UNITED STATES PATENT OFFICE.

LESTER B. BROWN, OF BRADFORD, PENNSYLVANIA, ASSIGNOR TO FANNIE W. BROWN, OF SAME PLACE.

PROCESS OF AND BATH FOR HARDENING MOLD-PLATES.

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Application filed September 6, 1893. Serial No. 484,895. (No model.)

To all whom it may concern:

Be it known that I, LESTER B. BROWN, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Processes of Hardening Mold-Plates for Brick-Pressing Machines, of which the following is a full, clear, and exact description.

In molds of the brick machines generally used the clay used for the bricks is compressed in the said molds under great pressure by the top plunger, and the compressed clay forced upward and out of the mold by the lower plunger. In these movements of the plungers clay and grit gets in between the plunger and mold plates and soon wears away the edges of these plates and also scratches and defaces the faces of the mold plates rendering them unserviceable.

The object of my invention is to produce highly polished and tempered cast-iron or cast metal plates such as are used in the molds of brick machines, that will easily withstand the action of the clay and grit that is dropped between them and thus greatly prolong their use. I attain these objects by the following described process, which consists essentially in heating the plates in a furnace heated by a carbon fire, and then subjecting the heated plates to a tempering bath, and finally grinding and polishing them to render them ready for use.

In the manufacture of these plates I first have suitable patterns made for casting the several sizes, the material used for such casting being iron of no specified grade although I prefer the better quality. The castings are shaped, and then bored where it is necessary, while in their soft and untempered state. When the plates are thus fully prepared, they are first placed in an oven or furnace in any suitable and convenient manner, which is charged with fuel in which there is animal charcoal. The object of providing the fire with animal charcoal is to supply the outsides of the plates with more carbon than is in the inside of them, and thus carbonated the outer surfaces of the plates will be harder than the inner portion and thereby become less disposed to crack or fracture on their change of temperature when thrust into the tempering bath. The plates are heated to a temperature of about 1,000° which greatly expands or enlarges the surface pores of the plates, which allows the carbon in the fire to enter them. These particles are retained in the pores as the plate is allowed to cool. The height of temperature given the plates depends on the work required of them, as the higher the temperature of the plates the more the pores expand and allow a greater amount of carbon to enter them, and, the harder they become after being submitted to the tempering bath.

When the plates are heated to about the proper temperature and before they are removed from the furnace, they are coated with a flux of lac or its equivalent by any suitable means, for the purpose of preventing the oxidation of the surfaces. When the plates have received the temperature required they are taken out of the furnace and plunged vertically into a tempering bath and allowed to cool therein. This tempering bath is composed of the following ingredients, the proportions being, water, ten gallons, common salt, one peck, oil of vitriol, one pint, saltpeter, one half pound, prussiate of potash, one fourth of a pound, and cyanide of potassium one half of a pound. This treatment of the iron steelifies it throughout its entire body, and provides it with a temper of such a degree of hardness as to prevent a file from making any apparent impression upon it. After the plates have thoroughly cooled and have been removed from the bath they are then ground and polished by any well-known means and mechanism. The plates are arranged to be revolved in a plane at right angles to the grinding and polishing material so that it will cross grind.

Although I have described my invention in connection with mold plates for brick machines, it will be understood that I do not limit myself to the treatment of these plates alone, as it is very obvious that my invention may be used in connection with any plates when it is desired to have a very hard surface. Neither do I limit myself to the exact proportions of the ingredients composing my

bath, as the proportions of the several ingredients may be varied without departing from the spirit of my invention.

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

1. The herein described process of hardening cast-iron or steel which consists in casting the metal to the desired shape or form, then heating the same in a fire containing animal charcoal and finally subjecting the heated article to a suitable bath composed of water, common salt, oil of vitriol, saltpeter, prussiate of potash and cyanide of potassium; substantially as set forth.

2. A bath for tempering cast-iron or steel composed of the following elements, to wit:—water, common salt, oil of vitriol, saltpeter, prussiate of potash and cyanide of potassium substantially in the proportions herein described.

3. The herein described process of treating cast iron and steel which consists in casting the metal to the desired shape or form, then heating the same in a fire containing animal charcoal, subjecting the heated article to a suitable bath composed of water, common salt, oil of vitriol, saltpeter, prussiate of potash and cyanide of potassium, and finally grinding and polishing the tempered article; substantially as set forth.

LESTER B. BROWN.

Witnesses:
JAMES GEORGE,
BEN R. HAGARS.