(No Model.)

J. L. MILLS.

PROCESS OF LITHOGRAPHING BY MEANS OF SAND BLAST.

No. 434,157. Patented Aug. 12, 1890.

Fig. 1.

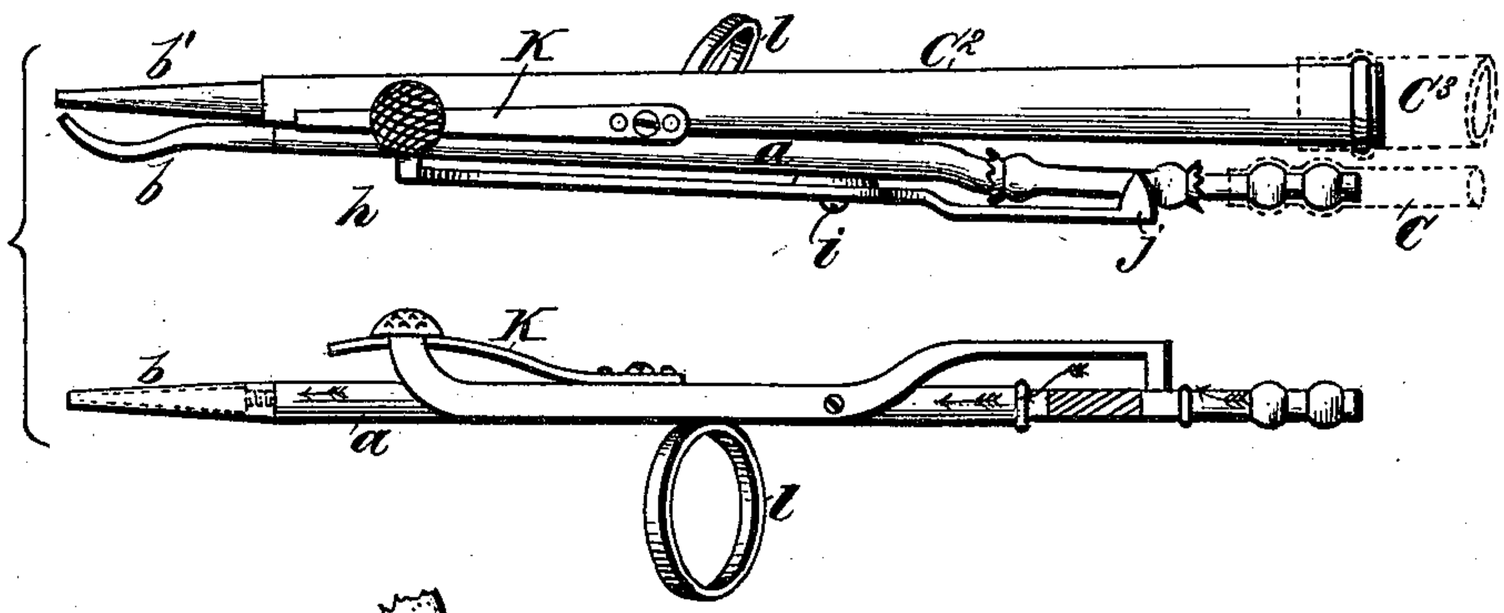
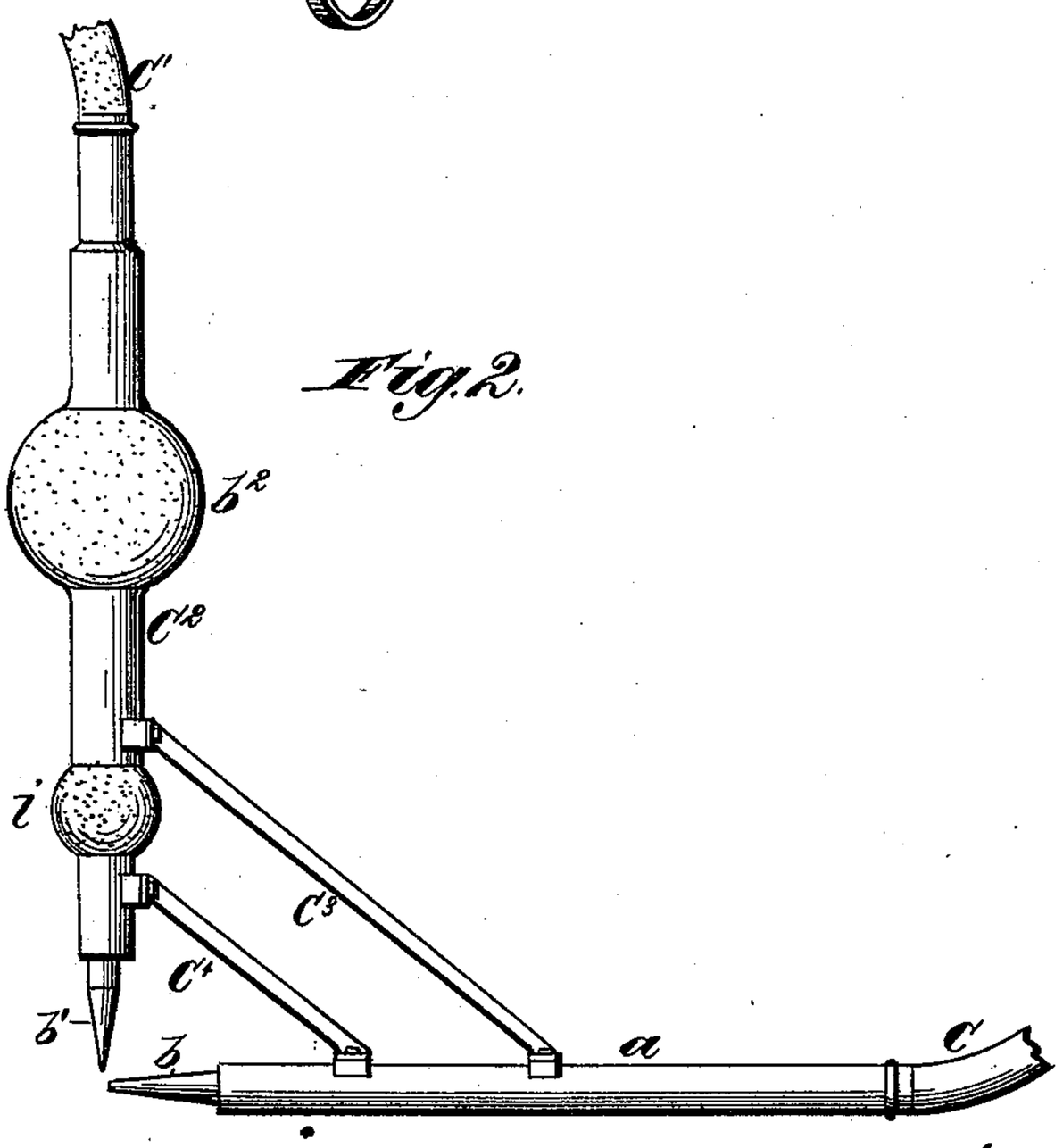


