2 Sheets—Sheet 1.

R. A. SAWYER.

The Art of Engraving and Dressing Glass and Other Substances.

No. 217,709. **Patented July 22, 1879.**

Fig. 1

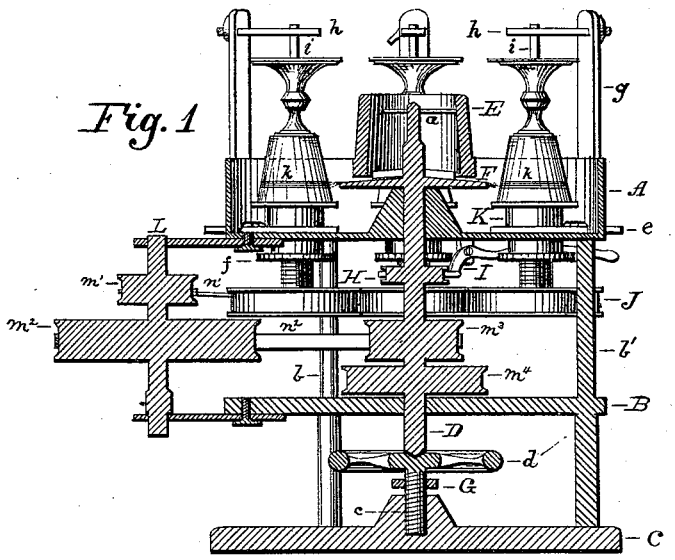
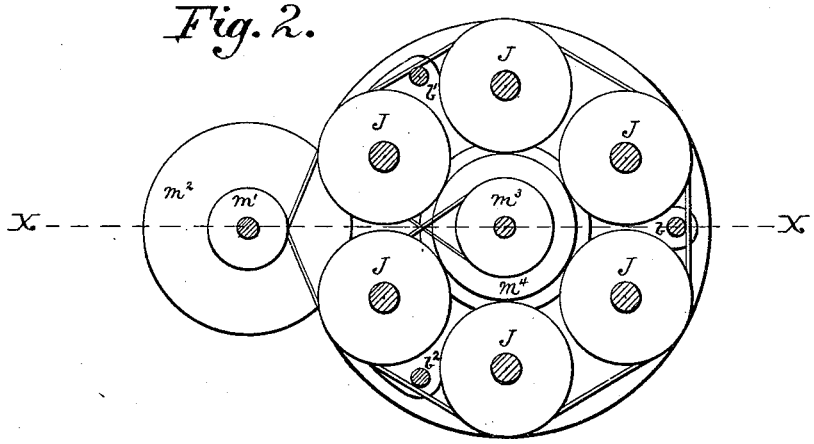


Fig. 2.



WITNESSES:

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2 Sheets—Sheet 2.

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Fig. 3.

