J. A. H. HATT.

HALF TONE SCREEN.

APPLICATION FILED JAN. 24, 1911.

1,066,611.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

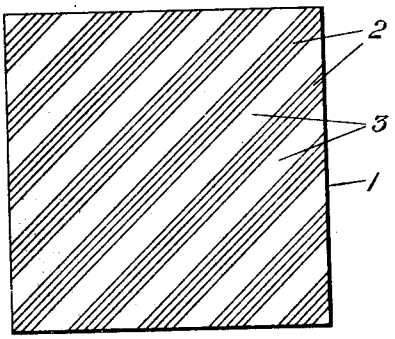


Fig. 2.

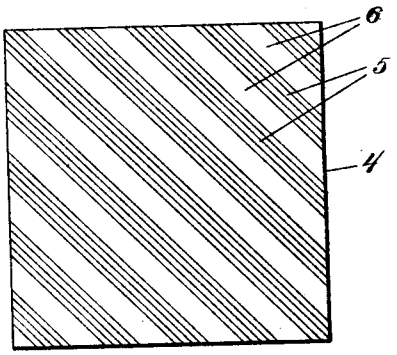


Fig. 3.

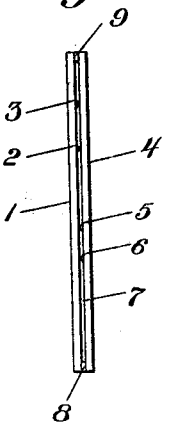
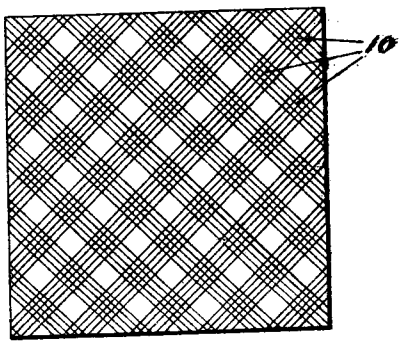


Fig. 4.



Witnesses:
R. Wenke
Alan M. Johnson

J. A. H. Hatt Inventor
By his Attorneys John D Morgan

J. A. H. HATT.

HALF TONE SCREEN.

APPLICATION FILED JAN. 24, 1911.

1,066,611.

Patented July 8, 1913.

2 SHEETS—SHEET 2.

Fig. 5.

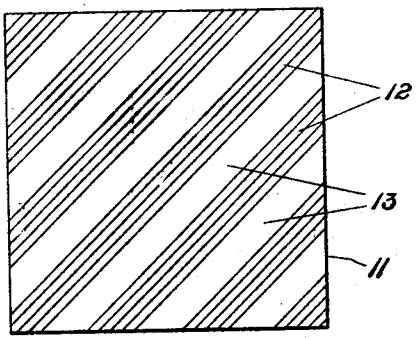


Fig. 6.

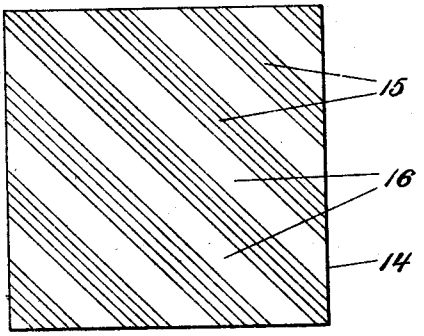


Fig. 7.

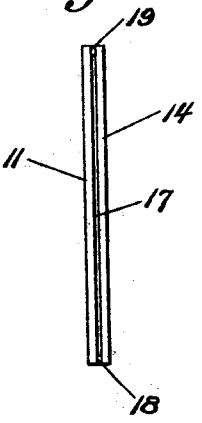
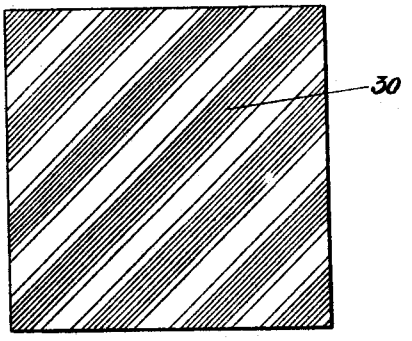


Fig. 8.



Witnesses:
Carl D. Huntington
George Tabb

J. A. H. Hatt Inventor
By his Attorney John B. Morgan

UNITED STATES PATENT OFFICE.

