July 12, 1938. H. ECKERLIN 2,123,276

METHOD OF MAKING RULED SCREENS

Filed Dec. 12, 1936

Fig.1

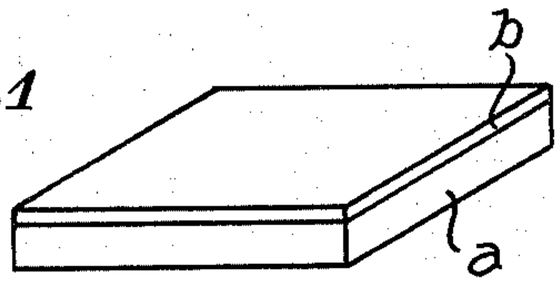


Fig.2

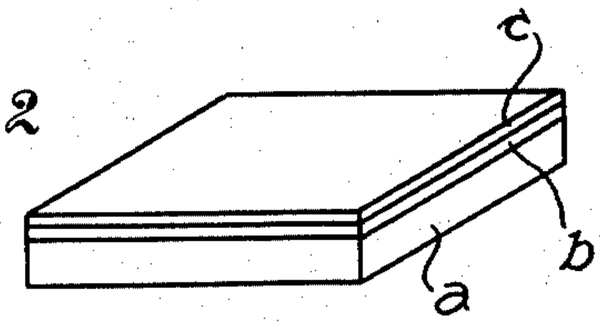
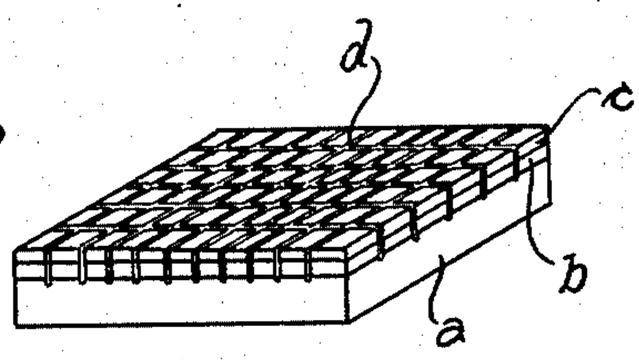


Fig.3



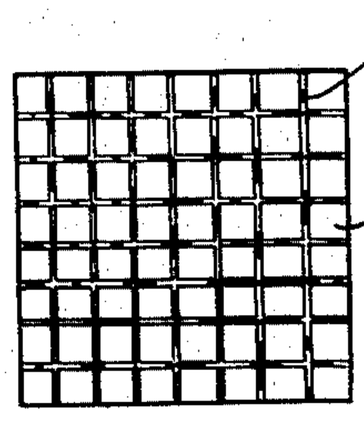
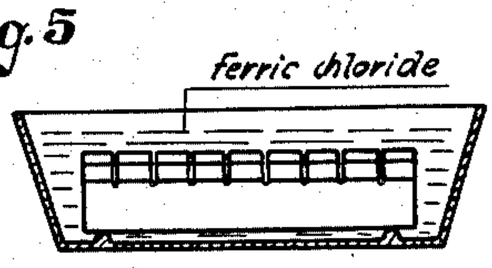


