(No Model.) 2 Sheets—Sheet 1.

W. S. EATON.

ART OF ENGRAVING.

No. 588,558. Patented Aug. 24, 1897.

Fig. 2

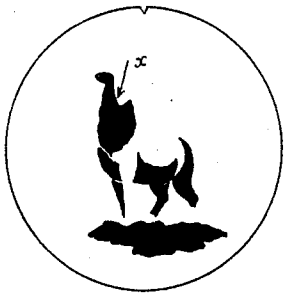


Fig. 3.

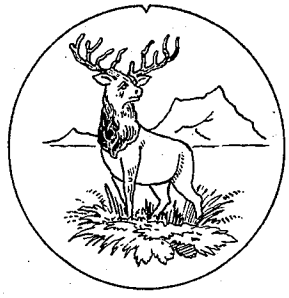


Fig. 1

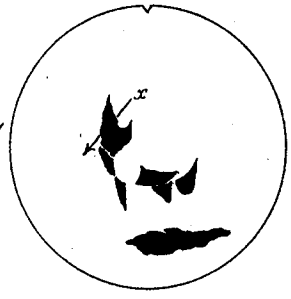


Fig. 4

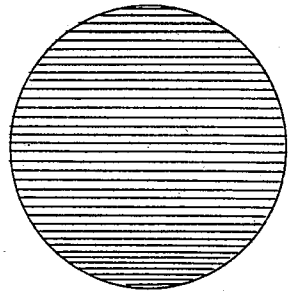


Fig. 1a





Fig. 2b



Fig. 3d

WITNESSES:
Frank B. Glover.
Francis H. Walsh

INVENTOR:
William S. Eaton
By his Attorneys
Miller Donaldson & Co

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. S. EATON.

ART OF ENGRAVING.

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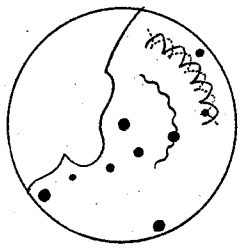


Fig. 1x

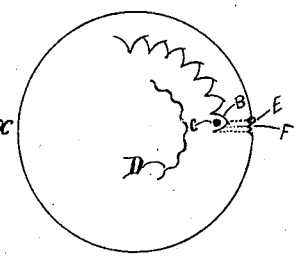


Fig. 2x

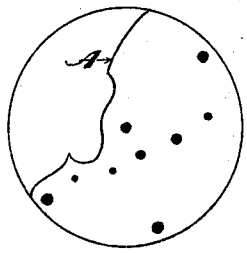


Fig. 3x

WITNESSES:
Frank B. Glover
Frances H. Walsh.

INVENTOR:
William S. Eaton
By his Attorneys
Waller Donaldson & Co

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM S. EATON, OF SAG HARBOR, NEW YORK.

ART OF ENGRAVING.

SPECIFICATION forming part of Letters Patent No. 588,558, dated August 24, 1897.

Application filed November 9, 1896. Serial No. 611,525. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM S. EATON, a citizen of the United States, residing at Sag Harbor, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in the Art of Engraving, of which the following is a specification, reference being had therein to the accompanying drawings.

In the art of producing engraved work by machinery—as, for instance, the decorative designs on watchcases, jewelry, and analogous articles, as well as in the production of engraved plates for printing purposes—certain difficulties have heretofore been encountered which in a considerable degree have militated against the use of such machinery. One of the chief difficulties has been (especially in the production of engraved plates for printing purposes) the amount of technical skill required on the part of the operator and the consequent cost of the work so produced. The same obstacle has in a great measure obtained in the production of artistic decorations on watchcases and similar articles, the work as heretofore produced requiring considerable touching up by hand to make it fit for the market.

The object of my present invention is to improve the quality of the work, lessen the amount of hand-engraving thereon, and enable the operator to do better work with less effort.

While my present invention is primarily intended for the production of printing-plates and the decoration of articles of jewelry, it has special advantages when used in connection with the production of rolls for calico-printing and also in the production of that class of ornamentation on watch-movement plates known as "damaskeening."

Other uses to which the invention is well adapted will readily suggest themselves to those skilled in the art.

I will first consider the invention in connection with the engraving of plates for printing purposes and for the decoration of watchcases. Up to the present time the only practical method known to me of carrying out this work was first to engrave a series of pattern-plates of a relatively large size and then, by means of an engraving-machine working on the well-known principle of the pantograph, transfer the picture or design from this series of plates to the work operated upon. This method is clearly shown in my United States Patent No. 402,314, issued April 30, 1889. Another method of obtaining the same result is shown in an application filed by me in the United States Patent Office January 9, 1896, Serial No. 574,894.

