

(No Model.)

2 Sheets—Sheet 1.

J. H. SCHARLING.

METHOD OF DEPOSITING LAYERS OF METAL ON GLASS.

No. 505,576.

Patented Sept. 26, 1893.

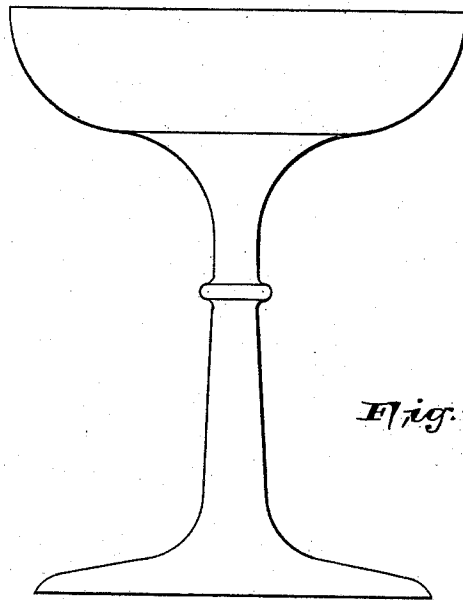


Fig. 1

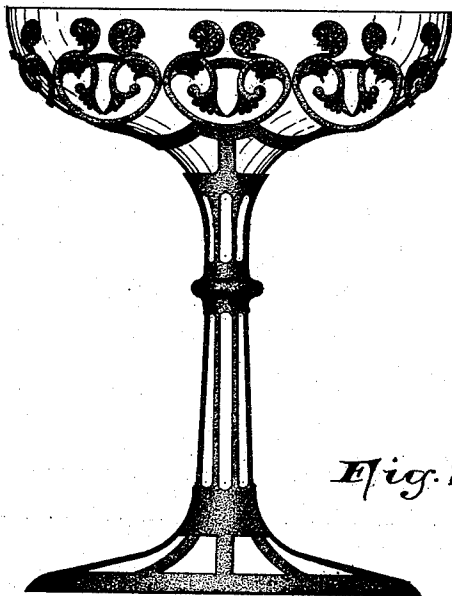


Fig. 2

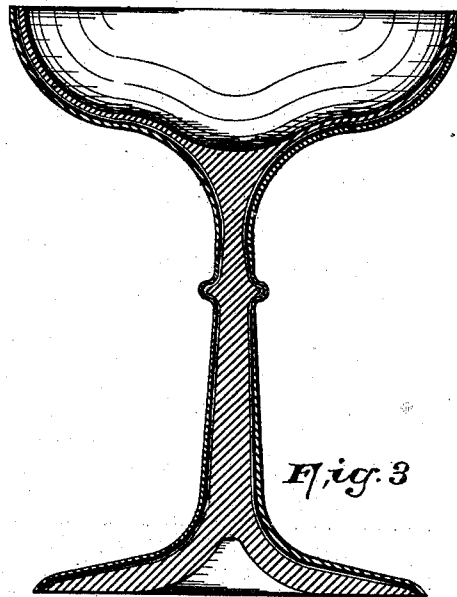


Fig. 3

WITNESSES:

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John G. Tinsley

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John H. Scharling,
BY *Fred C. Graentzel,* ATT'Y.

(No. Model.)

