

(No Model.)

2 Sheets—Sheet 1.

H. SCHULZE-BERGE.

APPARATUS FOR APPLYING POWDERED SUBSTANCES TO
SURFACES OF GLASS.

No. 296,228.

Patented Apr. 1, 1884.

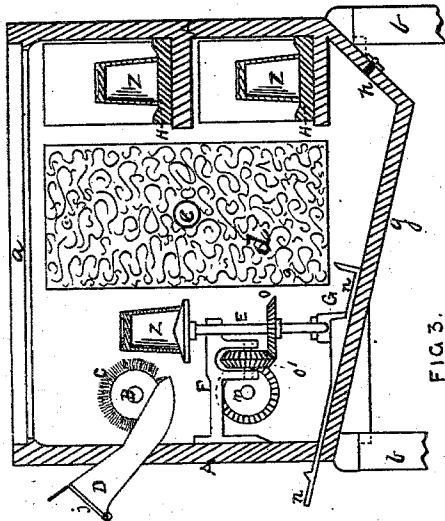
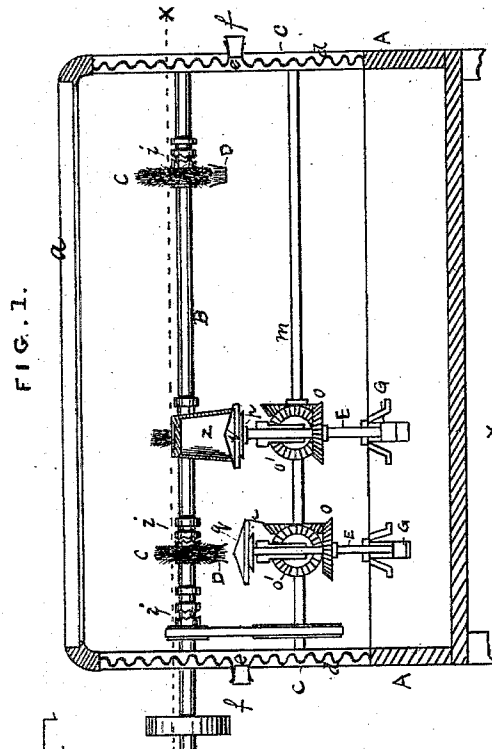


FIG. 1.



Witnesses—
W. B. Conwin
John V. Smith

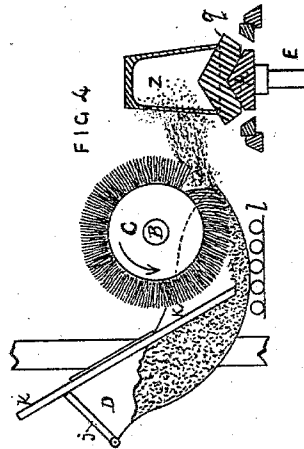


FIG. 3.

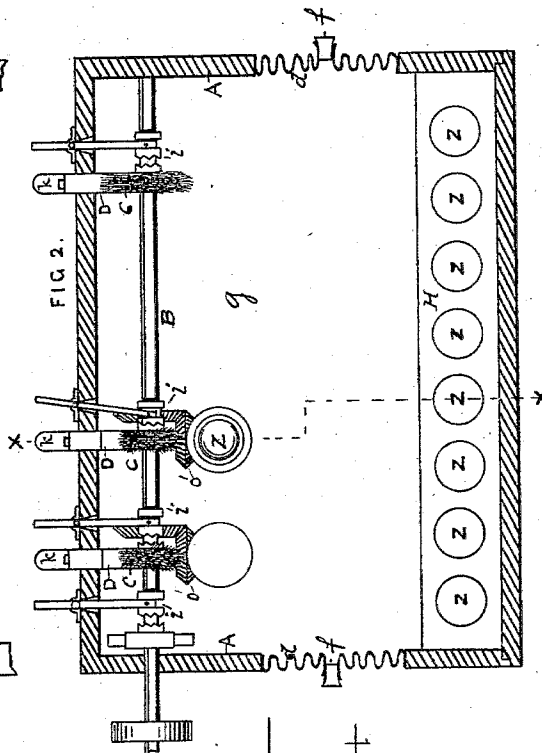


FIG. 4.

