No. 681,465. Patented Aug. 27, 1901.

A. WEBER, JR.

GLAZING PORCELAIN.

(Application filed Aug. 13, 1900.)

(No Model.)

Fig. 1

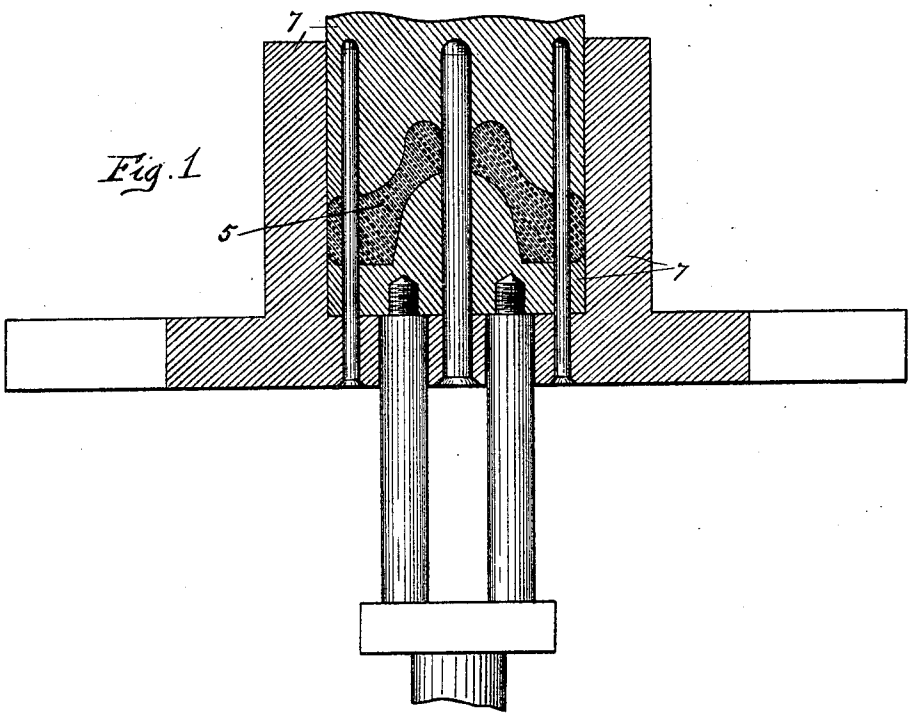
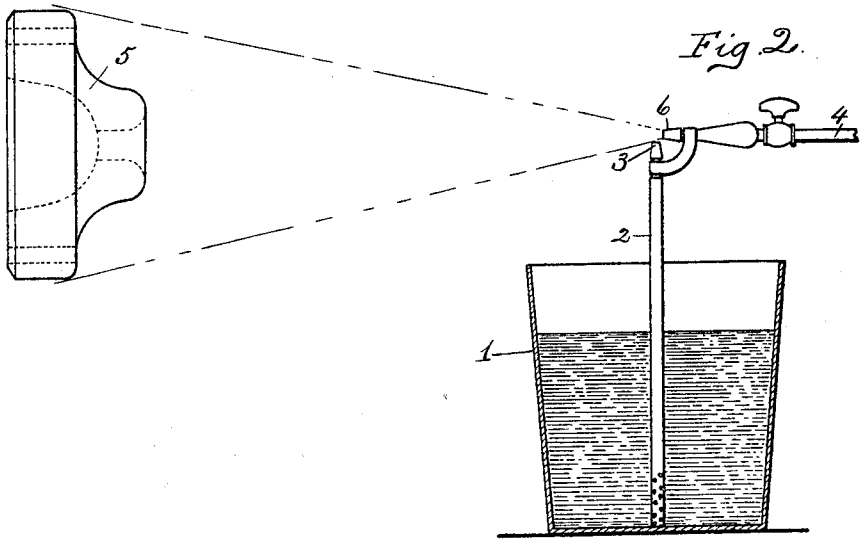


Fig. 2.



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UNITED STATES PATENT OFFICE.

