J. G. LOW.

Manufacture of Decorative Tile.

No. 212,478. Patented Feb. 18, 1879.

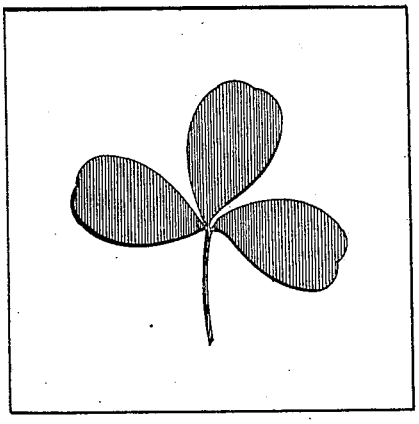

Fig. 1.

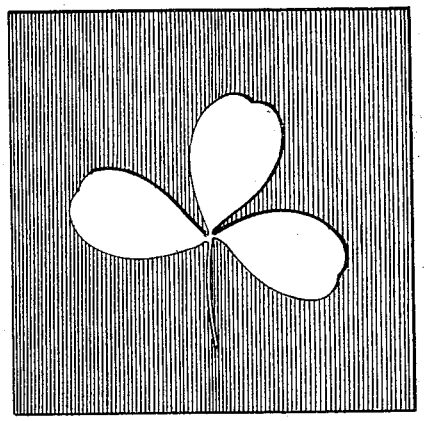

Fig. 2.

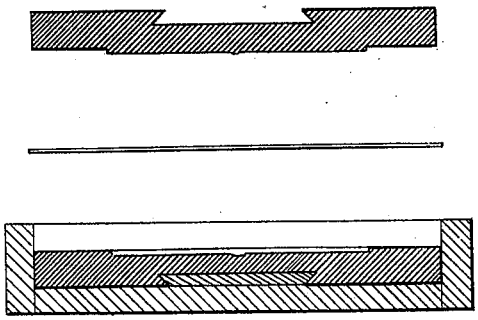

Fig. 3.

WITNESSES

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IMPROVEMENT IN THE MANUFACTURE OF DECORATIVE TILES.

Specification forming part of Letters Patent No. **212,478**, dated February 18, 1879; application filed January 24, 1879.

To all whom it may concern:

Be it known that I, JOHN G. LOW, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented an Improvement in the Manufacture of Decorative Tiles, of which the following is a specification:

Decorative tiles may be classified, according to their decorations, into four general sorts: First, those made with flat surfaces, and either of a natural or artificial monochrome without designs, called "self-colored tiles," or ornamented with surface-enamel, or painting in outline, monochrome, or polychrome; second, those made with flat surfaces, inlaid in chromatic patterns to a slight depth, otherwise known as "encaustic tiles;" third, those made with designs in relief; fourth, those made with irregular, incised, indented, or depressed designs, having texture in the depressions. Either of the last two sorts may be painted in monochrome or polychrome, and either of the four sorts may be glazed either with a colorless glaze or with a colored glaze, or may be enameled.

The distinction now insisted upon is the condition of the exposed surface, whether plane or irregular, either by relief or intaglio ornamentation.

The first part of my improvements relates to means of decorating the surface by intaglio and relief ornamentation.

The second part of my improvements relates to means of providing the backs of tiles with dovetailed or cramping grooves or holding places for attachment.

State of the Art.—Prior to 1840 all tiles, so far as known, were made from wet clay, beat up in molds, at first in plaster molds, and later in brass molds. In that year the Prosser patent was taken in England, June 17, for compressing buttons from clay-dust, and was subsequently applied to the manufacture of tiles by the Mintons, Maw, and others. By this process flat tile were produced by compression in molds from dry clay-dust; and either by arabesque designs on the face of the plunger or platen, usually the plunger, of the mold, or by engraving-tools, an indention was produced, into which "slip" was introduced, which, on firing, formed the chromatic pattern inlaid on the flat surface.

Another and later method of using dust-clay is known as the "Boulton and Worthington process," and used by Malkin & Co. It consists in the use of metallic boxes, fitted with plungers and fashioned like the arabesques or other patterns, to be used as ornaments, in which the "design-clay" dusts are compressed within a frame, which frame is afterward, the boxes and plungers being first removed, filled with clay-dust of the ground color, which is compressed within the frame and around the pattern made as stated, and the whole then fired; but up to the present time, so far as I am informed, no relief-tiles or intaglio tiles having texture in the depressions have been made in whole or in part by compression out of clay-dust, and certainly no tiles having "undercut" designs have been made in any part out of compressed clay-dust.

