UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN COMPOUND AND PROCESS FOR CRYSTALLIZING GLASS.

Specification forming part of Letters Patent No. **212,681**, dated February 25, 1879; application filed November 26, 1878.

To all whom it may concern:

Be it known that I, WILLIAM GIBSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Compound and Process for Crystallizing Glass; and I do hereby declare that the following is a full, clear, and exact description thereof.

The nature of my invention consists in a compound and process for crystallizing the surface of glass, enameled ware, and other kindred surfaces by working on the surface of glass, whether it be plate, plain sheet, or colored, in the mass, flashed, enameled, or partially stained on one or both sides, and thereby producing certain new, ornamental, and useful effects in decoration, as will be hereinafter more fully set forth.

I will first describe the compound which I preferably use to obtain the best results.

I melt in a strong fire fifty parts of any ordinary flint or lead glass, twenty parts of silicious sand, ten parts litharge in scales, and ten parts calcined bones. This when properly melted is the material I have found best suited as the vehicle or flux by which the various effects can be produced. To three parts of this compound or mixture I add two parts, by measure, of calcined flint-powder. These being mixed are to be ground in water in various degrees of fineness, according to the effect desired.

I mix with a little milk as a binder for plain grounds, and over the whole surface of the glass I give a uniform coat, and then vitrify in the muffle or furnace in the usual manner known to glass-stainers. The sheets of glass thus coated are then heated in a tin oven or any safe way to prevent breakage, for the purpose of expanding the particles of the material of the coating on the surface and the body of the glass itself as much as safety will admit of. After the glass has been thus heated the whole is to be coated with a strong solution of gelatine or any of the known hard and non-elastic vegetable gums or albumenized pastes. This being allowed to dry and harden is to be removed by heat in a gas-heated stove, or by any other safe or convenient method, thereby producing crystalline effect over the whole surface of the glass.

In place of the above I may add to the original compound one-fourth of a part of white oxide of tin, or the same quantity of purple oxide of cobalt or the oxides of chrome or of iron, and using gum-water instead of milk, and with this paint I cover such parts of the glass only as it is desired to crystalline, and remove with any of the coatings, as in the first process. By this I obtain clear glass and crystalline on the same glass, and in such quantity as it may be required.

The object of these additions to the original compound is that in many of the designs it may be desirable to leave certain portions of the ground on the glass; and such portions so left having a white, red, blue, or other tint, it becomes a great aid to the artist in giving a texture in his after-finish of leaves, vines, draperies, &c., and as one or all may be so used on the same glass gives a great command of facilities in producing effects.

Particular effects may be controlled with perfect certainty. For instance, when I want to produce a stippled or granulated effect I apply any of the mixtures first described without first heating or expanding the glass just where this effect is desired, and as soon as covered, and while still wet, I place it in a moderately-heated oven and evaporate or dry quickly, increasing the heat so as to remove the material at one operation.

When it is desired to produce large flakes or fern-leaf effects, I, after coating the glass with any of the above-described mixtures, use real leaves themselves, or cut forms in paper, or use pieces of string, open-figured lace, or any of the many kindred substances that will suggest themselves to the artist in forming his design. These, after having been placed as taste may suggest on the glass with one or more of the adhesive mixtures, are to be coated over in whole or in part with one or more coats, thus leaving the glass coated in uneven thickness, and being allowed to harden and to be removed by heat, as before described.

Transparent colors, silver, gold, &c., may also be added for mural decorations, panelings for furniture, &c. All the various effects may be produced on the same glass where defined spaces are controlled by design and outline. Where a brilliant stony gem effect is required

a piece of paper embedded in the mass of any of the adhesive matters, and made strong and of irregular thickness, will give results which, although brilliant, have a rounded and not a sharp prismatic effect. Again, by coating the glass with the adhesive mixture in which has been mixed a small proportion of glycerine together with some foreign material, such as clay, whiting, fullers' earth, or their equivalents, and embedding a sheet of paper or thin muslin over the surface of glass in this paste mixture on its removal by heat, as before described, the prism flakes assume a great size and brilliancy, and are valuable for glass-stainers as a new surface for picture effects.

When it is desired to produce effects which, to the artist, will suggest shells, worms, and insects along with the vegetation, I apply the adhesive mixture with a small brush, or from a syringe forming convolutions or spiral lines of different thicknesses. This should be done with a very strong material, and being allowed to dry is again coated over the whole surface, with the pasty mass made thinner and weaker by the addition of a little water. The object of this is to have the glass coated over with kindred substances, weak over strong, or strong over weak, which being removed by heat, as before, will insure the desired effects.

When it is desired to produce a brilliant uniform, but not flaky or prismatic, effect equally over the whole surface, I use first a uniform thickness of the adhesive paste, which being dried and removed is to be again coated uniformly all over, as before, and again removed by heat.

Double crystalline may be made with the same process, and may be used when backed up with colors for architectural and other purposes.

By adding glycerine and clay to the adhesive matter, and using it in a weaker form, the crystalline will be more soft in its effect.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. As a preliminary step to the production on glass of the various effects herein described, the compound or flux formed by melting together flint or lead glass, silicious sand, litharge in scales, and calcined bones, or their equivalents, in or about the proportions set forth.

2. In combination with a flux, substantially as described, calcined flint-powder and milk, when mixed and applied substantially as set forth.

3. The process, substantially as herein described, of crystallizing the whole or part of the surface of glass by coating the desired surface with the compound described and vitrifying in the muffle, then heating the glass, and then coating with a non-elastic paste, which, when dry, is removed by heat, all substantially as herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM GIBSON.

Witnesses:

SPENCER C. DOTY,

WALTER W. GIBSON.