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH LEWIS MILLS, OF BALDWIN'S GARDENS, GRAY'S INN ROAD, COUNTY OF MIDDLESEX, ENGLAND.

PROCESS OF LITHOGRAPHING BY MEANS OF SAND-BLAST.

SPECIFICATION forming part of Letters Patent No. 434,157, dated August 12, 1890.

Application filed November 19, 1889. Serial No. 330,919. (No specimens.)

To all whom it may concern:

Be it known that I, JOSEPH LEWIS MILLS, art-color printer, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at Baldwin's Gardens, Gray's Inn Road, in the county of Middlesex, England, have invented certain new and useful Improvements in Lithographing by Means of Sand-Blast; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is illustrative of a top or plan view of an engraving-machine embodying the improvements of my invention; and Fig. 2 is a detail view, in elevation, of a modification of my improved machine.

My invention relates to a process of lithographing from stone by means of a sand-blast; and it consists of the process hereinafter fully described and claimed.

In carrying out my invention I provide a lithographic stone which has been polished with water-of-air stone, and I grind the surface of such lithographic stone by rubbing it with sand interposed between it and another flat stone, or by subjecting it to a sand-blast. Next I paint or roll in with a roller the entire grained surface with lithographic or greasy ink, soap, or any other suitable greasy lithographic substance, and when the grease has been perfectly absorbed by the stone, and the superfluous grease has been removed with turpentine, the lithographic surface is then rolled in with Brunswick-black, or some other suitable preparation, until it presents an even and equal appearance. The condition of the lithographic surface after being thus treated is that of a solid slab of lithographic grease, which is coated or covered over with a thin coating of Brunswick-black, the purpose of which coating is to protect said greasy surface, which lies immediately under it upon the lithographic stone, from the action of the acid, which it is necessary to employ for the etching of the work after the sand-blast has been applied and before the work can be efficiently rolled up. When this prepared lithographic surface is perfectly dry, a tracing of the picture or design intended to be engraved is placed thereon and the artist uses, preferably, the instrument illustrated in the accompanying drawings as a free-hand tool for removing all the parts of the picture or design which are not required, and partially removing the parts where more or less strong tints are required, and leaves untouched the parts which are required to be black.

