

July 28, 1936.

W. S. MARX, JR

2,048,876

METHOD OF PREPARING PRINTING PLATES

Filed Oct. 10, 1933

5 Sheets-Sheet 1.

Fig. 1.



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July 28, 1936.

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Fig. 3.

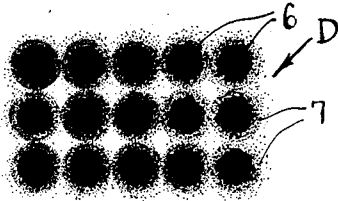


Fig. 2.



Fig. 5.



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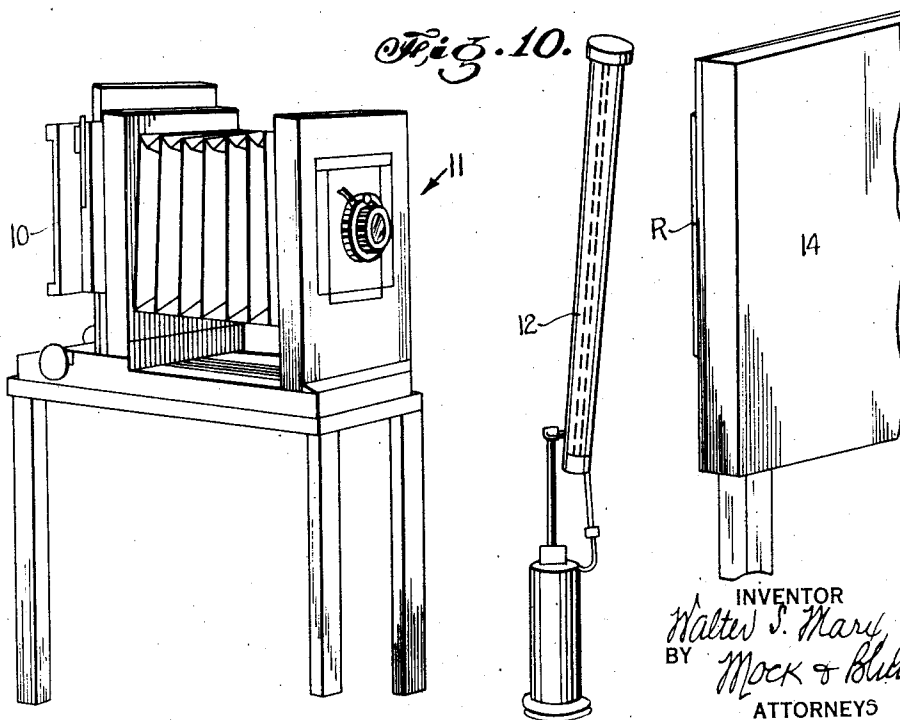
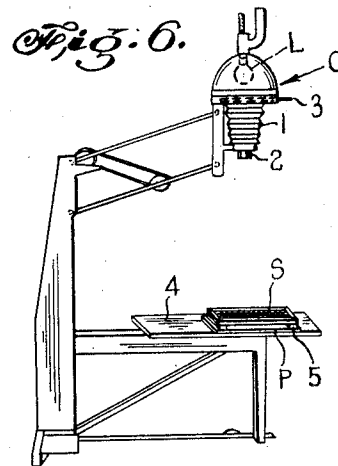
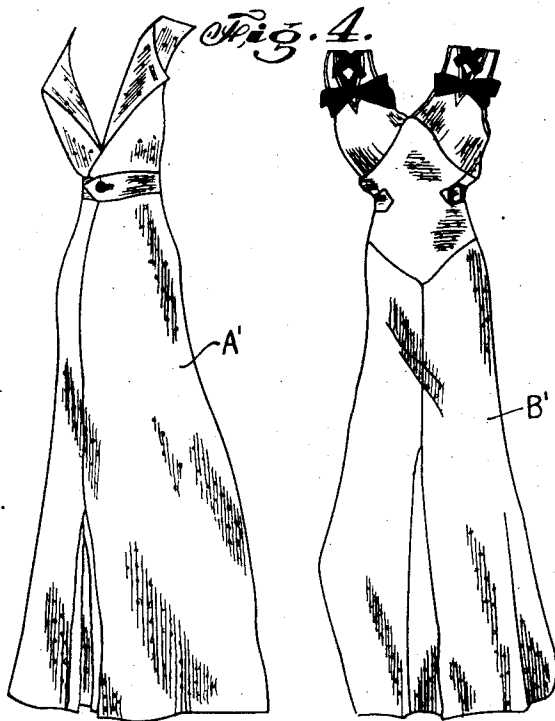
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Fig. 7.



