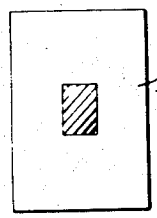
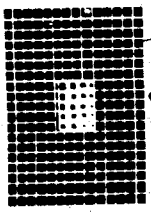
Jan. 18, 1944. A. L. HUTTKAY 2,339,482

PROCESS OF PRODUCING HALF-TONE MASK NEGATIVES

Original Filed March 6, 1942



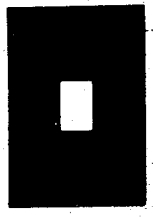
1 Fig. 1



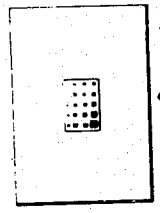
2 Fig. 2



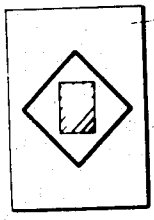
3 Fig. 3



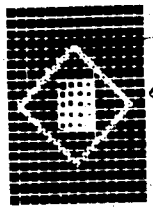
4 Fig. 4



5 Fig. 5



6 Fig. 6



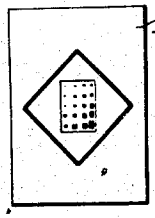
7 Fig. 7



8 Fig. 8



9 Fig. 9



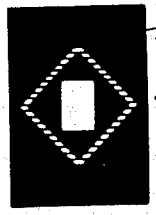
10 Fig. 10



11 Fig. 11



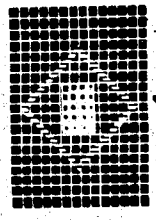
12 Fig. 12



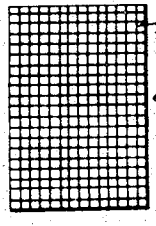
13 Fig. 13



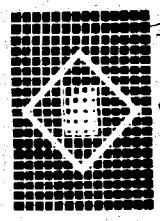
14 Fig. 14



15 Fig. 15



17 Fig. 17



16 Fig. 16

INVENTOR

Arthur L. Huttkay

BY Michaels Stern

his agent

Patented Jan. 18, 1944 2,339,482

UNITED STATES PATENT OFFICE

2,339,482

PROCESS OF PRODUCING HALFTONE MASK NEGATIVES

Arthur L. Huttkay, Newark, N. J.

Original application March 6, 1942, Serial No. 433,531. Divided and this application December 1, 1942, Serial No. 467,492. In Canada February 9, 1942

18 Claims. (Cl. 95—5)

This application is a division of U. S. patent application Ser. No. 433,531, filed March 6, 1942.

This invention relates to new and improved processes of preparing mask negatives, i. e., negatives which have substantially opaque areas corresponding to the high-light sections and substantially transparent areas corresponding to the tone sections of an original drawing. Mask negatives of this type may be used for various purposes but one of the most important is their use in processes of preparing printing plates and more particularly in processes of eliminating half-tone screening dots in the high-light sections of half-tone positives or negatives.

An object of the present invention is to provide simple processes of preparing such mask negatives which processes are free from inexpedient methods such as laborious hand painting or hand opaquing.

Another object of this invention is to provide processes which will practically exclude the necessity of using skilled labor for producing such mask negatives and which will greatly facilitate the necessary manipulation connected with producing such negatives.

With the above objects in view, the present invention mainly consists in producing mask negatives by treating the entire surface of a continuous tone negative made from the original drawing with a preferably subtractive photographic reducer in the manner described in detail below. In case the original drawing also contains line sections, the areas of the mask negative corresponding to these line sections should be transparent too.

It should be noted that throughout this specification and claims, the term "high-light sections" is used to designate those sections of an illustration or drawing which are required to be printed in reproduction as pure white, i. e., free from screen pattern, and is usually used as referring to background or "white" sections of an illustration. The term "tone sections" refers to the shaded or dark section of the original illustration or drawing to be printed in reproduction as half-tones. The term "line sections" refers to the continuous opaque lines appearing on the original drawing.