In the accompanying drawings, the air or steam tube *a*, Fig. 1, formed of any suitable material or metal, is attached to an air-pump or a steam-engine by a pipe or tube C, formed of any suitable material or metal, and is furnished with a removable nozzle or point *b*, and with a thumb-lever *h* working on a pivot *i*, which lever when depressed opens the valve *j*. The spring K acts upon the aforesaid thumb-lever *h* and keeps the aforesaid valve *j* closed. The tube *a* is placed parallel to the sand-tube C^2, which is provided with a removable nozzle or point *b'*, and is attached to the sand-reservoir by a suitable pipe or tube C'. The instrument is provided with a ring *l* for the first finger of the operator, so as to permit of being suspended from his hand, and thus to leave his thumb free to act upon the lever *h*.

The modification shown in Fig. 2 is of a composite character as regards the sand-tube C^2, this tube being made up of sections or parts of varying capacity and of two hollow globes or balls, the larger of which is glass and the smaller of copper or other suitable metal. These globes or balls are punctured with very fine holes, which admit air from the outside, but do not admit the escape of sand, &c., from the inside. The tubes *a* and C^2 are attached to each other by metal brackets C^3 and C^4, and each of said tubes is provided with a removable nozzle or point. The said tube C^2 is attached to the sand-reservoir by an india-rubber or other suitable pipe or tube C^3, which is punctured throughout its entire length, so as to admit air from the outside and thereby prevent the sand, &c., from becoming congested and so forming a vacuum which would impede its free flow.

The object of the several nozzles or points hereinbefore mentioned being removable is that they may be replaced by other nozzles

or points more or less fine, according to the requirements or the work in hand. The sand falls by its own gravitation from the sand-reservoir into the sand-tube and is impelled against the surface to be operated upon by compressed air or steam, as the case may be, passing through the air or steam tube. The nearer the instrument is held to the lithographic surface the greater is the cutting force obtained, because the less expansion of the sand occurs, and the farther away the less cutting force because of the increased expansion of the sand. If the artist wants to make fine lines he holds the instrument close to the stone. If he requires coarser lines he holds the instrument farther off, and if he desires to cover much surface with shading he holds the instrument still farther off. The engraving part of the process having been finished, the work is etched with acid and water and gum, and can then be rolled up with a lithographic roller and impressions can be pulled.

By "sand-blast" I mean any known form of removing surfaces by the impact of sand, emery, steel, shot, &c., falling by its own gravitation or impelled against such surfaces.

Having described an instrument herein by which my process can be carried out most conveniently, I will now describe the process itself.

The process consists in engraving on the lithographic stone the subject, picture, or design by means of a blast of sand, emery, or other suitable substance impelled against the surface to be operated upon and applied by any suitable instrument or machine, and afterward to pass the printing-roller charged with the lithographic ink over the surface of such stone, imbuing or impregnating only the parts of such surface which have not been engraved, and leaving the engraved or sunken parts untouched, and so creating any desired printing-surface. I either direct the sand-blast to the plain stone first and charge the lithographic surface with lithographic ink, grease, asphalt, or other suitable medium afterward, or I charge the stone with lithographic ink, grease, asphalt, or other suitable medium first and direct the sand-blast to the lithographic surface afterward, thereby removing the lithographic surface in places wheresoever it may not be required.

A modification of this process as described is as follows: Having prepared the lithographic surface to receive a photograph, I take upon such surface a photograph of the picture or object intended to be engraved. This photograph is preferably "linear," and of any sensitive and more or less dense nature—for example, a bichromatized solution of gelatine—and serves as a resist or stopping-out medium for protecting the parts of the lithographic surface which it covers. I then apply the sand-blast to the entire surface with any suitable sand-blast apparatus, thereby entirely removing the parts of such surface which are not covered by the photoglyphic or photographic film, exposing the lithographic stone in these parts, and so attaining the white color, and thus obtaining a positive lithographic result if the film is a negative, and a negative lithographic result if the film is a positive. Wherever the photograph overlies the lithographic surface the sand does not penetrate the latter; but where the photograph does not overlie the lithographic surface the sand or such like enters between the lines, grains, and stipples, and chips away the surface. Lastly, I etch with a suitable etching and roll up in the ordinary way.

For zincography I prepare the surface of the plate with suitable grease, which I remove in precisely the same manner as hereinbefore described, then etch with a suitable etching, and roll up in the ordinary manner.

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

An improved process of lithographing by means of a sand-blast, consisting in the following steps: first, covering a smooth lithographic stone with lithographic ink or other greasy material; secondly, covering the surface with a thin coating of Brunswick-black; thirdly, taking a photograph on a sensitized film on a part of such surface; fourthly, applying the sand-blast to the entire surface, thereby removing all parts of it which are not covered by said photograph, and, finally, etching the surface, substantially as described.

In testimony whereof I have hereunto set my hand this 18th day of April, 1889.

JOSEPH LEWIS MILLS.

Witnesses:
P. O'HALLORAN,
GEO. SMITH.