My present invention, so far as it relates to surfacing tile, consists in the production and preparation of the molds for embossing or indenting tile made of clay-dust, to the preservation and use of such molds, to the formation of undercut figures by the aid of such molds, and to the making of compact homogeneous clay-dust tiles, having surfaces ornamented in relief or intaglio having texture.

In the drawings, Figure 1 is a plan of a tile with an intaglio figure thereon, representing its use as a mold. Fig. 2 is a plan of a tile with a figure in relief thereon, also representing its use as a mold. Fig. 3 is a cross-section, illustrating the manner of their use, all of which will hereinafter be more fully set forth.

I take a plastic material, like paraffine, and place it in the tile-frame of the tile-compressing machine, and subject it to pressure, thus producing a flat thin plastic plate of about the thickness of a tile; or I take a quantity of clay-dust and similarly compress it, and saturate said dust with paraffine. The upwardly-presenting surface of this plate is then plentifully sprinkled with pulverized plumbago, which is compressed into the surface of the plate.

The compressed plate may now be engraved with any desired pattern, and, care being taken to cover with black-lead powder, brushed on with naphtha, or any other solvent of paraffine as a vehicle, or dusted onto a slightly-warmed

surface, or stippled on with a stippling-brush, the parts denuded by engraving can be used as an electrotype-mold to make a reverse, and the electrotype used as a matrix to make an obverse. These electrotypes, well backed, as when used for printing, and set in steel or other strong boxes to prevent crush of the backing, will serve as dies for making the intaglios and reliefs for stamping tile in dry clay-dust.

In case high reliefs are desired, the paraffine (or, better, the clay and paraffine) plate may be carved as desired, carefully avoiding undercutting, and then covered with its plumbago surface, by the naphtha process or stippling, and electrotyped and used as the die.

When high reliefs, which it is desirable to undercut, are to be made, the mold is made so that the compressed clay will draw, and, the main part of the design being thus formed, the modeller carves the undercutting by hand, the clay being sufficiently tenacious when compressed to allow this, and the finished tile, partly hand-made and partly machine-made, is then fired.

For obtaining textures, low reliefs, or intaglios of natural objects, and the like, I may, if I desire, use the paraffine plate made, as I have described above, with plumbago surface, for electrotyping; but, instead of engraving it, I form an impression in its black-leaded surface by the objects I wish to represent, in the manner hereinafter described for unleaded paraffine or clay-dust. I prefer, however, as it gives me great variety in design with slight expense, to adopt the following manipulation: Having formed the compressed plate, as already described, I raise in the tile-frame of the tile-machine the lower platen till the upper surface of the compressed plate is conveniently near the top of the frame, and compose upon the surface, by laying thereon bits of woven stuff, lace, pieces of embossed paper, leather or other fabric, leaves, grasses, flowers, or other objects having suitable textures and outlines, such a design as I think will be attractive. I then lower the platen to place, and bring down the plunger with strong compression upon the objects. By this means they are indented in outline and texture in the plastic or clay-dust surface, even overlays being represented with an accuracy absolutely true to nature, and always in intaglio.

As already said, this intaglio may be used as a mold for electrotypes, when properly made, by use of pulverized plumbago as a surfacing agent; but I usually take this matrix so made and place over it a diaphragm of thin tough material—a rubber film will serve, and many other materials; but the best and cheapest I have yet found is the thin Japanese paper, of uniform texture and great toughness, such as appears in the Japanese handkerchiefs and napkins, so called. This diaphragm must exactly cover the surface of the intaglio. Upon it is next laid the dust of surface and body-clay of the tile to be embossed, which is subjected to compression in the ordinary way, and thereupon, on raising the plunger and platen, the intaglio and relief may be separated, the diaphragm peeled by aid of a sharp tool to start it from the die, usually the relief, to which it generally, if not always, adheres, and the intaglio will usually, with proper care in handling, be found perfectly uninjured during several hundred impressions.