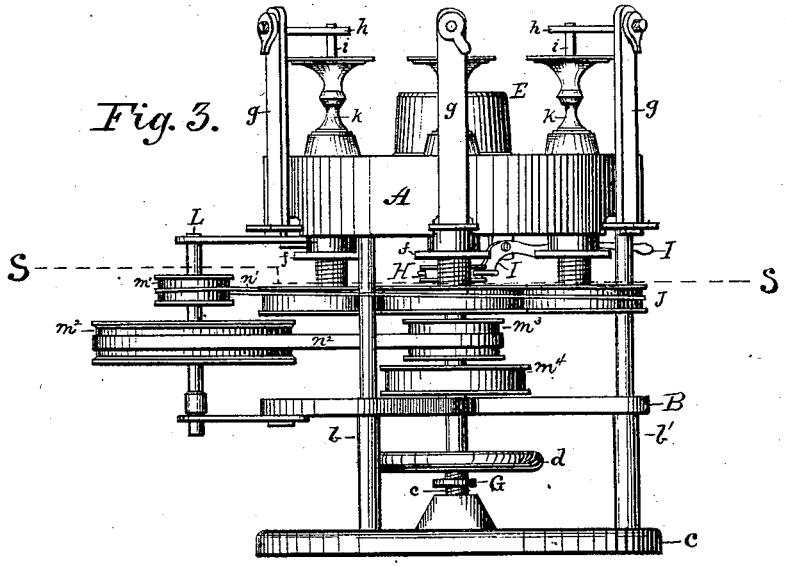
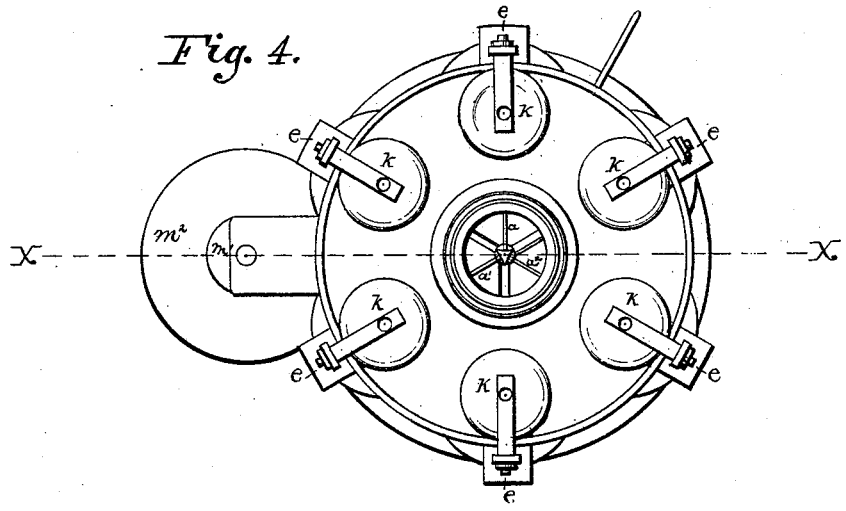


Fig. 4.



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UNITED STATES PATENT OFFICE.

RAPHA A. SAWYER, OF MARTIN'S FERRY, OHIO.

IMPROVEMENT IN THE ART OF ENGRAVING AND DRESSING GLASS AND OTHER SUBSTANCES.

Specification forming part of Letters Patent No. **217,709**, dated July 22, 1879; application filed January 25, 1879.

To all whom it may concern:

Be it known that I, RAPHA A. SAWYER, of Martin's Ferry, in the county of Belmont and State of Ohio, have invented certain new and useful Improvements in the Art of Engraving and Dressing Glass and other Substances; and I do hereby declare that the following is a full, clear, and exact description of my invention, which 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 invention relates specially to a machine for engraving upon glass and other hard substances by means of sand used as a projectile.

It consists, first, of rotating the article to be engraved about its vertical axis toward or in a a counter direction circumferentially to the stream of sand projected against it.

It consists, secondly, of a revolving sand-receptacle, which, for convenience of reference, I will term a "sand-drum," to project the sand with the requisite velocity against the article to be engraved, and one or more rotating chucks or stands placed around the same, upon which the article to be engraved is secured, and means to revolve the chucks upon their axis separately toward or in a counter direction circumferentially to that of the sand-drum, all of which will be hereinafter fully described in detail.

In the drawings, Figure 1 is a vertical section through line *x x;* Fig. 2, plan through line *s s*. Fig. 3 is a side elevation; Fig. 4, top view.

The letter A represents a circular box mounted on columns *b b' b''*, having a base-plate, C, and intermediate supporting-plate, B. Through the center of this circular frame is a shaft, D, the upper end of which extends above the floor of the box A, and terminates in a drum, E, which is secured to the shaft with cross-braces *a a'*. Just below the edge of this drum, and forming the bottom of the same, is a conical disk, F, secured to the shaft D. The upper surface of this disk is formed with corrugations of suitable depth and inclination to project the sand from the drum. The lower end of the shaft D rests upon an adjustable bearing, G, which consists of a threaded bolt, *c*, having a hand-wheel, *d*, attached.

H is a fixed pulley having a grooved face, in which work the arms of a bifurcated lever, I, secured to the under side of the box A. By means of this lever the sand-drum is raised and lowered, as desired.