Furthermore, it should be noted that the term "negative" is used throughout the specification and claims to designate photographic reproductions on any type of photographic material in which the highlight sections of the original illustrations or drawing appear opaque, the tone sections more or less transparent or white, and the line sections entirely transparent or white. In the same way, the term "positive" designates photographic reproduction on any kind of photographic material, i. e., on photographic paper, film or plate, in which the high-light sections of the original drawing are substantially white or transparent, the tone values of the tone sections substantially the same as on the original drawing, and the line sections entirely opaque. It is evident that if in the specification and claims superimposed negatives are mentioned, these negatives must consist of a photographic light-sensitive layer on a transparent base, as for instance photographic films or plates.

Finally, it should be noted that the term "drawing" as used throughout the specification and claims, should not be limited to the exact meaning of the word drawing, but that this term should also comprehend other illustrations, e. g., photographic or like illustrations if these are combined with a white background. Furthermore, it should be stressed that the term "drawing" as used throughout the specification and claims is intended to comprehend not only entire illustrations, but also parts thereof if the same contain highlight and tone sections. Thus, for instance, also a part of a combined illustration which in itself consists of high-light and tone sections, e. g., contains a tone section surrounded by white background is considered a drawing in accordance with the present invention also if the illustration contains other tone or high-light sections spaced from the aforementioned tone section.

Accordingly, the term "entire surface" as used in the following description and claims is intended to define the entire surface of a drawing of the type defined in the preceding paragraph or the entire surface of a negative or positive produced from such a drawing.

The novel features which are considered as characteristic for the present invention are set forth in particular in the appended claims. The invention itself, however, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments, when read in connection with the accompanying drawing in which:

Figure 1 illustrates a type of original drawing having tone and high-light sections;

Figure 2 represents a half-tone negative made from the original drawing shown in Figure 1, having high-light and tone sections;

Figure 3 represents a continuous tone nega-

tive made from the original drawing shown in Figure 1;

Figure shows a mask negative made from the continuous tone negative shown in Figure 3;

Figure 5 shows a drop-out half-tone positive made with the aid of the mask shown in Figure 4 from the original drawing shown in Figure 1;

Figure 6 illustrates a type of original drawing having high-light, tone and line sections;

Figure 7 is a half-tone negative of the original drawing shown in Figure 6 having high-light, tone and line sections;

Figure 8 represents a continuous tone negative made from the original drawing shown in Figure 6;

Figure 9 shows a mask negative made from the continuous tone negative shown in Figure 8;

Figure 10 shows a drop-out half-tone and line positive made preferably with the aid of the mask shown in Figure 9 from the original drawing shown in Figure 6;

Figure 11 is a partly opaque continuous tone negative according to Figure 8 having opaque areas corresponding to the line sections of the original drawing shown in Figure 6;

Figure 12 is a partly opaque continuous tone negative according to Figure 8 having opaque areas corresponding to the tone sections of the original drawing shown in Figure 6;

Figure 13 is a partly opaque mask negative according to Figure 9 having opaque areas corresponding to the line sections of the original drawing shown in Figure 6;

Figure 14 is a partly opaque mask negative according to Figure 9 having opaque areas corresponding to the tone sections of the original drawing shown in Figure 6;

Figure 15 is a partly opaque half-tone negative according to Figure 7 having opaque areas corresponding to the line sections of the original drawing shown in Figure 6;

Figure 16 is a combined half-tone and line negative having transparent areas corresponding to the line sections of the original drawing shown in Figure 6; and

Figure 17 represents a half-tone screen of usual type used in connection with the processes described below in detail.

In order to facilitate understanding of the above-enumerated figures, it should be noted that in these figures all white areas represent white high-light sections in the original drawings and white or transparent areas in the photographic positives and negatives; all opaque areas in the figures represent line sections in the original drawings and opaque areas in the photographic negatives and positives; all areas indicated in the figures by diagonal shading represent tone sections of the original drawings and corresponding areas of the negatives and positives; all dotted areas in the figures represent half-tone areas of the negatives and positives; and finally all areas indicated by horizontal shading represent areas of the positives and negatives made opaque by painting out, i. e., coating with an opaque substance.

The above explanation will make the drawings of the present application so clear and easily understandable for everybody skilled in this art that further elaborate description of each figure in detail may be omitted.

