Extract from the Judge's Report at the 40th Exhibition of the American Institute,

held in the City of New York, October, 1871: -

No. 2522 – Specimens of cutting hard substances by the sand-blast process.

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The process is designed to execute ornaments, inscriptions in intaglio, or other hard and brittle substance; or to cut deep grooves in natural rocks, in order to facilitate the process of quarrying; or to make circular incisions around the central mass of rock in the process of tunneling to remove slag, scale, and sand from the surfaces of metal castings, or to clear the interior surfaces of boilers or boiler tubes of incrustations; or to cut ornaments or types from wood as well as from stone; or to depolish the surface of glass, producing by the aid of stencils or other partial protections, as the bichromatized gelatine of photographic negatives, every variety of beautiful figures, including copies of the finest lines, and the most delicate line engravings; or to prepare copper plates in relief for printing, by making gelatine photographic pictures upon smooth surfaces of resin and pitch, cutting them out by the blast, and afterwords molding from , and electrotyping molds.

This process is without precedent. The use of sand in sawing marble, or in grinding glass by common methods, hardly furnishes an analogy.

The apparatus consists of a tube of small diameter, concentrically placed within a somewhat larger tube, and connected, the former with a reservoir of sand, and the later with a generator of high steam. The vessel of sand being placed higher than the mouth of the tube, its contents discharge themselves by their gravity; but, on the admission of steam to the outer tube, the discharge is accelerated by aspiration or exhaustion, while the sand discharged is driven in a forcible current against the surface to be acted upon. The distance of this body from the jet is greater or less according to the object to be effected. When mere surface cutting or depolishing of glass is desired, an air blast with a pressure of not exceeding four inches of water is employed. A fan suffices to produce this; and the jet, instead of being cylindrical, is a broad and thin sheet. The fan, occupying the lower part of the apparatus, drives the sand through a circuit in which, on the descending side, it encounters the object to be acted upon, and then falling further comes under the action of the fan again, and so continues to be used over and over again. The utility of this invention is apparent in the statement above given of the purposes to which it is applicable. **It is regarded by the judges as being one of the most remarkable and valuable inventions which the age has produced.** Considering, therefore, the great originality, importance and value of this process, and the great variety and diversity of applications, both useful and ornamental, of which it is capable, the judges unanimously recommend that the Great Medal of Honor of the Institute be conferred upon the ingenious inventor as a well merited distinction.

(Signed) F.A.P. BARNARD
ALFRED M. MAYER,
HENRY MORTON.

A true copy from the report on file.

(Signed JOHN W. CHAMBERS,
Secretary of Managers.

Professor Egleston's remarks and experiments on the sand blast : ---

Below are given the results of the experiments made at the Fair of the American Institute, New York, on the effect of the sand blast on substances of different hardness.

The loss in weight, and the time required to effect it:

	Grms
Corundum, from Delaware Co., Pa . . .	1.49000
What remained after 30 seconds' wear . .	0.22021
Loss	1.16971
Emery, from Chester, Mass.	1.66500
Time, 1 minute.	1.16968
Loss.	0.49532
Topaz, Sante d'eau.	0.20970
Time, 1 minute.	0.01263
Loss.	0.19707
Topaz, pebble..	0.97740
Time, 1 minute.	0.76241
Loss	0.19707
Black diamond.	0.12607
Time, 3 minutes.	0.12235
Loss	0.00327
Time, 5 minutes, loss..	0.00497
Time, 8 minutes, loss..	0.00869

The emery, from Chester, Mass., is composed to some extent of magnetic iron ore. A hole was made through the specimen leaving the corundum projecting, showing that the iron was affected much more rapidly than the harder material. A conical hole was made in the topaz pebble, which in another minute would have penetrated it, had the blast been allowed to act longer. The surface of the black diamond was reduced from a very rough face to almost a plane one. The examination of these specimens under

the microscope shows exactly the same characteristics as those exhibited by the rolled specimens of the harder stones, and explains how, in nature, substances like diamond and topaz, may be worn away by the action of other minerals, which are even three degrees of the scale of hardness softer. The action of this machine on the different rocks and mineral will undoubtedly go a great way in explaining many difficult problems in structural geology; and I have no hesitation in saying that I consider the result of these experiments as being of great importance.

A collection of beautiful, decorative specimens of engraving upon glass, carvings of stone and photographic pictures, not one of which has been cut by hand, may now be seen at the office.

Licenses granted for the use of the Sand-blast Process, and machines furnished for all kinds of work by

GORHAM BLAKE,
General Agent for the United States,
Room 7, No. 93 Federal St., Boston.

Boston Sand Blast Glass Co., 93 Federal St., Boston.
New York Sand Blast Co., 82,93, and 85 Center St., New York.
Chicago Sand Blast Glass Co., Room No. 5, 79 Dearborn Street, Chicago.

Data from: http://books.google.ca

- Tilghman's sand blast Benjamin Chew Tilghman