My present invention is designed to accomplish the same results as the foregoing, but in a simpler manner, and at the same time give results not possible by the methods above named.

The present invention consists in the use of a plate of transparent material having lines upon or in its surface in connection with drawings, sketches, and the like and with an engraving or ornamenting machine.

I will now practically describe my invention in its application to the decoration of watchcases, the same description being applicable for the production of plates for printing purposes.

The first step in carrying out my process is the making of a transparent plate having parallel lines sunk into its surface. The number of lines to the inch may vary according to the requirements of the work, but for general use I find twenty to the inch well adapted. This plate is economically produced by first ruling a metal plate in a machine capable of giving well-spaced lines of uniform depth—as, for instance, a planing-machine. This lined metallic plate is then placed in a press, and a sheet of transparent material—such, for instance, as celluloid—is placed upon the lined surface. Over the celluloid sheet may be placed another plate having a polished surface, and the whole is then submitted to heat and a pressure of approximately two thousand pounds to the inch, more or less. The combined effect of the heat and pressure or of pressure alone forces the lined plate and celluloid sheet intimately together, so that on stripping them apart the celluloid sheet will be found to be an excellent reproduction of the metal plate, the lines having no appreciable effect on its transparency. It is obvious, of course, that a celluloid or other transparent plate could be directly produced in the planing-machine, but such a method

would be found to be more expensive than the one described, and the cutting of the material under the action of the planing-tool somewhat affects its transparency.

In producing engravings by my method the operator is enabled to take a drawing—such as a lithograph, a sketch, or a photograph—and reproduce with great fidelity the light and shade thereof with a minimum amount of labor. To do this, the protograph or drawing is properly secured to the bed or table of the machine and in its proper relative location to the tracer and work to be produced. A convenient manner to secure the photograph or drawing is by means of thumb-tacks, the object sought being to prevent its moving until the work shall have been finished. Upon the drawing or photograph is now placed the lined transparent plate, through which the operator can discern clearly all the gradations of light and shade on the picture beneath. Having now adjusted the transparent plate so that its lines will in direction give the best result, the operator proceeds to follow the lines, applying pressure to the tool where the shades appear darkest on the original and lightening the pressure for the half-tones and finally lifting the point clear of the work for the high lights. Various effects may be produced by turning the transparent plate so that its lines may run in a different direction and proceeding as before, the drawing or photograph and the work being unaltered in position.

The process so far described indicates very well how certain lines of artistic work may be carried into effect. Working in the above manner excellent reproductions of photographs, &c., may be made on the same or a reduced scale, according to the adjustment of the machine and the spacing of the lines on the transparent plate. In its application to the commercial production of watchcase decoration, in which the operator is supposed to be wholly or in part devoid of artistic training, I proceed as follows, referring to the accompanying drawings, in which—

Figures 1 and 2 are views of paper forms used in carrying my invention into effect. Fig. 3 is a view of an engraved plate containing the ornamentation to be transferred or copied. Fig. 4 shows a transparent lined plate. Figs. 1^a, 2^b, and 3^d show the various stages of the work. Figs. $1^\times$, $2^\times$, and $3^\times$ show a modification of the method as applied to watch-movement plates.

Suppose, for instance, I wish to produce on a watchcase a picture of a stag. I first engrave a plate with all the outline required, as shown in Fig. 3. I next take sheets of paper, preferably of the same size as the engraved plate, and outline in pen or pencil lines so much of the drawing as I may wish produced to give the middle tints or half-tone effects. Such a prepared paper is shown in Fig. 2, and for the sake of clearness the spaces are filled in with black to more clearly show the boundary of the work. This paper is placed beneath the transparent lined plate, which is indicated in Fig. 4, and all the lines covering the black portions are traced. The result of such tracing will appear on the work, as shown in Fig. 2^b. Fig. 2 is now removed and Fig. 1, likewise prepared, but designed to give an increase of depth and shadow, is placed beneath the transparent plate, and the same operation is proceeded with. The result of such engraving will appear as in Fig. 1^a, but the work will be superposed on the lines of the preceding operation, thereby supplying the shadows. This is now removed and the outlined plate, Fig. 3, is substituted, so that by tracing over its lines the drawing or engraving is finished. The combined use of the paper drawings 1 and 2 beneath the transparent plate and the outlined plate, Fig. 3, will appear as in Fig. 3^d. To assist the operator and show the best direction of the lines, arrows $x\,x$ are drawn on Figs. 1 and 2, as shown.

