

N° 7540



A.D. 1915

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), } 20th May, 1914

Date of Application (in the United Kingdom), 19th May, 1915

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to Inspection of Specification, became operative

Accepted, 19th May, 1916

#### COMPLETE SPECIFICATION.

##### Improvements in Screens for use in Photo-engraving.

I, ALBERT KELLER-DORIAN, of 3, Chemin Rampon, Lyons, France, Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 This invention relates to improvements in screens for use in photo-engraving. Screens for half-tone process printing have been proposed in lieu of the usual "line screen" and constituted so as to permit of the subject being photographed through such screen direct on to a sensitized plate the negative obtained being used for printing upon the sensitized metal plate.
- 10 One form of such screen comprises a transparent plate having tapered projections distributed over its surface the interstices between said projections being partly filled with an opaque or semi-opaque substance.
- Another form has its surface divided into two sets of units in different planes the so formed recesses acting in a lens-like fashion during the printing on the
- 15 sensitized metal plate so as to break up the photographic picture.
- Screens are also known comprising opaque dots, lines or the like leaving transparent spaces between them, the screen being applied to one side of a glass plate and the sensitive emulsion on which the negative is to be taken on the other.
- 20 The screen of the present invention comprises a uniformly transparent plate having a series of minute convergent optical elements of short focus juxtaposed and distributed over the entire surface of the plate, and having their respective foci practically the same the said elements being moulded in the plate the whole constituting a uniformly transparent screen comprising no opaque or
- 25 semi-opaque dots or surfaces the deviation of the light rays by the convergent elements alone causing the formation of "the point" in the engraving process.

It can be understood that each convergent or refracting element acts as an objective and than an infinite number of objectives are present, the distribution-

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of which on the transparent surface constitutes the screen proper. By the use of such screens metal plates for process engraving can be obtained by contact printing by interposing the refracting screen between a negative and the sensitized metal plate. The distance the screen should be from the sensitized plate can be definitely regulated and is in any case extremely small so that the clearness of the printed plate is assured. 5

The improved screen is constituted by a sheet of transparent material, glass, gelatine, celluloid or the like, and one of its faces is embossed with the refractory elements, which is effected by rolling by means of a suitably engraved cylinder, or by suitably moulding or compressing the material of the screen. The engraving can be composed of symmetrical or unsymmetrical elements, it can comprise straight or curved lines or various points. The essential condition is that the respective foci of the various elements are practically the same, the focal length of the elements determining the distance which the screen should be from the sensitized metal plate. 10 15

The annexed drawing illustrates the invention.

Figure 1 illustrates a section of the screen greatly enlarged.

Figures 2 to 4 are similar views illustrating different methods of using the screen.

Referring to Figure 1 *a* indicates the optical elements and shows their shape in section and *b* indicates the elements of the following line the said elements being arranged in quincunx. 20

The curvature of the elements is not proportionate to the thickness of the screen but to the distance at which the screen is to be used from the sensitive layer. Figure 2 shows the screen arranged in a camera. A is the sensitized plate the layer of emulsion of which is indicated by *c*. B indicates the screen; the objective of the camera is in front of B. The space E between the plate and the screen may be occupied by a sheet of celluloid of a thickness corresponding with the length of the radius of curvature of the respective elements of the screen B. This arrangement can only be used for dry plates; wet collodion requires screens mounted on glass as will hereinafter be described and the optical elements facing the sensitized layer the suitable separation between the screen and the plate being maintained by means of the usual devices. 25 30

Figure 3 shows the method of using the screen for obtaining a process plate directly in a printing frame by printing from a non-screened negative. C indicates the non-screen negative on glass with its gelatine layer *c* turned towards the screen; B is the screen. A is the zinc plate covered with a layer of photographic emulsion *a* or any other similar product such as bitumen. S indicates the direction of the light rays. This arrangement shows that the new screen operates optically in quite a different manner from known screens particularly the metzograph screen which would not give any result under such conditions. 35 40

This is because the metzograph screen has a surface the lens like elements of which have a very flat curvature the radius of which is very long as compared with the elements of the present screen in which each element comprises a separate objective having a curvature of short radius. Owing to this fact the effect of each element of the metzograph screen is very slight and the action of this screen is only due to an irregular dispersion of the light rays. 45

The improved screen only acts similarly to the metzograph screen when it is mounted on glass or made in glass and employed with a camera; on the contrary when it is employed with the printing frame it performs its usual function so as to be used as shown in Figure 4 in which: A represents the plate of zinc covered with emulsion *a*. B a photographic negative stereo on a film and C the screen. The arrow S shows the direction of the light. 50 55

Screens made of glass are obtained by softening a sheet of very fusible glass by means of heat and impressing the surface by means of a suitable engraved

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plate. Similarly to screens made of plastic material it is necessary not to impress the engraving to its full depth otherwise elements with rough surfaces might be obtained. Another method is to put in the furnace a sheet of glass laid on an engraved plate made of a metal which does not adhere to the glass. 5 Under the action of the heat the glass softens and is impressed lightly in the engraving. It is sufficient to slowly cool the plate and glass whereupon the screen becomes detached from the engraved plate.