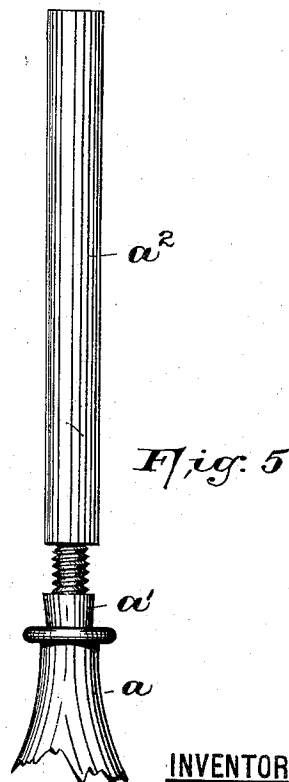
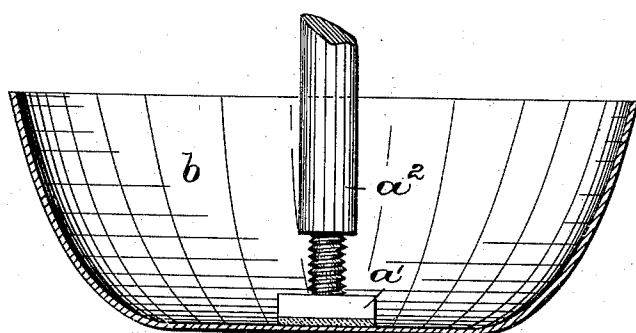
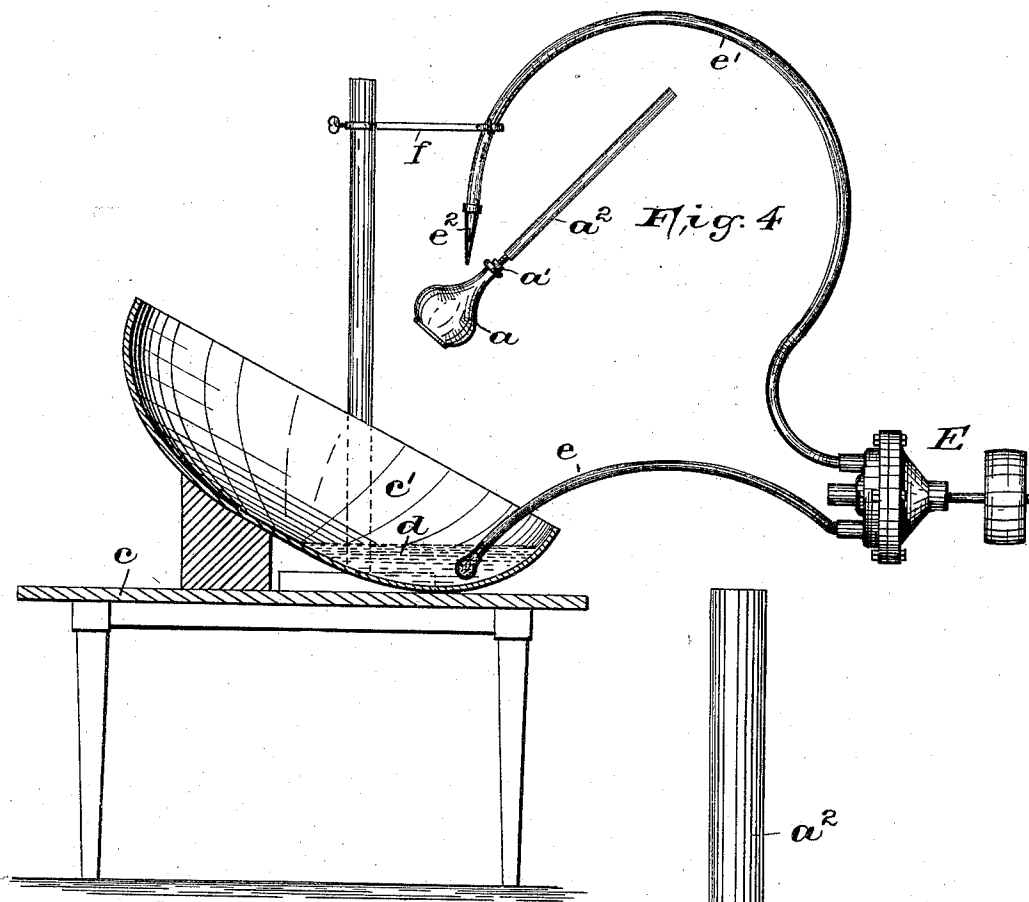
2 Sheets—Sheet 2.

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METHOD OF DEPOSITING LAYERS OF METAL ON GLASS.

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WITNESSES:

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INVENTOR:

John H. Scharling,
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UNITED STATES PATENT OFFICE.

JOHN H. SCHARLING, OF NEWARK, NEW JERSEY.

METHOD OF DEPOSITING LAYERS OF METAL ON GLASS.

SPECIFICATION forming part of Letters Patent No. 505,576, dated September 26, 1893.