Fig.4

Fig.5



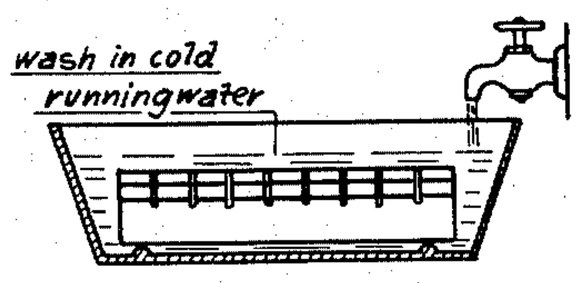


Fig.7

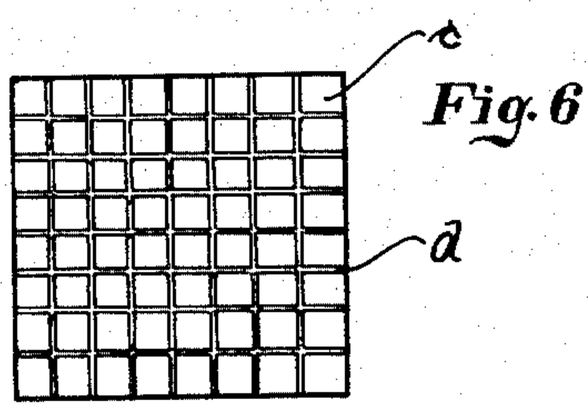


Fig.6

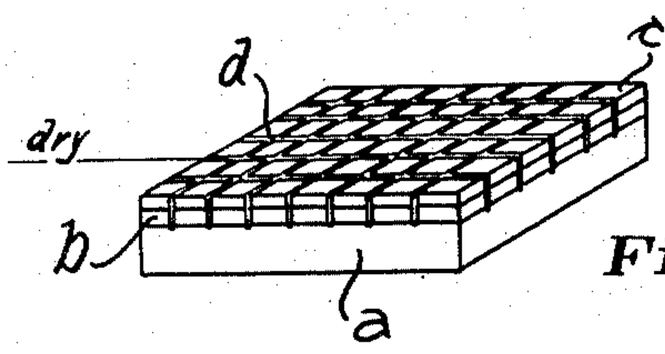


Fig.8

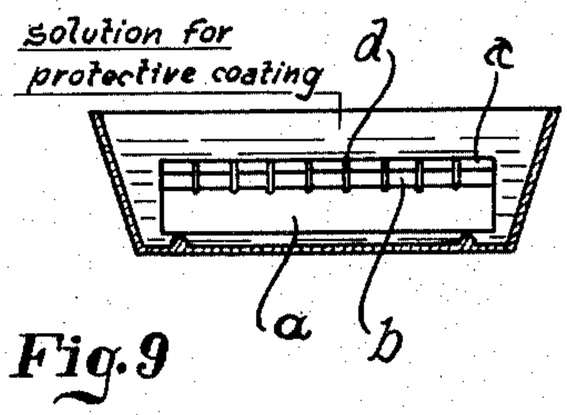


Fig.9

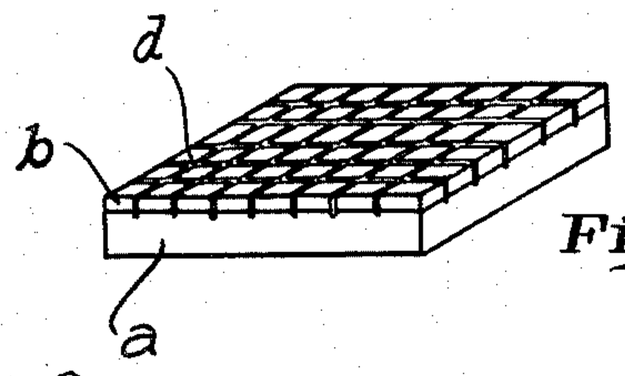


Fig.10

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METHOD OF MAKING RULED SCREENS

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Application December 12, 1936, Serial No. 115,585
In Germany January 2, 1936

1 Claim. (Cl. 95—81)

This invention relates to a process for the production of original ruled screens for photo-mechanical processes or for optical scientific work.

It has been found that a transparent plate can be rendered perfectly opaque by covering the same with a resist of lead sulphide (such as is used in the production of mirrors for motor cars), even when the coating of lead sulphide is very thin.

In the process of cutting transparent lines or dots in the lead sulphide coating with the aid of a diamond point placed in the ruling machine, the diamond tool will always leave traces of lead sulphide residues, such as grains or strands, in the transparent parts of the plate or screen, even when the tool is microscopically perfectly ground.

As is known in the photo-engraving-industry the essential feature in the production of ordinary original ruled screens for photo-mechanical work is the provision of one or two transparent plates having opaque lines or dots surrounded by transparent elements, lines or dots. The transparent elements of all screens for photo-mechanical purposes produced by cutting out the corresponding parts of the resist must be completely glass-clear and free from any light-obstructing residues. The opacity of the opaque elements in the screen must be perfect and the cut thereof must be microscopically sharp and faultless, even for rulings up to 500 lines per inch.

It has hitherto not been possible to produce a perfect original screen as aforesaid with the aid of a single coating of lead sulphide film on a transparent plate.