K is a rotating chuck or stand, a series of which are shown adjustably connected to the box A, disposed in a circle around the sand-drum. *e* is a radially-adjustable clamping-plate, held in position by means of a thumb-nut, *f*. *g* is a standard secured to the plate E, having an arm, *h*, provided with an adjustable point or clutch, *i*, adapted to center the article to be engraved and hold the same while being revolved. J is a band-pulley to revolve the stand; *k*, glass goblet. L is a pulley-shaft journaled into two projecting arms attached to the frame of the machine. m^1 is a belt-pulley transmitting motion to the stands or chucks K; m^2, pulley receiving motion from the pulley m^3 on central shaft; m^4, main belt-pulley; *n' n''*, cross-belts.

The sand is placed in a hopper above the sand-drum E, into which it falls in suitable quantities. The rapid rotary motion of the drum projects the sand in a fine stream against the article to be engraved, the cutting qualities of the sand being materially increased by the articles to be engraved being revolved in a rapid manner toward or in a counter direction circumferentially to the centrifugal force of the sand projected from the drum.

The vertical adjustment of the sand-drum renders it possible to cut any desired width of surface—such, for instance, as ornamental or plain bands around goblets and like articles.

By the arrangement of the sand-drum in the center of the machine I am enabled to place a great number of articles around it, and thus facilitate the process of engraving, as one operator can attend the machine, where under the present system one operator can only engrave one article at a time.

In order to produce ornamental designs upon the surface of the article to be engraved I cover the surface of the article with a perforated pattern cut out of some suitable resistant medium—such, for instance, as mica, sheet metal, or leatheroid. The exposed portions of the surface being acted upon by the sand are cut away to the depth desired.

The advantages of revolving the article against the centrifugal force of the sand projected from the sand-drum to facilitate the process of engraving and the additional advantage of being enabled to engrave a series of articles of any particular style at one time are obvious and need not specially be referred to.

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

1. A machine for engraving on glass or other hard substances with sand used as a projectile, consisting of a vertical revolving sand-drum, in combination with one or more vertical revolving chucks or stands located around the sand-drum, adapted to support the articles to be engraved, and suitable operating mechanism, substantially as herein shown, and for the purposes set forth.

2. In a machine for engraving upon glass and other hard substances with sand used as a projectile, a vertical revolving sand-drum, together with one or more vertical chucks located around the sand-drum, adapted to support and revolve the article to be engraved about its vertical axis in an opposite or reverse direction circumferentially to that given the sand-drum, in combination with mechanism to operate the same, substantially as herein shown, and for the purposes set forth.

3. The process of engraving upon glass and other hard substances with sand used as a projectile, consisting in revolving the article to be engraved about its axis toward or in a counter direction circumferentially to the centrifugal force of the sand projected against it, substantially as herein shown, and for the purposes set forth.

4. The combination, with the box A, of the revolving chuck K, clamping-plate *e*, standard *g*, adjustable arm *h*, point or clutch *i*, substantially as herein shown, and for the purposes set forth.

5. The combination, with the box A, of the chuck K, plate *e*, and thumb-nut *f*, substantially as herein shown, and for the purposes set forth.

6. The combination of the box A, shaft D, grooved pulley H, and lever I, substantially as herein shown, and for the purposes set forth.

7. The combination of the box A, the shaft D, adjusting-screw G, and base-plate C of the machine, substantially as herein shown, and for the purposes set forth.

8. The combination of the drum E, arms *a* *a'* *a''*, corrugated disk F, and shaft D, substantially as herein shown, and for the purposes set forth.

9. The combination of the box A, revolving chucks K, shaft D, and drum E, substantially as herein shown, and for the purposes set forth.

10. The combination of the box A, revolving sand-drum E, shaft D, chucks K, pulley J, shaft-pulleys m^1 m^2 m^3, belts n' n'', and main pulley m^4, substantially as herein shown, and for the purposes set forth.

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

RAPHA A. SAWYER.

Witnesses:
E. B. HOWARD,
W. D. CUSHING.