Application filed March 30, 1892. Serial No. 427,008. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN H. SCHARLING, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Methods of Depositing Layers of Metal on Glass; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention relates to improved methods of depositing one or more coatings of metal upon articles of glass ware or china, such as glasses, bottles, &c., and the producing of suitable designs on such deposited metals, and is applicable to all cases where surface ornamentation is to be produced either upon glass, china, &c., and it is not limited to any particular design.

The invention therefore consists of a novel process or method of depositing different layers of metal on the articles of ware, and also a new method of floating upon the article a thin potash solution or other solution of silver by means of apparatus to be described hereinafter, which solution decomposes itself and forms a thin and translucent coating of silver upon the article, which is hardly perceptible to the naked eye, and upon which can be deposited by the electro-depositing process a second layer of either gold, platinum, silver or other metal.

In the drawings, Figure 1 is an elevation of a glass provided with the coatings of metal, before the design to be produced thereon has been formed by the process hereinafter described. Fig. 2 is a like view of the glass provided with the metal covering having the design produced therein, and Fig. 3 is a vertical section of Fig. 1, showing the thickness of the glass and the different layers of metal thereon. On Sheet 2, Fig. 4, is a view of an apparatus employed in my new method of flowing the first coating or layer upon the article of ware. Figs. 5 and 6, are views of part of a bottle and a finger bowl, showing the manner of securing them to a handle for holding the

article beneath a nozzle, from which the solution flows.

In carrying out my invention, I first take an ordinary article of ware, such as a glass bottle *a* or a finger bowl *b*, and, as shown in Fig. 5, I secure in the neck of the bottle a cork *a'* into which I screw a handle *a''*, as shown. Or, when a finger bowl or saucer or cup is to be used, I secure the cork to the bowl on the inside or outside as the case may be, by means of cement and then screw the handle into the cork, as shown in Fig. 6.

Upon a suitable table or bench *c*, I arrange a tilting bowl *c'*, which contains the solution *d* for the first coating or layer. In this solution I place the end of a suction pipe *e* which is attached to a suitable power or other pump *E*, and from which extends a pipe or tubing *e'* provided with a nozzle *e''*. The nozzle end of this pipe or tube is held above the bowl *c'* and in a clamp *f* placed on the table, as will be seen from Fig. 4.

The potash solution contained in the bowl *c'*, consists preferably of the following ingredients, namely: potash, nitrate of silver, ammonia and milk-sugar, but the ingredients may be varied, and any other known solutions for coating glass with silver may be used.

In order to flow the solution upon the article of ware, the bottle, glass or bowl provided with the holding device, shown more especially in Figs. 5 and 6, is held beneath the nozzle of the pipe *e'* and the pump is set in operation. The liquid flows upon the article to be covered, and the operator turns and twists the same beneath the stream flowing through the nozzle, whereby the bottle or other article becomes covered with a coating or layer of uniform thickness. As soon as the solution passes upon the article it decomposes, owing to the chemical properties of the ingredients used, leaving a thin translucent coating of silver metal upon the glass, which is only perceptible to the eye by a bluish tint. This method of flowing the solution upon the article is a very economical one, as a very slight quantity of the potash solution can be used over and over again, as will be evident from Fig. 4, while in the old process of dipping, in order to entirely im-

merse the article a great quantity of the expensive solution was necessary. Another great advantage is that the workman is not compelled to handle the solution himself and when the article is large he can use both hands in handling it. When the inner layer or coating of silver has thus been formed upon the glass article, a coating of gold can next be formed upon the silver layer by means of the well-known electro-depositing process and upon this, may be formed, in the same manner, a third layer of silver. Thus, a glass cup or finger bowl provided with these layers will have the appearance of a solid silver cup lined with gold, the gold layer being produced to view through the transparent layer of silver directly upon the glass body.

