I cannot state any one certain mixture or proportion of the refined cast-iron that I use; it is left to the judgment of the man who has the charge of mixing the irons, as it is in all cases where he can perceive the qualities of his strong or soft irons. If the iron is of a very soft nature it requires more of the refined iron to give the desired chill than when the iron is a little harder.

My refined iron can be used to any extent, as may be desired, without any more waste than when only a small portion is employed.

Any cast-iron will give the desired chill when refined, even the most common stone-coal or anthracite soft-gray iron to the best cold-blast charcoal soft iron that has no chilling properties before refining. I contemplate using this fined cast-iron from one-tenth to more than five or six tenths, if the quality of the soft pig requires it.

My invention is chiefly based on the discovery that fining or partially refining iron which was not adapted for chilling imparts to it a chilling property.

The invention is not limited in its application to the use of iron refined by my peculiar process, but may be applied, though less eco-

nominically, by the use of cast-iron refined by other modes.

My composite iron is not limited in its utility to the production of chilled castings, but is useful for castings in general where the metal is especially required to possess great strength and hardness—as, for example, in rolling-mill rolls, cog-wheels, &c., whether chilled or not.

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

1. The composite cast-iron herein described, consisting of fined or partially-refined cast-iron

and soft-gray cast-iron fused together, substantially as set forth.

2. The combination of a fined or partially-refined cast-iron with a soft-gray cast-iron for the production of chilled castings, or for other purposes.

In testimony of which invention I hereunto set my hand.

CHARLES BURGESS.

Attest:

GEO. H. KNIGHT,
B. F. PEREGINE.