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GLAZING PORCELAIN.

SPECIFICATION forming part of Letters Patent No. 681,465, dated August 27, 1901.

Application filed August 13, 1900. Serial No. 26,737. (No model.)

To all whom it may concern:

Be it known that I, AUGUST WEBER, Jr., a citizen of the United States, residing at Schenectady, county of Schenectady, and State of New York, have invented certain new and useful Improvements in Glazing Porcelain, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a central cross-section of a mold adapted to form porcelain articles. Fig. 2 is a view in side elevation of the apparatus for producing a jet of air containing minute particles of glaze accompanied by moisture, with a molded article supported in the path of said jet of air.

In the manufacture of porcelain articles—such, for example, as those commonly used for electrical fittings, as well as for other purposes—a white fine clay is employed, which when molded to the desired form, baked, and provided with a glazed surface forms an ornamental and insulating support for the metallic parts of various kinds of electrical apparatus. The cohesive qualities of this kind of clay are very slight and the molded article while in its green state—that is, prior to undergoing the baking or firing process—is extremely delicate and frangible, for which reason, among others, it is the common practice to bake such molded articles prior to subjecting them to the glazing operation, the article being subjected to a second firing process after the glazing material has been applied thereto. Each firing process consumes a large amount of time, due to the fact that the temperature of the interior of the kiln must be gradually raised to the required degree and then gradually reduced. The most common method of applying the glaze to such articles is by what is known as the "dipping process," in which each article is dipped in a liquid mixture of glaze. The moisture is quickly absorbed by or evaporates from the surface of the article, leaving thereon a coating of glaze which when afterward fluxed by heat forms upon the article a smooth vitreous surface. It will readily be seen that a glazing liquid so applied will flow to a greater or less extent upon the inclined and vertical surfaces of the article before the moisture has been absorbed or evaporated sufficiently to destroy the fluid nature of the glaze. The result is to irregularly deposit the glazing material, which by flowing accumulates along the lower portions of vertical and inclined surfaces, as well as in the bottom and corners of the sockets or apertures in the article, and thus produce a varying product. As this class of porcelain articles is usually made with one or more sockets or recesses adapted to receive connecting mechanism, the accurate fitting of such parts together is materially interfered with by any unequal distribution of the glaze upon the vertical walls of such sockets or in the corners of the same.

The object of my invention is more particularly to provide such porcelain-ware with a uniform coating of glaze upon such surfaces, as desired, and also to facilitate the glazing operation.

In carrying out my invention I apply to the surface to be glazed minute particles of glaze, accompanied by moisture in such quantities only as to form a stable deposit upon such surface, such deposit being preferably so applied while the porcelain article is in what is known in the art as the "green stage"—that is, before it has been fired—the deposited glaze being afterward fluxed by the heat of the firing process.

In carrying out my method I make use of an apparatus, which may be of any known form, for producing a jet or current of air or other gaseous fluid and projecting the same past the open end of a tube leading from a liquid mixture of glaze, which may operate upon a principal similar to that of an ordinary toilet-atomizer, to introduce into such jet minute particles of the glaze accompanied by moisture from the glazing mixture, which particles are carried by the jet of air and deposited upon any object interposed in the path of such jet.

In Fig. 2 of the drawings I have shown a reservoir 1, adapted to contain a liquid mixture of glaze and having a tube 2 leading from the reservoir exteriorily of the same and terminating in an open end or nozzle 3. A tube 4, leading from an air-compressor or other source of supply of gaseous fluid, (not shown,) is supported, in connection with the tube 2, with its nozzle 6 in such a position as to direct a jet of gaseous fluid forced therethrough across the open end 3 of the tube 2 communicating with the glaze mixture. By supplying gaseous fluid under pressure in any known manner to the pipe or tube 4 a jet or current of such gaseous fluid will be directed outwardly from the nozzle, carrying with it minute particles of glaze, accompanied by moisture from the liquid mixture. The article 5 to be glazed may be supported in the path of such jet by hand or in any known manner, and when so supported the minute particles of glaze accompanied by moisture will be deposited upon the exposed surface of the article, and such deposit can be so regulated by varying the quantity of liquid in the glaze mixture, the force and duration of the jet, or the position of the article being treated, that the deposit will be entirely prevented from any tendency to flow upon any surface to which it is applied, remaining thereupon as a stable deposit, and this regardless of the position of the surface to which the glaze is applied, as to whether the same is vertical, horizontal, or inclined. By applying the glaze in this manner the particles thereof can be uniformly distributed upon every part of the surface which it is desired to treat, and when the article so treated is subjected to the heat of the firing or burning process the deposited glaze will flux uniformly upon such surface, it being possible by this method to apply the glaze interiorly of the holes and sockets to which metal parts are to be fitted without interfering in any way with the accurate fitting of the parts in use.