While I have shown the paper patterns, Figs. 1 and 2, with the design portions thereon filled in with black, it is not necessary to the success of my process that they should so be made. A mere outline of the part drawn with a moderately black line answers well enough for all commercial purposes, and here will be seen the great advantage of my present invention as compared with my patented invention wherein a series of engraved plates had to be made, using the time of a skilled workman and using up expensive material. Given one transparent lined plate in the present instance, to get ready to produce any sign it will be necessary only to engrave one plate (thereby saving two-thirds of the material and two-thirds of the workman's time) and the drawing of the paper patterns in outline, requiring but a few minutes' work.

Care must be taken to lay out the outlined plates and the paper patterns so that when placed in the machine the engraving will properly register. This is easily accomplished by first centering the engraved plate, Fig. 3, and ruling one diametrical line through the center point. By placing the blank paper for Fig. 1 over the engraved plate (having centered and lined it also) so that its center point and diametrical line exactly coincide with the engraved plate and rubbing gently with a burnisher all the lines of the engraving will faintly appear on the paper. The shading may then be easily located. This operation would then be repeated with the blank for Fig. 2.

I have shown Figs. 1, 2, and 3 provided with a notch coinciding with the diametrical line. This notch engages with a pin let into the bench or work-table, so that when withdrawing one pattern and substituting another the different parts will always properly register. I usually place a pin in the table about ninety degrees from the notch which provides for the side register.

In considering the use of a transparent engraved plate for other decorative purposes reference is had to Fig. $2^{\times}$, which shows a plate engraved with a Gothic-like design and which may run entirely around the circle.

Fig. $1^{\times}$ shows a watch-movement plate in process of decoration, and Fig. $3^{\times}$ shows a paper drawing with all the jewel and screw holes accurately located thereon.

In proceeding with the decoration of watch-movement plates I first engrave my design on a sheet of transparent material. Beneath this I place a paper sheet, as shown in Fig. $3^{\times}$. It will now be clearly seen that all jewel and screw holes represented on the paper, as well as the line A, representing the irregular edge of the plate, will appear through the transparent model-plate, Fig. $2^{\times}$, the engraved lines of which are followed by the tracer of the machine until it reaches a jewel or screw hole which shows through the plate, when the tool is lifted from the work and allowed to fall again after it has passed the hole. In Fig. $2^{\times}$ the location of one jewel-hole is shown through the plate at C. The lines of the design B are shown as clearing this hole, and so the tracer may follow uninterrupted until some other obstructing feature shows through the plate, which will be the boundary-line A, showing the edge of the plate.

In order to produce the effect on the work shown in the dotted line in Fig. $1^{\times}$, I rotate the transparent engraved plate, Fig. $2^{\times}$, on its own axis a distance corresponding to one-half the Gothic figure, the paper plate beneath remaining in its original position. In so shifting the transparent engraved plate it brings the engraved line directly over the screw-hole C, so that in following the line I am enabled to raise the tool at that point. It is here that the advantage of the transparent plate is seen, for without it at a change of the plate to produce the crossing of the figure, as shown at Fig. $1^{\times}$, the true location of the jewel-hole would be lost, and the ornamenting-point would run into the hole and destroy the jewel and be itself broken.

In Fig. $2^{\times}$ is shown a pin E, engaging with notches F in the transparent plate, so that the plate may be rotated by degrees. Any other convenient method may be employed.

While I have spoken of my transparent plate being made of celluloid, I do not wish to confine myself to the use of that material. Gelatin or other substance allowing the drawing to show through may be used instead. Celluloid, however, works very well, being tough, wearing well, and being very transparent.

Another variation of my improved process, and which entirely does away with the making of the paper patterns, is to first outline the design, as shown in Fig. 3, and then to place this outlined plate in the machine in its proper place, with the transparent lined plate above it and clamped into intimate contact, all the engraved lines showing through. When the operator possesses a reasonable degree of skill, nothing further will be necessary than to follow all the parallel lines where shades and shadows are required in the finished work. The engraved lines clearly showing through the transparent determines the ending of the lines, so that the operator knows just when to raise the tool from the work.

When the required amount of shading and cross-lining has been put in, the transparent plate is removed and the work finished by the already-adjusted plate.

What I claim is—

1. An improvement in the art of engraving consisting in taking a form or pattern-sheet, placing over the same a transparent plate containing guiding-lines and transferring by means of an engraving device from the lined plate to the work to be engraved, substantially as described.

2. An improvement in the art of engraving, consisting in sketching portions of the design on one or more sheets, transferring said portions in succession by an engraving device through a transparent lined plate placed over said sheets and completing the design from an engraved plate containing the full outline of the design, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. EATON.

Witnesses:
FRANCIS H. WALSH,
FRANK B. GLOVER.