The difficulties in obtaining a perfect screen suitable for photo-mechanical work arise particularly in the production of coarse rulings up to 120 lines per inch, or in the production of all rulings applied to a large surface area, or in the production of very fine rulings for optical scientific purposes. The aforesaid difficulties arise either because the single lead sulphide coating adheres firmly to the transparent plate, or when the coating has become too old for microscopically sharp cuts, or because the diamond ruling tool wears out prematurely on account of the hardness of the coating, or because particles of lead sulphide adhere to the lower or front surface of the diamond tool, thus causing in all cases residues of lead sulphide to remain in the transparent ruled or cut elements of the screen.

The presence of such residues only becomes apparent when the finished ruled plate is removed from the ruling machine. A screen having such defects would not be suitable for photo-mechanical purposes.

The invention will now be described in connection with the accompanying diagrammatic drawing, in which Fig. 1 is a perspective of a transparent plate with an opaque coating of a lead-sulphide covering layer thereon; Fig. 2 is a similar perspective showing the lead-sulphide coating covered by a protective-coating layer that is resistant to lead-sulphide solvents; Fig. 3 is a similar perspective showing the doubly-coated plate of Fig. 2 after it has been treated in a ruling machine; Fig. 4 is a plan of the ruled plate shown in Fig. 3, showing, more plainly, the lead-sulphide residues left in the transparent rulings; Fig. 5 is an elevation of the ruled plate of Figs. 3 and 4, shown disposed in a container of lead-sulphide solvent, such as ferric chloride; Fig. 6 is a plan similar to Fig. 4 after the lead-sulphide residues have been removed by the treatment illustrated in Fig. 5; Fig. 7 is a view similar to Fig. 5 illustrating the ruled plate of Fig. 6 in a wash of cold running water; Fig. 8 is a perspective illustrating the drying step after removal of the ruled plate from the wash illustrated in Fig. 7; Fig. 9 is a view similar to Figs. 5 and 7, showing the plate of Fig. 8 in a solution for removing the protective coating; and Fig. 10 is a perspective of the plate, showing the protective coating removed.

According to this invention, the aforesaid disadvantages are overcome by covering the lead sulphide coating *b* with an additional protective varnish coating *c*, such as is customarily employed in the production of original ruled etched glass screens. As is known this varnish coating resists hydrofluoric acid and therefore also ferric chloride.

The plate *a* prepared as aforesaid is placed in the ruling machine and the diamond tool is then set so that it cuts both coatings *b* and *c* at the same time so as to produce microscopically sharp transparent lines or dots *d*. After completion of the ruling, the coated plate is immersed in ferric chloride solution, as illustrated in Fig. 5, in order to etch away any residues of lead sulphide in the ruled transparent elements of the plate or screen. These residues are illustrated in Fig. 4. The plate is then rinsed in water as illustrated in Fig. 7, and dried. The dried plate is shown in Fig. 8. After drying, the second or protective coating is removed from

the plate in known manner, as by means of a solution, as illustrated in Fig. 9, without damaging the lead sulphide coating. The resulting product is illustrated in Fig. 10. A perfectly ruled screen is finally obtained, in which the opaque elements consist of microscopically sharply defined lead sulphide and the transparent intervals (lines or dots) are entirely glass-clear, i. e. free from any light-obstructing residues.

Only when an original screen having a coating of lead sulphide is produced in the manner hereinbefore described it is suitable for the hereinbefore described purposes. The screen may consist of a single plate or of two plates optically sealed together, for example for the half-tone process, offset process, photogravure process, copying processes or for scientific optical work.

I claim:—

A method of producing original ruled-screens suitable for photochemical and photomechanical reproduction purposes comprising covering a transparent plate with an opaque coating of lead sulphide, covering the coating with a second coating resistant to lead-sulphide solvents, positioning the coated plate in a ruling machine, applying the diamond point of the ruling machine to the coatings to cut rulings simultaneously through the coatings, applying a lead-sulphide solvent to the ruled plate to etch out of the rulings the lead-sulphide residues that are left in the transparent rulings after the diamond-point cutting operation, and removing the second coating.

HERMANN ECKERLIN.