In applying the glaze the glazing mixture is preferably maintained in a uniformly-mixed condition by frequent agitation or stirring.

The application of the glaze by my improved method is accomplished with so little force that the deposit can be thus safely made upon the surface of the most delicate molded articles before the same have been hardened by the firing process, and my invention contemplates the application of the glaze in this manner not only to the biscuit-ware, but to the molded porcelain articles while yet plastic or in a green state, the subsequent firing operation thus serving to simultaneously bake the porcelain composition of which the article is formed and flux the glaze thereupon.

It is more difficult to apply glaze to green porcelain than to baked porcelain on account both of the extremely fragile nature of the plastic molded clay and of the more or less impervious nature of the surface of the article fresh from the molding-dies, due to the use of an oily lubricating coating with which the die-surfaces are treated preliminary to the molding operation. The lubricant so used during the molding operation becomes deposited upon the surface of the molded article to a greater or less extent, rendering it practically impossible by methods heretofore employed to secure even approximate uniformity in the distribution of any mixture containing water, which necessarily forms a large part of all glazing mixtures.

It is well known that if moisture be applied to a greasy or oily surface in quantities sufficient to flow it will not assume a uniform disposition upon such surface, due to the fact that the force of cohesion between the particles of moisture is greater than the comparatively slight force of adhesion exerted between the moisture and the grease or oil, which causes the moisture to entirely leave some portions of the greasy or oily surface and gather in globular form upon other portions thereof. Such is the result whenever a liquid glazing mixture is applied in unstable form to a molded surface containing grease or oil from the die.

By my improved method the quantity of moisture accompanying the particles of glaze in their application to the surface being treated is so regulated that its cohesive force is less than the adhesive force between the glaze and such surface, so that the tendency of the glaze to flow when deposited is entirely overcome, such deposit assuming instantly a stable position upon the differing surfaces. The nature and shape of the surface to which the glaze is thus applied are immaterial, the deposit being uniformly made over clean surfaces and a surface containing more or less lubricating matter deposited by the dies, as well as over vertical, inclined, and horizontal surfaces.

I am able by means of my improved process to entirely avoid the formation of lumps of glaze, pin-holes, and other imperfections in the glazed surface, while producing a finished glazed porcelain article with a single firing, thereby securing an improved product with much saving in time, labor, and expense.

The glaze mixture may be prepared according to any of the known formulas. In preparing the glaze mixture I prefer to use a comparatively small proportion of water, making a comparatively thick mixture. The desired form may be imparted to the porcelain composition in any known manner, as by the molding apparatus 7 shown in Fig. 1.

I have described my improved process as applied to the glazing of porcelain; but it is equally applicable to various kinds of pottery, clayware, and the like. In carrying out my process I prefer to maintain both the glaze mixture and the article being treated at normal temperature during the operation of applying the glaze.

By the term "stable deposit" as used in

this specification and also in the claims I refer to such a deposit as is formed by applying to the base-surface minute particles of glaze accompanied by moisture in such quantities that the moisture is instantly absorbed by the porcelain and the small particles of glaze form a stable deposit at the place of their original application.