Inventor—

Hermann Schulze-Berge
by his attorneys
Bakewell Kerr.

(No Model.)

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FIG 5.

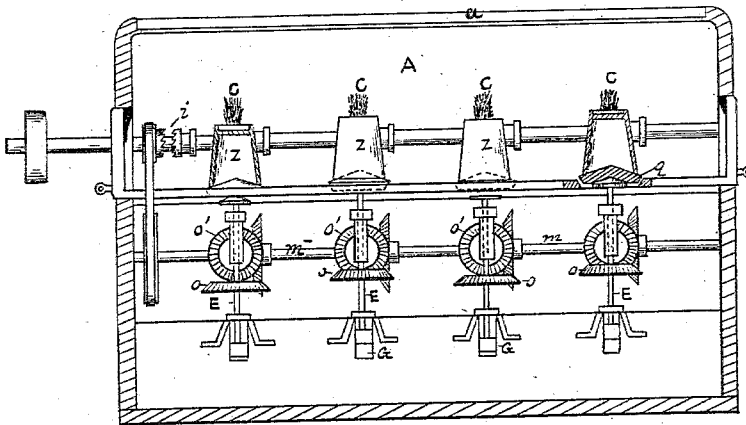
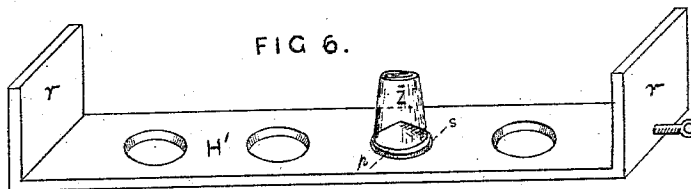


FIG 6.



WITNESSES.

W. B. Corwin
Geo. H. Smith

INVENTOR.

Hermann Schulze-Berge
by his attorneys
Bakewell Kerr.

UNITED STATES PATENT OFFICE.

HERMANN SCHULZE-BERGE, OF ROCHESTER, ASSIGNOR TO HIMSELF AND
JESSE H. LIPPINCOTT, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR APPLYING POWDERED SUBSTANCES TO SURFACES OF GLASS.

SPECIFICATION forming part of Letters Patent No. 296,228, dated April 1, 1884.

Application filed January 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, HERMANN SCHULZE-BERGE, of Rochester, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Applying Powdered Substances to the Surfaces of Glass; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of my improved apparatus. Fig. 2 is a sectional plan view on the line *x x*, Fig. 1. Fig. 3 is a transverse vertical section on the line *x x* of Fig. 2. Fig. 4 is an enlarged side elevation of the devices for applying the powdered matter and holding the article to which it is applied. Fig. 5 is a longitudinal sectional elevation of my apparatus, with shelf for placing articles over the revolving holders. Fig. 6 is a perspective representation of the shelf shown in Fig. 5.

In other patents granted to me I have described methods of etching and decorating glassware by applying to the surface certain solid substances in a pulverized condition. Some of these substances—such as carbonate of potash and the silicates of the alkalis—deliquesce when exposed to the atmosphere, and therefore cannot readily be applied by dusting them in a powdered condition on the surface of the glass, and while this difficulty can be in a measure overcome as to these salts by adding benzine while they are being pulverized, yet this does not render them easy of use in the manner described. Other pulverized substances which I employ in etching glassware—such, for instance, as the fluorides of potash and soda—are very injurious to the workmen when the dust is inhaled, and as the applying of these substances in the form of fine powder by dusting cannot be carried on without a considerable amount of the fine particles floating in the air, it becomes very important that some apparatus should be used by which the dusting process can be carried on in a close chamber out of contact with the atmosphere of the room occupied by the workmen. This, then, is the object of my invention, and in accomplishing it by the apparatus

I am about to describe I am enabled to do so in a more expeditious manner than heretofore attained, and with advantage also in the regularity and uniformity of the deposit of the dusty material. For this purpose I employ a case or chamber, not air-tight, but inclosed on all sides to prevent the free access of the atmosphere and the escape of the fine particles of the pulverized substances employed, which also effects a saving of material.