As already stated above, the most important part of the present invention consists in a new process of producing a mask negative of the type shown in Figure 4 and in modifications of this process. This mask negative should have such a distribution of density that (1) the completely white, i. e., high-light, sections of the original drawing shown in Figure 1 correspond to a very high density in the mask shown in Figure 4 while all tone sections of the original drawing should correspond to substantially transparent mask areas and that (2) there be substantially no difference of tone in the transparent areas of the mask.

In order to produce a mask negative meeting these requirements, this negative is produced by making first a continuous tone negative 3 of the original drawing 1, and then treating the entire surface of this continuous tone negative 3 with a preferably subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear; the thus produced mask negative 4 is fixed, washed, and finally dried and used for producing a drop-out half-tone positive 5 in the way described below in detail. This reducer treatment is preferably carried out while the continuous tone negative 3 is still wet. For reducing purposes, any reducer of the subtractive type may be used; such reducers have the characteristic feature that they reduce all densities of the developed image by about the same density step regardless of the amount of density. Reducers of this type are, for instance, ferricyanide combined with hypo, a ferricyanide bleaching solution, an acid quinone solution, and ammonium persulfate in solutions free from halogen ions and others.

Although very satisfactory results were obtained by this new reducing process, sometimes the opaque areas of the mask negative 4 became somewhat translucent; in order to avoid this, it is herewith proposed to treat the continuous tone negative 3 before or after the reducing step with a photographic intensifier. This photographic intensifying is preferably carried out after reducing and results in an intensification, i. e., darkening, of the opaque areas of the mask negative 4 without influencing the transparency of the transparent negative areas. For this intensifying step, any known type of photographic intensifier may be used, as for instance sulphide intensifiers, uranium intensifiers, methol silver intensifiers, silver hydroquinone intensifiers, and silver nitrate solutions having a slow working reducing agent incorporated therein.

The intensifying step described above may be combined with a bleaching step resulting in a change of color of the intensified opaque areas of the mask negative; thus, for instance, by using certain combinations of bleaching and intensifying solutions, it is possible to change the color of the intensified opaque areas from dark grey to a dark brownish red having a density which, from the photographic point of view, is about twice that of a dark grey negative.

In accordance with a preferred embodiment of the present invention, the above-described process of producing the mask negative of the type shown in Figure 4 is carried out in the following way:

First, from the original drawing 1, a continuous tone negative is produced by photographing in the usual way. Then, the continuous tone negative 3 is developed with a very short exposure time, e. g., one second at f–11, and thereafter treated while still wet with a fairly strong solution of potassium ferricyanide. This treatment is continued until all areas of the negative which

correspond to tone sections of the original drawing are substantially transparent. The thus produced mask negative 4 is then removed from the potassium ferricyanide reducer bath, washed, and finally placed in a mild hypo, i. e., thiosulphite, solution. After repeated washing and drying the mask negative is ready for use. Instead of using the potassium ferricyanide solution and the hypo bath separately and one after the other, it is also possible to make a solution containing a relatively high percentage of potassium ferricyanide and a smaller percentage of hypo and to treat the developed continuous tone negative 3 only with this solution. The result will be the same as that of a process consisting of two separate treatment steps.

Although it is possible to attain with a thus produced mask negative satisfactory results, it has been found that intensifying of the opaque mask areas is of advantage. This is carried out by again placing the mask negative produced in the above described way in a reducer, i. e., potassium ferricyanide bath and bleaching the opaque negative areas until they appear almost transparent; at this moment a slight image can be seen when the negative is held against a black background. Thereafter, without subjecting the thus reduced mask negative to a hypo treatment, it is put into an intensifier bath, e. g., a sodium sulphide solution. This intensifier intensifies the previously dark grey opaque areas of the mask negative and gives these areas a brownish red color having twice the photographic density of the dark grey areas before intensifying. After washing and drying the thus intensified mask negative 4 is ready for use.

In some cases it proved advantageous to retouch the original drawing before making the continuous tone negative, e. g., by darkening the lightest tones of the tone sections and/or making its high-light sections pure white, so as to have a definite separation between the lightest tones of the tone sections and the high-light sections of the drawing.