JOSEPH ARTHUR HENRY HATT, OF NEW YORK, N. Y.

HALF-TONE SCREEN

1,066,611. Specification of Letters Patent. Patented July 8, 1913.

Application filed January 24, 1911. Serial No. 604,390.

To all whom it may concern:

Be it known that I, JOSEPH ARTHUR H. HATT, a citizen of the United States, residing in the borough of Brooklyn, in the city and State of New York, have invented new and useful Improvements in Half-Tone Screens, of which the following is a specification.

This invention relates to screens or gratings for use in producing photo-mechanical printing plates of illustrations; and more particularly in certain aspects thereof; the invention relates to screens for use in the camera for making halftone negatives, from which printing plates are made photo-mechanically.

The objects of the invention will in part be set forth hereinafter and in part will be obvious to those skilled in the art.

The invention consists in the novel parts, articles, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, which are referred to herein and constitute a part hereof, illustrate a screen constructed in accordance with the principles of the invention.

Of the drawings: Figure 1 illustrates one of the plates of which the screen is made; Fig. 2 illustrates the other plate constituting the screen; Fig. 3 shows the plates put together with the air gap between; Fig. 4 shows the effect through the two plates by transmitted light; Fig. 5 shows one plate for making a screen with a different kind of ruling; Fig. 6 shows the other plate constituting the screen; Fig. 7 shows them mounted with an air gap between; and Fig. 8 is looking through the two superimposed plates by transmitted light.

In reproducing pictures with printing plates by the halftone process, the great desideratum is to secure the perfect rendition of all of the gradations of the original in the reproduction; in other words to secure a full value for all the infinite combinations of lights and shades from one extreme to the other in order that the impressions made from the printing plate may present as truly as possible the actual light and shade combinations of the original itself. This, of course, means all the gradations in the extreme highlights as well as the detail in the deepest darks, together with the true value of the middle tones.

One of the practical difficulties has been that any effort directed toward preserving the gradations in the highlights has resulted in losing the detail in the darks; and on the other hand efforts to preserve the detail or modeling in the darks have done this at the expense of the highlights and middle tones.

The screen of the present invention retains in a remarkable and unusual degree both the highlights and the deep shadows, while at the same time it brings out the middle tones or intermediate grays to an unusual degree.

One reason for the difficulty in producing a correct range of gradations with the ordinary screens now in use is that they, or rather their component parts, are cemented together with a transparent balsam which has the property of making the two pieces or parts of the screen act to the rays of light practically as one homogeneous mass of glass, in other words a ray of light passing through the small interstices of the screen is not deflected or diffused. Such screens have the property of allowing the pencils of light to be too nearly parallel or to emerge from the screen opening in too straight a line. My invention corrects this defect to a great degree, by giving the ray of light a slight diffusion when it strikes the gap or air space between the glasses comprising the screen, and then again when it strikes the other glass after leaving the gap or air space. Practical tests in the camera have shown that this air space in the screen of my invention, as distinguished from the present make of screens does enable the production of a superior quality of negative as regards the gradations and enables a superior negative to be made with less effort.

While with the screens heretofore in use, there is usually a tendency to make a negative with what is known as a "screeny" effect, that is, where the screen is too evident in the resulting negative because the action of the screen is not elastic enough in allowing the pencils of light to reproduce the varying gradations of the original, the pen-

cils of light being far too nearly parallel; with my screen this defect is very largely overcome.

I have chosen to illustrate my invention as embodied in a screen no part of which is opaque, but the various parts thereof are of various degrees of translucency, although so far as concerns some features of the invention it may be embodied in screens having portions thereof entirely opaque.

Referring to the accompanying drawings, in Fig. 1 is shown a plate 1, usually of glass, having rulings 2 thereon, said rulings being to a certain degree translucent. Between said rulings are spaces 3 of relatively great translucency and these may be in whole or part of the glass only. In Fig. 2 of the drawings is shown a plate 4. Said plate has rulings 5 thereon, which rulings also may be to some degree translucent. Between said rulings are the spaces 6 which are also of greater translucency than the rulings 5 and preferably are the clear glass. These rulings 2 on the plate 1 and 5 on plate 4 are arranged so as to be diagonal to each other when the plates 1 and 4 are assembled and registered to make the screen, and preferably cross each other at right angles. The plates 1 and 4 are assembled with the rulings on the inner side of each and the plates are spaced apart so as to permit between the two plates a medium having a different refractive effect from the two glass plates. See especially Fig. 3, by way of illustration. In this figure, the features to which reference characters 2, 3, 5 and 6 appertain are not visible, the reference numerals and their lead lines in this instance being used to show the locations rather than the things themselves. According to one feature of the invention said intervening medium has also a diffusial action on the light. Certain of the superior results may be obtained by having the intervening medium such that the action on the light is diffusive without the refractive effect of said intervening medium being different from that of the glass.

