UNITED STATES PATENT OFFICE.

MICHAEL SMITH, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO RUSSELL & ERWIN MANUFACTURING COMPANY, OF NEW BRITAIN, CONN.

IMPROVEMENT IN PROCESS OF REMOVING EARTHY MATTERS FROM BRONZE AND OTHER CASTINGS.

Specification forming part of Letters Patent No. **110,081**, dated December 13, 1870.

To all whom it may concern:

Be it known that I, MICHAEL SMITH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Process for Removing Earthy Matter from Brass, Bronze, and other Metallic Castings, of which the following is a specification.

My invention consists in removing by a chemical agent burned clay or sand or other material adhering to metallic castings, and is especially applicable and useful in cleaning castings made under pressure having deep and contracted cavities, from which adhering fragments of the material of the mold cannot be successfully removed by mechanical means without destroying the fine lines of a brass, bronze, or composition casting. If a casting is made under pressure in a mold made of burned clay, the fluid metal is forced into the smallest cavities of the mold. The subsequent shrinkage of the metal will then hold a certain quantity of the burned clay or sand of the mold in the deep and sharp cavities of the casting, so that it is impossible to remove such adhering matter of the mold by any mechanical means without destroying the fine face and outlines of a perfect casting. To employ the aid of chemicals for the purpose of removing said adhering burned clay or sand is the object of the invention. The chemical used is of such a nature that it will soften the burned clay, so that it may be washed off. At the same time it does not act on the metal.

Operation: My invention is carried out effectually in the following manner: When the casting is removed from the mold of burned clay, a considerable portion of clay will adhere to the casting. All that can be removed by rapping and jarring the casting is loosened in this manner. The casting is then placed in a gutta-percha box containing hydrofluoric acid. The said acid will act at once on the bases of the burned clay, which appear to be siliceous, thereby softening the burned clay in the course of two or three hours, according to the strength of the acid, so that it may be washed off in water with a brush. The peculiarity of said hydrofluoric acid is that it does not act on or eat the metal unless the metal is kept in it a long time, when a slight action may be perceived on close examination.

The following metal or composition castings may be cleaned of the adhering burned clay or sand without injury to the most delicate outlines, as far as I have found by experience: copper, brass, bronze, and all compositions containing a considerable portion of copper, also silver, gold, lead, and type metal. (Iron is slightly acted on by the fluoric acid, and cannot be cleaned without some injury to the casting.)

The utility of the process and agent specified above for the purpose of removing burned clay and sand from delicate castings, especially castings made under pressure, can be best appreciated by those who know by experience with what tenacity the clay and sand adhere to compression-castings, in many instances rendering it apparently impossible to remove the adhering substance without destroying the whole casting. Another way in which this useful agent may be applied is this: The fluohydric acid, in its gaseous form, may be made to act on the clay adhering to the casting in a dry state, which dissolves the clay into dust; but this process is dangerous, as the fluoric-acid gases are deadly poison when inhaled. The use of the acid in its liquid form is harmless, only care is necessary not to get it into wounds of the skin, which would cause bad sores.

Having described a simple manner of using my invention, what I claim as new is—

Fluoric, fluohydric, or hydrofluoric acid, or the chemical equivalent thereof, for the purpose of softening and removing burned clay, sand, or other earthy matter adhering to metallic castings, substantially as described.

MICHAEL SMITH.

Witnesses:
JOHN STEPP,
JOSEPH LEGER.