Of course it will be understood that instead of gold I may use platinum, and these layers are put on very thin, while the outside layer or coating of silver may be put on any required thickness by the electro-depositing process. The article can then be polished and finished, after which, any suitable design may be painted upon the outer layer with a resist varnish, and then placed into an acid bath, whereby the outside silver coating not protected or covered by the resist varnish will be eaten away, producing in clear and sharp outline the design and exposing the middle layer of gold or platinum. The varnish is then cleaned off, and the exposed gold or platinum surfaces are removed by any mechanical means, such as a scratch brush, and the metal so removed can be recovered by refining the same. This leaves the bottle, or other article thus covered with a raised outline of the design in silver, and exposing in places the glass or china. The raised metal surfaces are then provided with the design desired, which can be engraved or otherwise wrought therein, and the article assumes the general appearance illustrated in Fig. 2. I have found by practice that where an article is provided with but one coating of metal, such as silver, the etching acid in eating away the surfaces of metal unprotected by the resist varnish, will also eat its way between the glass and the layer of silver thereon, thereby partially destroying the outline of the design and also the beautiful effect. This is due to the fact that the first coating of silver can not be made to closely adhere to the glass, a layer of air being formed between them into which the etching acid penetrates and thereby destroys the effect. In depositing, however, a coating of platinum or gold upon the first layer of silver by the electro-depositing process, the two metals firmly unite and form one body, as it were, and when the outer layer of silver is etched away in parts, the etching process will stop as soon as the gold or platinum layer has been reached, for the acid is not of such power as to attack these metals. The exposed gold or platinum parts and the silver depos-

ited by means of the potash solution can then be removed by the means just mentioned in the above.

Another great advantage obtained is, that at the same time the article receives the appearance of gold lined silver ware, when gold has been used instead of platinum.

Another great advantage is that the intermediate coating or layer of gold or platinum prevents the tarnishing of the inner silver layer, which is fully protected by the glass on one side and the gold or platinum on the other side.

Of course it will be understood that the several layers of metal are not to be limited to any particular kind of metal, nor to metal coverings for glass ware solely, and that in this manner any indefinite number of designs can be formed upon the article.

Having described my invention, what I claim is—

1. As a new article of manufacture, an article of ware of glass or other like material, provided on its exterior with an inner and translucent layer or coating of silver, an intermediate coating of gold or other precious metal, and an outer layer or coating of silver, substantially as and for the purposes set forth.

2. As a new article of manufacture, an article of ware of glass or other like material, provided on its exterior with an inner and translucent layer or coating of silver, an intermediate coating of gold or other precious metal and an outer layer or coating of silver, and a suitable design etched or otherwise produced in said coatings of metal to expose the surface of the article between the metal portions, substantially as and for the purposes set forth.

3. The method herein described, of depositing layers of different metals on glass-ware or other like articles, which consists as follows, to wit:—first, of repeatedly flowing an easily decomposable silver solution by means of a pump upon the article, while slowly turning or moving the article during such process, and thereby depositing, by the decomposition of this solution, a thin layer or coating of silver upon said article; second, electro-depositing a layer of gold or other precious metal upon said silver layer, and finally, electro-depositing another layer of silver upon said intermediate layer of metal, substantially as set forth.

4. The method herein described, of depositing layers of different metals on glass-ware or other like articles, which consists as follows, to wit:—first, of repeatedly flowing an easily decomposable silver solution by means of a pump upon the article, while slowly turning or moving the article during such process, and thereby depositing, by the decomposition of this solution, a thin layer or coating of silver upon said article; second, electro-depositing a layer of gold or other precious metal upon said silver layer, and finally, electro-depositing another layer of silver upon said in-

intermediate layer of metal, then covering said outer layer with a design printed thereon with resist varnish, and subjecting the whole to an etching acid, substantially as set forth.

5 5. The method herein described, of depositing layers of different metals on glass-ware or other like articles, which consists as follows, to wit:—first, of repeatedly flowing an easily decomposable silver solution by means
10 of a pump upon the article, while slowly turning or moving the article during such process, and thereby depositing, by the decomposition of this solution, a thin layer or coating of silver upon said article; second, electro-depositing a layer of gold or other precious metal
15 upon said silver layer, and finally, electro-de-

positing another layer of silver upon said intermediate layer of metal, then covering said outer layer with a resist varnish in design, etching away the exposed parts of silver to
20 the intermediate coating, and finally, mechanically removing said exposed parts of said intermediate layer and the metal beneath said parts of the inner layer, substantially as set forth.

25 In testimony that I claim the invention set forth above I have hereunto set my hand this 26th day of March, 1892.

JOHN H. SCHARLING.

Witnesses:

FREDK. C. FRAENTZEL,
WM. H. CAMFIELD, Jr.