It would seem probable that a mask negative 9 may be produced from the original drawing 6 having high-light, tone and line sections without any difficulty in the above described way. However, it has been found that during reducing the edges of the line areas of the continuous tone negative 8 are attacked by the reducer, thereby broadening the lines. In order to avoid this reducer action, it is herewith proposed to make first the continuous tone negative 8, then to coat those areas of this negative which correspond to the line sections and adjacent high-light sections of the original drawing 6 with a transparent reducer resistant substance, e. g., shellac, and thereafter subject the thus partly coated continuous tone negative 8 to the reducer treatment described above in detail. This shellac or other coating dries and prevents the reducer from attacking the edges of the line areas, resulting in a mask negative 9, with line areas having a width equal to that of the original lines in drawing 6.

For producing the finished drop-out positives of the type shown in Figures 5 and 10, other intermediate negatives are also needed. In order not to crowd the detailed description of the processes of producing the finished drop-out positives with unnecessary details, the methods of producing the intermediate negatives needed for these processes will be described below briefly before further proceeding with this description:

The methods of producing the continuous tone negatives 3 and 8, and the mask negatives 4 and 9 have been described above.

The half-tone negatives 2 and 7 are made in the usual way, i. e., by photographing on light-sensitive photographic material the original drawings 1 and 6 respectively through the half-tone screen 17, and "flashing," i. e., photographing a white sheet of paper through the same screen on the same photographic material.

The combined half-tone and line negative 16 is made in the same way as the half-tone negative 7, with the sole difference being that during flashing a transparent sheet of Celluloid or like material, having opaque areas corresponding to the line sections of the original drawing, is placed between the superimposed half-tone screen 17 and the white sheet of paper arranged behind the same.

Figures 11 to 15 show negatives being partly opaque, i. e., partly painted out, for the purposes of the present invention. Thus, Figure 11 shows a partly opaque continuous tone negative according to Figure 8 having opaque areas corresponding to the line sections of the original drawing 6; this negative is made by painting out the line areas of the continuous tone negative 8. Figure 12 shows a partly opaque continuous tone negative according to Figure 8 having opaque areas corresponding to the tone sections of the original drawing 6 and produced by painting out the tone areas of the continuous tone negative 8. The partly opaque mask negatives 13 and 14, the first having opaque areas corresponding to the line sections and the latter having opaque areas corresponding to the tone sections of the original drawing 6, are made by painting out the mask negative 9, in the way described in connection with negatives 11 and 12. The partly opaque half-tone negative 15 is produced by painting out the line areas of the half-tone negative 7.

Having thus explained the methods of making all intermediate negatives, the new processes of producing the finished drop-out positives will be described in the following in detail:

A drop-out half-tone positive of the type shown in Figure 5 is produced in accordance with the present invention by making from the original drawing 1, the halftone negative 2 and the mask negative 4, superimposing these negatives upon an unexposed, photographic, light-sensitive material, and exposing this unexposed photographic material through the superimposed negatives 2 and 4; thereafter, the thus produced drop-out half-tone positive is developed, fixed, and washed, and finally dried. This drop-out half-tone positive 5 may also be produced by superimposing upon an unexposed light-sensitive material, the continuous tone negative 3 and the mask negative 4 and exposing the unexposed light-sensitive material through these superimposed negatives 3 and 4 and the half-tone screen 17 arranged at a certain distance from these negatives, obtaining thereby the required drop-out half-tone positive 5.

It is evident that in this case and in all cases described below in which an original drawing is photographed, or an unexposed photographic material exposed through half-tone screen 17, this screen has to be arranged at a certain distance from the light-sensitive material unto which the photograph or print is made; this distance varies in accordance with the screen used and the method of its computation is well-known to everybody skilled in this art and therefore does not have to be explained in detail.

One of the methods of producing a drop-out half-tone and line positive of the type shown in Figure 10 comprises the steps of making from the original drawing 6 a partly opaque continuous tone negative 12, a partly opaque half-tone negative 15, and a mask negative of the type shown in Figure 4, superimposing on an unexposed light-sensitive material the negatives 4 and 15 and exposing the photographic material through these superimposed negatives, removing these negatives, superimposing on the thus partly exposed photographic material the negative 12 and then exposing the photographic material through this negative; the drop-out half-tone and line positive 10 obtained by this method is then developed, fixed, washed, and finally dried.