According to one feature of the invention the intervening medium used is air. The plates 1 and 2 are shown spaced apart a very little by suitable means such as strips 8 and 9, thus leaving the space 7 therebetween. By referring to Fig. 4 it will be seen that by transmitted light, the intersections of the rulings 2 and 5 present portions of still less translucency than the rulings themselves. The effect of the medium intervening between the two parts of the rulings cannot be shown in the drawings, but evidences itself in the plate obtained by use of the screen. By reason of the intervention of such medium between one set of rulings and the other, it will be understood that the light action is correspondingly changed, resulting in the closing up or connecting of the dots in the high lights with much less exposure than with the screens now in use, and thereby the middle tones are not sacrificed by being over-exposed as they always are in the connecting of the dots in the high lights when the screens now in use are employed.

In Figs. 5 to 8 the invention is shown applied also to a screen in which the rulings are partly translucent, but are parallel to each other, instead of crossing each other. In this case the plate 11 is shown with the rulings 12 thereon and the highly translucent parts 13 therebetween. On the plate 14 are placed similar parallel rulings 15 with similar spaces 16 therebetween. The rulings 12 and 15 are so placed on their respective plates that when said plates are assembled said rulings will overlap each other in part, whereby a ruling is obtained having a central part 30 of least translucency and at either side a part of greater translucency and between these parts of still greater translucency. The members 18 and 19 are shown spacing apart the plates 11 and 14 and providing the space 17 between the two parts of the combined ruling for the intervening medium. The effect so far as the superimposition of the rulings is concerned is shown in Fig. 8, but in this case also the effect of said intervening medium cannot be shown in the drawings.

In accordance with one feature of the invention, the tintings or rulings may be created by covering the surface of the plate or plates with a highly transparent or translucent emulsion, carrying a pigment of a proper shade or intensity to give the proper degree of translucency or light transmitting power or powers. Various analin dyes will be found suitable for this purpose. The plates may then be placed in the ruling machine and the coating removed and the absolutely clear glass left to constitute the parts of greatest light transmitting power.

It will be understood that the drawings represent the rulings greatly enlarged and that the drawings are in many respects necessarily more or less diagrammatic in character, but they will enable those skilled in the art to understand the invention in connection with the description.

What I do claim as my invention and desire to secure by Letters Patent, is:

1. A half tone screen including in combination two plates of transparent material, arranged parallel to each other, but spaced a little apart so as to have a layer of air therebetween, said plates carrying a half tone ruling.

2. A half tone screen including in combination two plates of transparent material, arranged parallel to each other, but spaced

a little apart so as to have a layer of air therebetween, each plate carrying upon its inner surface a ruling.

3. A half tone screen including in combination two plates of transparent material, arranged parallel to each other, but spaced a little apart, so as to have a layer of air therebetween, each plate carrying upon its inner surface a translucent ruling.

4. A half tone screen including in combination two plates of transparent material, arranged parallel to each other, but spaced a little apart, so as to have a layer of air therebetween, each of said plates carrying a ruling, the ruling on one plate being partly in line with the ruling on the other plate in a direction perpendicular to the surface of said plates.

5. A half tone screen including in combination two plates of transparent material, arranged parallel to each other, but spaced a little apart so as to have a layer of air therebetween, each plate carrying upon its inner surface a translucent ruling, the ruling on one plate being partly in line with the ruling on the other plate in a direction perpendicular to the surfaces of said plates.

6. A half tone screen including in combination two plates of transparent material, each of said plates carrying a ruling, and a gaseous substance interposed between said plates having a slight diffusing or dispersing action on the light transmitted through said screen.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSEPH ARTHUR HENRY HATT.

Witnesses:
JOHN D. MORGAN,
ROSE MENK.