In the drawings, A is the case or chamber, which may be of any convenient size. In a large factory it will be convenient to use chambers of different sizes, so as to be conveniently adapted to use with large or small articles of glass or china ware. The chamber A is four-sided, and has a cover, *a*, preferably of glass, so as to enable the operation to be witnessed by the workman. If liquid hydrofluoric acid is used for etching purposes within the chamber in practicing the invention described in my Patent No. 276,895, of May 1, 1883, the fumes of the acid would in time obscure the glass; but this may be prevented by placing within the chamber a small dish of hydrate of ammonia, which will unite with the hydrofluoric-acid vapor and precipitate as fluoride of ammonia. The chamber A may be rectangular in horizontal cross-section; but I prefer to make the bottom with a double incline, *g h*, as shown in Fig. 3. The case thus formed is supported on legs *b b*, &c.

On each of the two opposite ends of the chamber A, I make an opening, *c c*, which is covered with sheet-rubber *d*, fastened closely at the edges of the opening, so as to exclude the atmosphere but “put on full,” so that when the hand of the workman is introduced through a small circular opening, *e*, in the center of the elastic sheet, he can thrust his arm into the interior of the chamber and move it about freely, the full sheet of rubber forming a sort of sleeve. The central opening may have a ring fastened to the rubber sheet, so that when not used by the operator it may be closed by inserting a plug, *f*, of any suitable material. Near one side of the chamber is a horizontal shaft, B, which turns in suitable bearings, and may be operated by steam, hand-power, or otherwise. This shaft B carries a

series of brushes, C, placed at convenient distances apart. These brushes are circular disks surrounded with bristles—such as hog's bristles, or whalebone—or other material having a good degree of elasticity. These brushes are attached to sleeves loose on the shaft B, but which are caused to rotate with the shaft, whenever desired, by clutches *i*, which may be severally operated from outside of the chamber, so as to throw the brushes in or out of motion whenever desired. A hopper, D, is placed in the rear of each of the brushes C, the top or mouth of each hopper being placed outside of the side of the chamber A, as shown in Fig. 3, so that it may be filled without opening the chamber, and is covered with a hinged lid, *j*, fitting closely, so as to exclude the atmosphere as far as possible. The lower end of each hopper enters the chamber A and extends under one of the brushes C, the forward extremity of the hopper coming in contact with the bristles of the brush, as shown in Fig. 4. Each hopper has a slide, *k*, extending to the outside of the chamber, by which the supply of pulverized fluoride or other substance employed is regulated. The rotation of the brush in the direction indicated by the arrow in Fig. 4 causes the pulverized substance to be forcibly ejected as a fine dust from the extremity or apron of the hopper onto any object, Z, placed in front of it. If the pulverized substance is one which has a tendency to deliquesce or to contract moisture, and thus lose its pulverulent quality, it may be kept dry by means of a steam pipe or coil, *l*, placed under the row of hoppers.

In front of each hopper and brush is a vertical revolving shaft, E, (see Fig. 3,) which is caused to revolve by gearing from a horizontal shaft, *m*, (see Fig. 1,) which operates the series of vertical shafts E. Each of the shafts E is supported near the top by a bracket, F, projecting from the side of the box, and its lower end is supported by a step, G. Each of these steps rests on an inclined slide, *n*, (see Fig. 3,) on the inclined bottom *g* of the chamber, so that when the slide *n* is pushed downward the step is lowered and with it the vertical shaft E. The effect of this is to lower the beveled wheel *o* on the shaft E and throw it out of gear with the beveled wheel *o'*, by which it receives motion from the shaft *m*.

In Fig. 1 one of the vertical shafts is represented as out of gear with the shaft *m*, and the other vertical shaft, which has a glass tumbler, Z, at its upper end, is in gear.

On top of each vertical shaft E is a conical cap-piece, *p*, which has placed on top of it a loose cap, *q*, which is conical on both its upper and under surfaces, as shown in Fig. 4, the under side being concave and fitting on the cap *p* and the upper surface being convex, so as to enter slightly the mouth of a tumbler, Z, placed on it. These cap-pieces will be made of various shapes and sizes, to receive and hold various articles to be placed on them, and rotated by the shaft E in front of the brush C.