When the surface is of one clay and the body of another, each clay is to be separately compressed, unless *sgraffito* effects are desired, in which case the surface-layer must be carefully applied, so as to not cover the pattern desired to be of the color of the body-clay.

The sharpness and definition of texture of reliefs made from dust-clay intaglios are very remarkable, and tile compressed from dust from its homogeneous quality is much less likely to warp or shrink unevenly in firing than any other, particularly if packed in a less fusible powder, like quartz grains or ganister in firing, as is not unusual with terra-cotta relief-work. By these means I obtain what has long been a desideratum in relief tile-work—a compact homogeneous embossed tile of uniform quality and slight shrinkage—more surely than has ever been done before.

It may often be desirable to obtain in tile both the relief and intaglio of the impression in the clay-dust. In this case the relief can be used upon the platen in the same way as the intaglio. Two of these tile, an intaglio and a relief, may be placed face to face in the seggar for firing, and usually will separate on removal; but I prefer to insure this by leaving the paper diaphragm between them.

In case the design is to be reproduced smaller, the shrunk fired tile may be black-leaded and electrotyped.

Of course these tile may have their intaglios filled with, or their reliefs covered with, kiln colors, slip, or enamel, either while simply clay or after firing, in any way and at any time proper in tile-making for such application; but this is no part of my invention.

No good method of fixing wall-tiles has yet been contrived, except those used by the ancients of flanging or beveling the edges backward and forward on alternate sides or in alternating section on the same side, or in constructing them with holes partly parallel to their surfaces for cramps or wires extending into the plastic cement, all of which are costly, and none of which are adapted for compressed clay-dust work.

Lately on occasions, in wet-clay work, undercut cramp-grooves have been made by hand; but these are costly and inapplicable to dust-work.

I employ the following means for forming dovetailed grooves on the backs of tile: I cut one or more pieces of wood of dovetailed cross-section to such length as may be desirable, usually long enough to extend clear across one way, and lay them on the platen of the tile-machine, narrow side down, and fill in the clay-dust upon them, or I place them on

top of the filled-in dust narrow side up, according as the face of the tile is to be up or down. In compression the narrow face of the wood will be level with the back of the tile, and the clay-dust will mold round it. In firing these formers will burn out, leaving their grooves, and this, if the wood be soft, light, and dry, without much, if any, chance of injury to the tile.

Many things may be used as substitutes for paraffines, such as waxes, and compounds of waxes, resins, gums, &c.; but I have not considered it requisite to enumerate them, as they would clearly be equivalents if their qualities of toughness, flexibility, and plasticity resembled those of paraffine.

The dust used should be fine enough to pass a one-hundred-mesh sieve at largest.

I claim as my invention—

1. The carved paraffine matrix surfaced with plumbago, as an electrotype-mold for tile-dies.

2. The paraffine matrix formed by compression, coated with plumbago, as described, and carrying incised or indented patterns, as an electrotype-mold for tile-dies.

3. The method of preparing an electrotype-mold for tile-dies from paraffine by the following manipulations: by compression into a plate, by coating the surface of said plate with plumbago-dust, incorporated therewith, as described, and by compressing into such plumbago-coated surface objects of various textures and outlines, substantially as described.

4. The method of preparing an electrotype-mold for tile-dies from paraffine by the following manipulations in their order: by compression into a plate, by carving the surface to the desired form, and by the incorporation therewith of plumbago-dust, all substantially as described.

5. The electrotype-mold for tile-dies formed of compressed clay-dust and paraffine, and having a surface of relief or intaglio prepared and surfaced with plumbago, substantially as described.

6. The intaglio or relief compressed-paraffine die, surfaced with a thin diaphragm of sufficient flexibility and toughness, made and used substantially as described.

7. The intaglio or relief compressed clay-dust die, surfaced with a thin diaphragm of sufficient flexibility and toughness, made and used substantially as described.

8. The compressed homogeneous clay-dust tile, having relief-figures shaped by compression on all the surfaces that will draw and undercut by hand, substantially as described.

9. The compressed homogeneous clay-dust tile, with intaglio or relief designs upon the surface, substantially as described.

10. The compressed clay-dust tile, with intaglio or relief designs upon its surface, reproducing by transfer the textures of actual objects, substantially as described.

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Witnesses:
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