

UNITED STATES PATENT OFFICE.

J. OSTRANDER AND J. S. HEARTT, OF TROY, NEW YORK.

IMPROVEMENT IN THE MANUFACTURE OF FIRE-BRICKS.

Specification forming part of Letters Patent No. 21,774, dated October 12, 1858.

To all whom it may concern:

Be it known that we, JAMES OSTRANDER and JONASS. HEARTT, each of the city of Troy, in the county of Rensselaer and State of New York, have jointly discovered or invented a new and useful Improvement in Compositions for Fire-Bricks, Tiles, or Blocks of every Shape; and we do hereby declare that the following is a full and exact description of the same.

Our improvement in compositions for fire-bricks consists in adding pulverized or ground soapstone or steatite in suitable quantities to those fire-brick mixtures heretofore commonly employed, which consist essentially either of raw or unburned fire-clay (with or without kaolin) and fire-sand; or of raw fire-clay (with or without kaolin) and burned fire-clay, ("biscuit,") ground; or of raw fire-clay, (with or without kaolin,) ground biscuit, and fire-sand, which soapstone, intimately mixed with the other ingredients, partially melts or cements them together in a peculiar manner during the usual burning of the bricks in a close kiln at a white heat, or thereabout, and thereby not only makes the bricks tough, so that they will not crumble or break to pieces as easily as they otherwise would, but also gives them such a structure that melted slag under a strong pressure and blast will not penetrate into or adhere to them, as it will bricks having the same composition, with the exception of the soapstone, at the same time that the soapstone leaves the bricks so porous and refractory that they will not "fly" or soften when used as linings to the hottest parts of the cupola and other furnaces.

In the manufacture of fire-bricks the clay holds the ingredients together from the beginning of the molding, and the coarsely-ground burned clay or biscuit, or its partial substitute—fire-sand or pulverized quartz—is necessary to give the bricks the indispensable porosity, while the various kaolins, being refractory, easily incorporated with and generally cheaper than the clay, are often introduced to lessen the cost of the bricks. We add the pulverized soapstone, which partially melts or cements the parts together in a peculiar manner during the burning, as above specified, producing a result very different from that attained by using salt, soda, potash, borax, alum, pulverized glass, and other vitrifiable materials for cementing the parts together.

When we use the best fire-clay obtained at Woodbridge, New Jersey, kaolin from Staten Island, New York, fire-sand from the north side of Long Island, New York, and Baltimore stove-lining soapstone, we prefer to use the ingredients in the following, or about the following, proportions for the various qualities of fire-bricks, viz: for the best kind, eight parts of pulverized soapstone, seventeen parts of raw fire-clay, and fourteen parts of ground biscuit or burned clay; for another quality, eight parts of pulverized soapstone, sixteen parts of raw fire-clay, three parts of kaolin, and twelve parts of ground biscuit; for another kind, eight parts of pulverized soapstone, eighteen parts of raw fire-clay, eleven parts of ground biscuit, and two parts of fire-sand; for another grade, eight parts of pulverized soapstone, sixteen parts of raw fire-clay, three parts of kaolin, ten parts of ground biscuit, and two parts of fire-sand; for another variety, eight parts of pulverized soapstone, twenty-one parts of raw fire-clay, and ten parts of fire-sand; and for another, eight parts of soapstone, pulverized, twenty parts of raw fire-clay, four parts of kaolin, and seven parts of fire-sand—all by weight.

The quantity of soapstone used may vary from ten to sixty per cent. of the whole mixture, with generally a beneficial effect, although we consider that twenty per cent., or thereabout, of Baltimore soapstone produces the best result. If forty to sixty per cent. of soapstone is introduced, the bricks are apt to soften or run in burning, if located in the hottest parts of the kiln. As the quality of soapstone varies considerably the quantity used must vary accordingly. Thus thirty per cent. of Baltimore stove-lining soapstone is generally about equal to twenty per cent. of that from Massachusetts or Vermont.

Fire-clays, fire-sands, and kaolins from different localities also differ more or less in quality, but the experienced fire-brick manufacturer will generally know by merely inspecting the ingredients about how much biscuit, sand, soapstone, and kaolin of a particular variety should be used to produce a certain quality of bricks.

In manufacturing the bricks with ground soapstone as a constituent part, we fill the pit with thin alternate layers of the ingredients, moisten them with water, mix the parts inti-

mately together by running the whole through a suitable mill, or by other means, mold and dry the bricks, and finally burn them in a close kiln, all in the manner commonly practiced in manufacturing fire-bricks when no soapstone is used.

We are aware that soapstone or steatite has been heretofore used as an ingredient in the manufacture of porcelain and of black-lead crucibles, but necessarily without attaining the beneficial result which we secure in the manufacture of fire-bricks by using it as an ingredient in combination with the commonly-used mixtures of fire-sand or granulated burned fire-clay and raw fire-clay, with or without kaolin, as herein specified.

Having thus described the nature and manner of practicing our improvement, what we claim as our joint invention, and desire to secure by Letters Patent, is—

The manufacturing of fire-bricks, tiles, or blocks of a composition consisting essentially of pulverized steatite or soapstone, raw fire-clay, (with or without kaolin,) and fire-sand or ground biscuit, or both, the ingredients being mixed in the ratios herein specified, or in any other available proportions, as set forth.

JAMES OSTRANDER.

JONAS S. HEARTT.

Witnesses:

GEO. R. SEYMOUR,

GEORGE DAY.