From this construction it is obvious that as the shaft E rotates it causes the article Z to revolve in front of the brush C, and as the brush C revolves it throws out a quantity of pulverized substance against the surface of the glass, on which any desired design or pattern has been stamped, printed, or sketched with varnish or other adhesive material, causing the dust to adhere only on the surface so impressed with the desired pattern. A number of articles to be so coated with pulverized substance may be placed in a sliding shelf, H, inside the chamber, to be placed upon the caps *q* of the revolving shafts E by the hand of the workman inserted through the hole *e* of the india-rubber sheet *d*, and my apparatus may be so used; but I prefer to provide means whereby this hand operation may be dispensed with. For this purpose I place a sliding drawer or shelf, H', similar to the shelves H, within the chamber A, immediately over the series of vertical shafts E E, &c. This shelf slides in and out of the box or chamber A, and when inserted closes the apertures by its end pieces *rr*. The shelf H' has a series of circular openings, *s*, smaller than the loose cap *q*, but large enough to allow the fixed cap *p* on the top of the shaft E to pass through it.

On the shelf H', over each opening *s*, is placed one of the loose caps *q*, with a tumbler or other article placed on it. The shelf or drawer H' is then inserted in the chamber A, when all the shafts E are lowered and out of gear with the shaft B, as before described. When the shelf H' is in place, the slides *n* are drawn up, raising the vertical shafts E. The fixed cap *p*, at the upper end of each shaft, passes through the hole in the drawer and lifts the loose cap *q* off the shelf, and at the same time gears with the revolving shaft B, which causes the vertical shafts and the articles placed thereon to revolve each in front of one of the revolving brushes C. As soon as a sufficient amount of dust has been applied to the surfaces of the glasses, the slides *n*, (which may be connected so as all to move at once,) are pushed down, the steps G of the shafts E are lowered, the vertical shafts then cease to revolve, and the tumblers or other articles are all simultaneously deposited on the shelf H', which is then drawn out and another shelf already filled with tumblers is introduced in its place, and the slide *n* being drawn up the operation is repeated. It is obvious that this operation, with the use of the drawer H', is much more rapid than when the renewal and replacing of glasses has to be done by hand.

The machine may be used either with or without the drawer H', and if used with it the india-rubber sheet *d* would not be absolutely necessary, though it is better to use it, as it enables the hands of the operator to be introduced in case of necessity without any serious exposure of the interior of the chamber to the access of outside atmosphere.

Having thus described my improvement,

what I claim as my invention, and desire to secure by Letters Patent, is—

1. The method hereinbefore described of applying pulverized substances to the surface of glassware, china, &c., by revolving the article in front of a stream of a pulverized substance projected against it, substantially as and for the purpose described.

2. The apparatus hereinbefore described for applying pulverized substances to the surface of glass, chinaware, &c., consisting of the combination of a revolving bristle brush, a hopper, and a revolving shaft or holder placed in front of the revolving brush, substantially as and for the purpose described.

3. The combination of the revolving brush and hopper or receptacle for pulverized substances, a revolving holder placed in front of the revolving brush, a shelf placed over the holder with an opening to allow of the passage of the revolving holder, and devices for raising and lowering the shelf in relation to the revolving holder, substantially as and for the purposes described.

4. The close chamber A, in combination with a series of revolving brushes, and receptacle or receptacles for pulverized substances,

within or upon which the brushes revolve, and a series of revolving holders for articles to which the pulverized substance is to be applied, substantially as and for the purpose described.

5. A close chamber, A, having openings covered with elastic fulled covering, and a hand-aperture closed with a removable stopper for the purpose of conducting operations requiring a practical exclusion of access to the atmosphere outside of the chamber, substantially as described.

6. The combination, in a machine for applying powdered substances to the surfaces of glass and other articles, of a hopper or receptacle, with a revolving brush arranged at or near the end of the hopper, so that its bristles may catch the dry pulverulent substance as it is fed down by the hopper and project it in a shower from the nose or edge of the hopper, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 15th day of December, A. D. 1883.

HERMANN SCHULZE-BERGE.

Witnesses:

W. BAKEWELL,
W. B. CORWIN.