Instead of the partly opaque half-tone negative 15, the partly opaque continuous tone negative 11 may be used; in this case, however, instead of the negatives 4 and 15, the negatives 4 and 11 are superimposed on the unexposed light-sensitive material and the photographic material is then exposed through these superimposed negatives 4 and 11 and a half-tone screen 17 arranged at a certain distance from the same.

A preferred method of producing a drop-out half-tone and line positive of the type shown in Figure 10 from the original drawing shown in Figure 6, comprises the steps of making from this drawing 6 two negatives, namely a combined negative 16 and a half-tone and line mask negative 9 in the way described above in detail, superimposing said negatives 9 and 16 on an unexposed light-sensitive photographic material, exposing said photographic material through said superimposed negatives 9 and 16, fixing, washing, and finally drying the thus produced drop-out half-tone and line positive 10.

It should be stressed that the use of the mask negatives shown in Figures 4 and 9 and the above described new methods for producing these masks are not limited to processes of producing drop-out half-tone positives and negatives in the way described above; these latter processes are described in detail only for the purpose of showing a preferred use of mask negatives produced in accordance with the present invention. These mask negatives may, however, be used also for various other purposes, such as for instance for combining drawn and photographed cinematographic and photographic pictures, for purposes of background photography or cinematography, and the like. Therefore, these mask negatives and the above-described processes of producing the same are claimed not only in combination with and for the purposes of producing printing plates, but in general for any purposes whatsoever.

What is claimed as new is:

1. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, and fixing the thus produced mask negative thereafter.

2. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of photographing the original drawing on a photographic film or plate, developing, fixing, and washing thereafter the exposed film or plate, treating the entire surface of the thus produced continuous tone negative while still wet with a photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing, washing, and finally drying the thus produced mask negative.

3. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing the thus produced mask negative, and photographically intensifying said negative before or after said reducing and fixing, increasing thereby the opacity of those areas of the negative which correspond to the high-light sections of the original drawing.

4. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing the thus produced mask negative, bleaching said negative, and intensifying the same consecutively without intermediate photographic fixing, said bleaching and consecutive intensifying being carried out before or after said photographic reducing and fixing of said negative and resulting in increase of the opacity of those areas of the negative which correspond to the high-light sections of the original drawing.

5. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear and these areas are becoming substantially transparent, fixing and washing the thus produced mask negative, hereafter bleaching said mask negative by means of a photographic subtractive reducer until also the opaque areas of the negative which correspond to the high-light sections of the original drawing are becoming substantially transparent, and intensifying the thus treated mask negative without intermediate fixing, thereby attaining strong opacity in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone sections of the original drawing remain substantially transparent.

6. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising retouching the original drawing in such a manner as to have a definite separation between the lightest tones of the tone

sections and the high-light sections of the drawing, photographing the thus retouched drawing on a photographic film or plate, developing, fixing, and washing thereafter the exposed film or plate, treating the entire surface of the thus produced continuous tone negative while still wet with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing, washing, and finally drying the thus produced mask negative.

7. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of photographing the original drawing on a photographic film or plate, developing, fixing, and washing thereafter the exposed film or plate, treating the entire surface of the thus produced continuous tone negative while still wet with a fairly strong solution of potassium ferricyanide until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing, washing, and finally drying the thus produced mask negative.

8. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of photographing the original drawing on a photographic film or plate, developing, fixing, and washing thereafter the exposed film or plate, treating the entire surface of the thus produced continuous tone negative while still wet with a fairly strong solution of potassium ferricyanide until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing the thus reduced negative with a thiosulphite solution, washing, and finally drying the thus produced mask negative.

9. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear and these areas are becoming substantially transparent, fixing and washing the thus produced mask negative, hereafter treating said mask negative with a potassium ferricyanide solution, and intensifying the thus treated mask negative without intermediate fixing, thereby attaining strong opacity in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone sections of the original drawing remain substantially transparent.

10. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, treating the entire surface of said continuous tone negative with a subtractive photographic reducer until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear and these areas are becoming substantially transparent, fixing and washing the thus produced mask negative, hereafter treating said mask negative with a potassium ferricyanide solution, and intensifying the thus treated mask negative with a sodium sulphide solution without intermediate fixing, thereby attaining strong opacity in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone sections of the original drawing remain substantially transparent.

11. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, reducing the entire surface of said continuous tone negative with a fairly strong solution of potassium ferricyanide, fixing the thus treated negative with a thiosulphite solution, washing the same, hereafter treating the thus produced negative with a substantially saturated solution of potassium ferricyanide, and intensifying thereafter the thus treated negative with a sodium sulphide solution without intermediate fixing, obtaining thereby a mask negative being strongly opaque in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone sections of the original drawing remain substantially transparent.

12. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of retouching said drawing in such a manner as to have a definite separation between the lightest tones of the tone sections and the high-light sections of the drawing, making a continuous tone negative from the thus retouched original drawing, treating the entire surface of said continuous tone negative first with a fairly strong solution of potassium ferricyanide and then with a thiosulphite solution, washing the same, hereafter treating the thus produced negative with a substantially saturated solution of potassium ferricyanide, and intensifying thereafter the thus treated negative with a sodium sulphide solution without intermediate fixing, obtaining thereby a mask negative being strongly opaque in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone sections of the original drawing remain substantially transparent.

13. A process of producing a mask negative of the type described from an original drawing having high-light, tone, and line sections, comprising making a continuous tone negative from said drawing, coating those portions of the continuous tone negative which correspond to the line sections of the original drawing with a transparent reducer-resistant coating material, photographically reducing the entire surface of the thus treated continuous tone negative until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, and fixing the thus produced mask negative thereafter.

14. A process of producing a mask negative of the type described from an original drawing having high-light, tone, and line sections, comprising the steps of making a continuous tone negative from said drawing, coating those portions of the continuous tone negative which correspond to the line sections of the original drawing with transparent shellac, photographically reducing the entire surface of the thus treated continuous tone negative until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear and these are becoming sub-

stantially transparent, fixing and washing the thus produced mask negative, hereafter bleaching said half-tone mask negative by means of a photographic subtractive reducer until also the opaque areas of the negative which correspond to the high-light sections of the original drawing are becoming substantially transparent, and intensifying the thus treated mask negative without intermediate fixing, thereby attaining strong opacity in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone and line sections of the original drawing remain substantially transparent.

15. A process of producing a mask negative of the type described from an original drawing having high-light, tone, and line sections, comprising the steps of making a continuous tone negative from said drawing, coating those portions of the continuous tone negative which correspond to the line sections of the original drawing with a transparent reducer-resistant coating material, reducing the entire surface of the thus treated continuous tone negative with a fairly strong solution of potassium ferricyanide, fixing the thus treated negative with a thiosulphite solution, washing the same, hereafter treating the thus produced negative with a substantially saturated solution of potassium ferricyanide, and intensifying thereafter the thus treated negative with a sodium sulphide solution without intermediate fixing, obtaining thereby a mask negative being strongly opaque in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone and line sections of the original drawing remain substantially transparent.

16. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of retouching said drawing in such a manner as to have a definite separation between the lightest tones of the tone sections and the high-light sections of the drawing, making a continuous tone negative from the thus retouched original drawing, coating those portions of said continuous tone negative which correspond to line sections of the original drawing with shellac, treating the entire surface of the thus partly coated continuous tone negative first with a fairly strong solution of potassium ferricyanide and then with a thiosulphite solution, washing the same, hereafter treating the thus produced negative with a substantially saturated solution of potassium ferricyanide, and intensifying thereafter the thus treated negative with a sodium sulphide solution without intermediate fixing, obtaining thereby a mask negative being strongly opaque in the areas corresponding to the high-light sections of the original drawing, while the areas corresponding to the tone and line sections of the original drawing remain substantially transparent.

17. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, chemically treating the entire surface of said continuous tone negative until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, and fixing the thus produced mask negative thereafter.

18. A process of producing from an original drawing having high-light and tone sections a photographic mask negative of the type described, comprising the steps of making a continuous tone negative of the original drawing, chemically treating the entire surface of said continuous tone negative until the tones in those areas of the negative which correspond to the tone sections of the original drawing substantially disappear, fixing the thus produced mask negative, and photographically intensifying said negative, increasing thereby the opacity of those areas of the negative which correspond to the high-light sections of the original drawing.

ARTHUR L. HUTTKAY.