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Fig. 9.

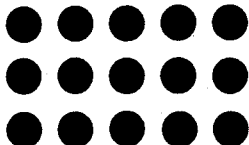


Fig. 8.



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UNITED STATES PATENT OFFICE

2,048,876

METHOD OF PREPARING PRINTING PLATES

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Application October 10, 1933, Serial No. 692,921

5 Claims. (Cl. 95—5)

My invention relates to a new and improved method of preparing printing plates.

One of the objects of my invention is to provide a new and improved method which can be used for numerous purposes; including the printing of advertisements in newspapers and the like.

An object of my invention is to provide a method which will greatly diminish the necessity of using skilled labor, which will facilitate the necessary manipulations preliminary to making the printing plate, and which will enable novel and striking effects to be economically secured.

Another object of my invention is to eliminate the necessity of "stripping" in the preparation of a negative for the production of the printing plate. It is frequently the case that in the preparation of matter such as advertising material or the like for newspaper reproduction and the like, the result desired is achieved by a combination of "line" and "half-tone" engraving; consisting of the reproduction of photographs or wash drawings or similar matter by the half-tone process, and black and white matter in which no appearance of the half-tone dot is permissible. In many cases of this type of work certain portions of the same drawing may be required in "line" or black and white, while the remainder may be in half-tone.

In the past these requirements have been met by methods well known in the art, of manipulation of the photo-engraving negative or of the plate, or by combinations of both these processes. Manipulations of the negative may consist (apart from photographic manipulations) of "stopping out" or rendering opaque portions of the negative and similar operations; or by mounting sections of different negative films on the same glass plates, which operation is known to the trade as "stripping". Manipulations of the plate include masking, double printing, over-printing, etc. According to my invention, these manipulations and processes concerned with the plate and the negative therefor are eliminated, thereby simplifying the process. By my method the screening of the half-tone portions, that is the resolution into half-tone dots corresponding to the tone values of the subject, is performed in an operation separate from the preparation of the negative from which the printing plate is prepared. Further, the steps which are ordinarily comprised in stripping, double printing, etc., are, according to my invention, also performed in a separate process

independent of the preparation of the above mentioned negative from which the printing plate is prepared.

Another object of my invention is to provide a method whereby all the necessary retouching or finishing operations can be performed upon a dry and durable positive, thus eliminating the necessity of manipulating wet films, and eliminating the necessity of retouching or refinishing operations upon the printing plate (which is ordinarily made by photo-engraving) and also eliminating the necessity of making a plurality of exposures upon the printing plate.

Another object of my invention is to simplify and speed up the work of making printing plates by enabling one line negative and one plate to be made containing a number of different subjects.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above general statement of the objects of my invention is intended merely to generally explain the same and not to limit it in any manner.

In the practice of my invention I prepare a positive of the matter which is to be reproduced, exactly in the form in which it is finally to appear. On this positive, those portions which are to appear in black and white are in black and white, and those portions which are to appear in half-tone are made up of half-tone dots of the required size and shape. This positive is preferably of the same size as the final printing plate; and re-touching, etc. operations are performed on the positive.

As a result of this, the only process required in the making of the printing plate from my positive is to prepare a line or unscreened negative, usually of the same size, from which negative the printing plate is directly prepared. This line or unscreened negative has no screen design thereupon. In carrying my invention into effect, I prepare a negative in the ordinary photographic manner from the copy to be reproduced. I then prepare a half-tone screen print on photographic paper or film from this negative, preferably of the dimensions of the final result. If necessary, I also prepare a second print, of the same size as the screened print in black and white, without the screen for such portions of the copy as are to be reproduced in black and white without screen.

By painting out or cutting out those portions of the half-tone print in which it is desired to elim-

inate the half-tone screen effect (or to produce what is known to the trade as "drop-outs" portions of a half-tone picture in which no screen dots appear) and by cutting out and pasting over those portions of the unscreened print which are to appear in line or black and white, and where necessary by retouching with either black or white, I produced a final result which is in all respects the result which it is desired to achieve and which is then ready for the simple process of line photo-engraving.

The method of operation and the steps required to carry out my invention will be understood by referring to the drawings in which:

Fig. 1 illustrates a half-tone or screen positive of the copy, prior to retouching or finishing said positive.

Fig. 2 is an enlarged detail view of a part of Fig. 1, illustrating the dot formation.

Fig. 3 is an enlarged diagrammatic view showing the nature of the dots which appear in Fig. 2.

Fig. 4 illustrates continuous tone or line reproductions of a part of the original copy, said parts being used for finishing the positive.