I make no claim, broadly, to applying glaze to a surface by means of a spraying apparatus, nor do I make claim to any particular form of apparatus for that purpose, nor do I wish to be limited to the use of the particular form of apparatus shown in the drawings, nor to any particular form of apparatus in carrying out my improved method, as the glaze can be applied in any known manner and by the use of any known apparatus, such that particles of glaze are applied to the base-surface accompanied by moisture in such quantities that the moisture is instantly absorbed by the porcelain and the several particles of glaze form a stable deposit at the place of their original application.

The class of articles to the glazing of which this invention relates have a homogeneous highly-absorptive base, the absorptive capacity of which is practically unlimited so far as requisite to coating its surface with glaze—that is, the body or base has sufficient capacity to absorb the moisture from as much liquid glaze as it is necessary to apply thereto in order to deposit the desired quantity of mineral glaze thereupon; but it cannot take up all this moisture at once, and if a temporary surplusage of moisture be applied the particles of glaze are caused to flow before the fluidity of the applied mixture can be destroyed by absorption. I limit my improved method to articles comprising a homogeneous highly-absorptive base and to the application of the liquid glaze thereto in such limited quantities successively that the moisture is absorbed as rapidly as applied and the particles of mineral glaze form a stable deposit on the base at their place of original application.

What I claim as new, and desire to secure by Letters Patent, is—

1. That improvement in the art of glazing porcelain, and the like, which consists in applying to the surface of a homogeneous highly-absorptive base minute particles of glaze accompanied by moisture, in such limited quantities successively that the moisture is absorbed by the base as rapidly as applied, and the particles of glaze form a stable deposit upon the base at the place of their original application, and afterward fluxing such deposited glaze by heat.

2. That improvement in the art of glazing porcelain, and the like, which consists in directing upon the surface of a homogeneous highly-absorptive base a jet of gaseous fluid containing minute particles of glaze accompanied by moisture, in such quantities as to form a stable deposit upon such surface by absorption by the base of the moisture as rapidly as applied; and afterward fluxing such deposited glaze by heat.

3. That improvement in the art of making porcelain, and the like, which consists in applying to the surface of a homogeneous absorptive green-composition base minute particles of glaze accompanied by moisture, in such quantities as to form a stable deposit upon such surface, and afterward simultaneously baking the green composition and fluxing such deposited glaze by heat.

4. That improvement in the art of making porcelain, and the like, which consists in molding plastic composition to approximately the desired form; applying to the molded surface of the composition while plastic, minute particles of glaze accompanied by moisture, in such quantities as to form a stable deposit upon such surface, and afterward drying the article and subjecting the same to a high degree of heat, whereby the plastic composition is baked and the glaze simultaneously fluxed, substantially as described.

5. That improvement in the art of making porcelain, and the like, which consists in shaping plastic composition to approximately the desired form in a mold, directing upon the molded surface of the green composition a jet of air containing minute particles of liquid glaze, in such quantities as to form a stable deposit of glaze upon such surface; and afterward simultaneously baking the green composition and fluxing the deposited glaze by heat, substantially as described.

6. That improvement in the art of making porcelain, and the like, which consists in shaping plastic composition, depositing upon the surface of the shaped composition, while green, a thin, approximately uniform and stable coating of glaze, and afterward simultaneously firing the green composition and fluxing the deposited glaze.

7. That improvement in the art of glazing porcelain, and the like, which consists in applying to the surface of a homogeneous highly-absorptive base, while at normal temperature, minute particles of glaze accompanied by moisture at normal temperature, and in such quantities as to form a stable deposit upon such surface; and afterward fluxing such deposited glaze.

8. That improvement in the art of making porcelain, and the like, which consists in applying to the surface of a homogeneous absorptive green-composition base at normal temperature, minute particles of glaze accompanied by moisture, at normal temperature, and in such quantities as to form a stable deposit upon such surface, and afterward simultaneously baking the green composition and fluxing such deposited glaze by heat.

In testimony whereof I have hereunto set my hand this 17th day of July, 1900.

AUGUST WEBER, JR.

Witnesses:
FRANK C. CURTIS,
GEO. A. MOSHER.