

UNITED STATES PATENT OFFICE.

WILLIAM G. ELLIOTT, OF BLISWORTH, ENGLAND.

IMPROVEMENT IN MAKING SLAGWARE.

Specification forming part of Letters Patent No. **11,692**, dated September 19, 1854.

To all whom it may concern:

Be it known that I, WILLIAM GILBERT ELLIOTT, of Blisworth, in the county of Northampton, gentleman, a subject of the Queen of Great Britain, have invented or discovered a new and useful improvement in the manufacture of bricks, tiles, pipes, and other articles capable of being molded; and I, the said WILLIAM GILBERT ELLIOTT, do hereby declare the nature of the said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following instrument in writing—that is to say:

My invention consists in an improvement in manufacturing bricks, pipes, tiles, and other articles from the slag of the smelting or blast furnaces of iron-works, or from an artificial slag of a like nature produced by fusing together chalk, clay, limestone, or some of the fluxes.

The slag from the blast or smelting furnaces of the iron-works has usually been suffered to run to waste, and its disposal is often a source of much expense to the proprietors of such works. Although the iron slag has occasionally been run or molded in lumps, blocks, or masses direct from the furnaces, and has been employed in building rough walls, the slag of the iron-works has usually been regarded as refuse matter, and a great encumbrance to the land in the vicinity of the works. Now, I have discovered that such iron slag, and also the artificial slag above mentioned, may be converted into profitable and useful commodities as follows: As the slag from the iron-furnaces is usually run to waste in the open air, I provide, as close as convenient to the furnace from which the slag runs, in an inclosed building, molds of metal or other proper materials of the forms or shapes suitable for the production of such articles as it may be desired to make of the slag, and I catch the slag in the open air in a large covered ladle or other vessel, which, when full, I convey into the inclosed building, and then run the slag, in a melted or fused state, into such molds. When a sufficient quantity has been suffered to run into the molds, according to the size or form of the article to be manufactured, and in order to finish the article in the desired form, I subject the molten material to heavy pressure in the mold, and while it is therein, and before it becomes com-

pacted, I pierce it in various directions by means of rods, which, if necessary, may be made hollow to contain water, so that they may not be destroyed by the great heat of the material. In some cases these rods or piercers may be applied directly to the stamper, and in all they are intended to aid in the expulsion of the gases from the molten slag, the piercing of it by them serving to open it and allow of the escape from it of the gases, so that the compression of the slag may be more perfectly effected than would be the case were the gases suffered to remain in it. By such means the desired form is given to each casting, and more uniform thickness, density, and coherence to the product, and consequently less contraction is caused in cooling than if the mold was first filled and the gases were allowed to remain or to escape by the contraction in cooling without receiving such pressure and piercing. The molded or cast articles are next to be removed from the molds, and gradually cooled or annealed in an oven or furnace, so as to be free from the brittleness which would otherwise render the articles comparatively useless. The gases in the slag as it is produced from a furnace cause it to have a spongy appearance, and render it of little or no value. They must be driven out of it before its particles can be sufficiently compacted together. This expulsion of the gases is an essential feature of my invention by means of piercing and pressure.

I am aware that in molding glass or metal pressure has been employed in order to force the molten metal into the crevices of the mold, but neither the pressure or piercing has ever been used in relation to or on slag as I use it in the manufacture of thick heavy substances or masses—that is, to the extent sufficient to expel the injurious gases from the slag or a material of like nature when in a liquid or fluid state in the mold. It is therefore a new feature in making articles of molten slag to expel its gases by piercing and pressure at the same time, and to subsequently anneal the compound slag, which, without the latter process, would be of little or no value, as it would be certain to crack or break if too suddenly cooled, or even subjected to being cooled, by exposure in an ordinary atmosphere.

Instead of producing rough, heavy, irregu-

lar, or brittle masses, such as have heretofore been occasionally made, the slag by my process is converted into bricks, pipes, tiles, and other articles fit for the purposes to which such well-finished articles are commonly employed.

The manufacture hereinbefore described is from the slag in a fluid state as it leaves the blast or smelting furnaces of the iron-works; but as the manufacture becomes general cases may occur in which it may be commercially profitable to construct furnaces for the express purpose of remelting the refuse slag, or of obtaining from the raw or natural materials in any particular locality the liquid mass analogous to slag and employing it in and for the manufacture of bricks, pipes, tiles, and other articles, as before described.

And now, having described the nature of my said invention and in what manner the same is to be performed, I declare that I do not claim as of my invention piercing-rods, presses, stampers, rollers, and molds for hollow and

pierced bricks, pipes, or other articles of any other shape or form; nor annealing ovens nor furnaces; but

I claim as my invention—

The improvement in the manufacture of bricks, pipes, tiles, and other articles capable of being molded from slag (or from a liquid mass analogous to slag) in a melted or fused state, such improvement consisting in expelling the gases of the slag by piercing and pressure at the same time when the slag is in a mold.

In witness whereof I, the said WILLIAM GILBERT ELLIOTT, have hereunto set my hand and seal this 16th day of February, in the year of our Lord 1854.

WM. G. ELLIOTT. [L. S.]

Witnesses:

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