Fig. 5 is a sectional view which illustrates how the continuous tone or line parts (which are illustrated in Fig. 4) are superposed upon corresponding portions of the half-tone or screen positive.

Fig. 6 is a diagrammatic view which illustrates how the half-tone or screen positive is secured, by means of transmitted light.

Fig. 7 is a view showing the final printed copy, in a newspaper, book, etc.

Fig. 8 is an enlarged detail view of a part of Fig. 7, showing the dot and line formation in the finished positive.

Fig. 9 is an enlarged detail view which illustrates the dot formation as it appears in the printing plate.

Fig. 10 is a diagrammatic view which illustrates the production of the final negative on a glass plate, or other transparent or translucent medium, this final negative being used for photographically printing upon the sensitized zinc plate or other printing plate which is to be produced.

In the ordinary production of photo-engraved plates for printing pictorial matter such as advertisements or the like, the original copy which is supplied is usually in the form of a wash drawing which has been prepared by an artist, or it may be in the form of a photograph. This wash drawing consists of different shades of black, gray and white. In some cases the original copy which is supplied to the newspaper is an ordinary continuous tone negative, as for example where a photograph is taken in the ordinary manner of the objects to be advertised. If the original copy is a continuous tone or line negative, such negative can be used in the apparatus which is illustrated in Fig. 6. If the original copy which is supplied is a wash drawing or drawings, a continuous tone negative or negatives are taken therefrom by means of an ordinary copying camera. The negative thus produced or the negative supplied is then used for the production of a screened positive by means of the apparatus shown in Fig. 6.

Referring to Fig. 6, this shows a well known type of projection camera, which can be used for printing from the continuous tone negative. The projection camera C is of any suitable type, having bellows 1, and a lens which is mounted in

a holder 2. The negative which is to be printed is mounted in a holder 3. This negative may be formed on any suitable light-permeable medium, such as glass or celluloid, or the like, and light is transmitted through the same by means of a lamp L. The original picture can be enlarged or reduced as desired. The positive or sensitized paper P is placed upon a table 4. This sensitized paper may be of any suitable durable type, such as a photographic bromide paper of the hard or contrast type. The metal bars 5 are placed upon the paper in order to hold the same flat, and to also serve as supports for a photo-engraving screen S. This screen may be of any suitable type, and it ordinarily has two series of parallel lines which cross each other. The distance of the screen S from the sensitized surface of the paper P can be varied as desired to produce the required result as is well known in the art of photo-engraving. This variation of distance is determined by the thickness of the metal bars 5 and to change the distance, bars of a different thickness are used.

This produces a half-tone or screen positive which is illustrated in Fig. 1.

Instead of using the sensitized paper P, I can use any material which is provided with a sensitized coating. For example, the sensitized coating may be located upon wood, or glass, or the like. However I prefer to use sensitized paper, in order to facilitate the trimming or cutting operations which are later referred to herein, and which are preferably performed upon dry and durable positive prints.

Fig. 2 shows the dot formation of Fig. 1 on a somewhat enlarged scale.

Fig. 3 shows the effect of halation upon the dot formation in the screen positive which is illustrated in Figs. 1 and 2. The effect of halation is to cause each dot D to have a relatively dark central portion 6 and a lighter perimeter 7. The amount of halation is dependent upon the exposures given and the quality of the printing paper used in making the positive. Due to the extreme hardness of the line negative and plate emulsion used in the preparation of the printing plate, this halation disappears in the final result which is illustrated in Figure 9.

In the art of photo-engraving, it is well known and has been an established practice to give various exposures at different lens apertures in order to register the complete range of half-tone dots in the preparation of the screened negative. I find that this same procedure is applicable to the preparation of the screened positive according to my invention; but due to the fact that the process is reversed to that of ordinary photo-engraving (in photo-engraving a negative is made from a positive, whereas according to my invention a positive is made from a negative), I find it necessary to use a different series of exposures.

In practice I find that I can achieve satisfactory results with three exposures. Of these, the "shadow" exposure which registers the darker tones on the positive is made with a large lens aperture and a short time of exposure. The "middle tone" exposure which registers the middle tones is made with a smaller lens aperture and a longer time exposure. The "high-light" exposure which registers the light tones is made with a still smaller lens aperture and a much longer exposure time.

By these means the complete range of tone of the copy negative is reproduced on the screened positive, as with the shadow exposure the lighter tones do not register at all, with the middle tone

exposure the lighter tones only register incompletely and with the high-light exposure the highest tones are registered; but the high-light and middle tone exposures alone would not register the deepest tone satisfactorily.