It has been described that these refracting screens permit of obtaining printed metal plates for process engraving without the use of a camera. They 10 can also be employed similarly to the ordinary screen by arranging them instead of and in place of the latter in the ordinary screen frames. To allow this adaptation in the case of supple films they are mounted on glass or are stretched in any suitable manner.

A modification of the invention comprises the combination of the screen 15 with a sensitive layer the latter being adherent to the smooth face of the screen itself constituting in fact an improved form of the known screened film or screened plate. Such screened plate has various advantages over the screen independent from the sensitive layer. It allows notably "of giving the point" in the deep blacks operation analogous to that which is obtained in 20 process engraving by the exposure of the sensitive layer whilst masking the print with a white sheet strongly illuminated. The screened plate is used in the known manner that is by simply exposing the developed plate with the sensitized metal plate behind, for a very short time.

The second advantage of the particular screened plate is to produce a fine 25 transparent tracery in the whites of the subject; inking can then be effected regularly, the ink being retained by the tracery in question.

With the improved screens, in order to obtain "the point" in as clear a manner as possible it is essential that the sensitized layer, used for making the negative or that on the metal plate should not coincide with the focal planes 30 of the refracting elements of the screen. The best position of the sensitized layer with respect to the screen surface is that in which, when the screen is placed in a camera in contact with a ground glass focussing screen and the said ground glass is moved away from the screen, the illumination on the ground glass by the light rays passing through the objective of the camera is 35 found to be uniform. This will be found to occur for a parallel group of rays when the distance is double the focal length of the refracting elements of the screen and for a diffused group this distance is less by reason of the overlapping of differently directed rays.

It is this feature which differentiates the "screened plates" described from 40 similar screened plates comprising minute objectives on one side of a plate or sheet of celluloid and a sensitized coating on the other used in colour photography in combination with colour filters. In these latter "screened plates" the sensitized layer must coincide with the focal plane of the refracting elements and such plates would not produce the results required in process 45 engraving the "screened plates" for which may be constructed so that the sensitized layer is at a distance from the screen surface approximately equal to twice the focal length of the respective refracting elements or objectives constituting the screen.

Having now particularly described and ascertained the nature of my said 50 invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A screen for use in photo-engraving comprising a uniformly transparent plate having a series of minute convergent optical elements of short focus moulded in the substance of the plate each of which forms a separate objective 55 said elements being juxtaposed over the entire surface of the plate and having their respective foci practically the same, the focal length of the elements

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determining a distance which the screen should be from the sensitized metal plate.

2. A screen as in Claim 1 wherein the transparent plate on the reverse side to the screen is coated with a sensitized film substantially as described.

Dated this 19th day of May, 1915.

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HERBERT HADDAN & Co.,  
Agents for Applicant,  
31 & 32, Bedford Street, Strand, W.C., London.

FIG. 1

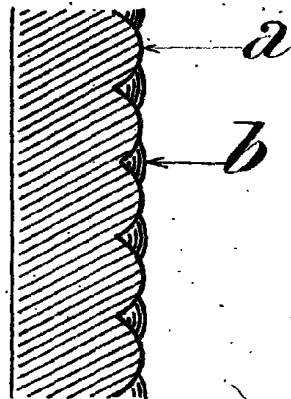


FIG. 2

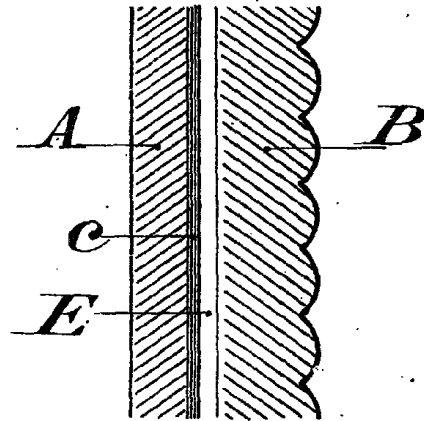


FIG. 3

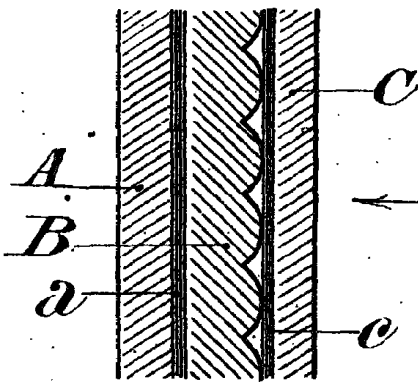
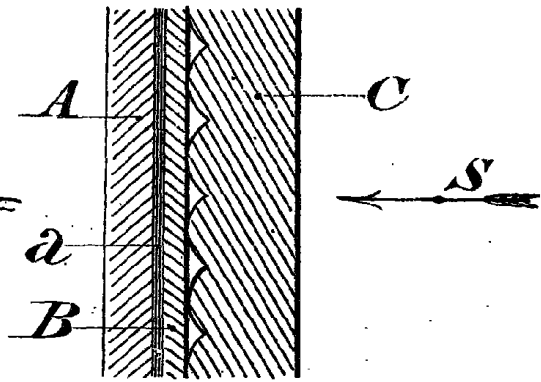


FIG. 4



[This Drawing is a reproduction of the Original on a reduced scale.]