The half-tone positive which has been secured by transmitted light is developed and dried, and it is then subjected to all the necessary retouching or finishing operations. For example, if the artist has supplied a series of separate drawings of individual objects which are to be assembled in a composite advertisement, the respective half-tone positives which have been secured by the projection printer illustrated in Fig. 6, are cut or trimmed and suitably assembled. Likewise, if the original copy does not show the individual objects in the relative sizes which are desired in the final advertisement, the apparatus shown in Fig. 6 makes enlarged or reduced prints of the drawings or negatives so as to bring them all to the desired common scale.

It will be noted that said trimming or cutting operations can be performed upon dry and durable positive prints which show the natural tone values so that this operation can be readily performed by unskilled labor.

Heretofore in doing work of this kind which was called "stripping", it was necessary to prepare half-tone negatives upon thin film, and said films had to be cut and manipulated while they were in the wet condition, because the film shriveled and distorted the picture when it was dried. This required highly skilled labor.

There is another advantage of working upon a dry and durable half-tone positive or positives, in that any desired additional matter can be printed or otherwise superposed upon the half-tone positive which is shown in Fig. 1. For example, if the price of the article was not supplied in the original drawing, said price could be painted or printed upon the half-tone positive which is shown in Fig. 1.

Referring to Fig. 1, the half-tone positive frequently does not reproduce the original tones or colors for preparing the photo-engraved printing plate in accordance with the desired result, as such a result may require dropouts, line work, etc.

Again referring to Fig. 1, the areas A and B do not have the desired clear white tone. The same applies to the representation of other light-colored parts of the original copy, such as the area C.

Referring to Fig. 6, the apparatus illustrated therein can be used without the screen S, for producing a full tone or line positive which corresponds to Fig. 1 in scale, and the like, save that Fig. 1 is half-tone and the last-mentioned positive is full tone or line and it has no screen design thereupon. From this full tone positive, any desired parts can be cut out, such as the area A', which corresponds to the area A of Fig. 1, and the area B', which corresponds to the area B of Fig. 1. Since it is possible to work with dry positive prints, the areas A' and B' can be cut out with great accuracy, and pasted over the corresponding areas A and B, so that the retouched positive consists in part of half-tone, and consists in part of full tone or line.

Referring to the area A of Fig. 1, white paint may be applied to this area, in order to produce a drop-out or area having no screen dots, or the corresponding part of a full tone or line positive in black and white can be pasted over the area A. Generally speaking, any part of the dry half-tone positive which is shown in Fig. 1 can be treated

with paint or coloring matter in order to produce any desired retouching operation. An example of this is shown in the full line outline of the dress shown in Figs. 7 and 8, which full line is absent in Figs. 1 and 2.

While the invention has been illustrated in connection with single tone reproduction, it obviously applies to multi-color reproduction.

The retouched or finished positive which may consist in part of half-tone, and in part of full tone, is now used for preparing a negative for the production of the printing plate. For this purpose the apparatus shown in Fig. 10 is utilized. The retouched positive R is placed in a suitable holder in a frame 14, and a line negative of this positive R is reproduced in negative in accordance with ordinary photo-engraving methods by means of the light-source 12 and the camera 11. When I refer to this "line" negative, I mean that this negative is produced without the use of a screen and this term is commonly used in the art of photo-engraving in order to designate a negative made in this manner. This line negative is used in the ordinary manner for printing upon the sensitized surface of a plate of zinc or any other suitable material. The plate is then etched in the usual manner.

The halation shown in Fig. 3 around the dots of the half-tone portions of the positive R disappears in this process of producing the printing plate, as is well known in the art of photo-engraving, whereby any halation existing on a half-tone photo-engraving negative is not reproduced in the printing plate owing to the characteristics of the light sensitive coating on said plate.

It will be noted that the original half-tone positive which is produced by the apparatus shown in Fig. 6, is prepared by means of transmitted light, so that the color tones are much more faithfully reproduced than if reflected light were employed.

Whenever, I refer to transmitted light in the claims, it is to be understood that I refer to light which is sent through a light-permeable member, as distinguished from light which is reflected from a light-impermeable member.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit, and the scope of my invention is not intended to be limited solely to the examples herein illustrated.

Whenever I have specified that a portion of a full line positive (made without the use of a screen) should be superimposed upon the corresponding portion of a screened positive, it is to be understood that the reverse procedure would be equivalent, since a portion of a screened positive could be superposed upon a continuous or full line positive.

In another aspect of my invention, a portion of a screened positive (retouched or not retouched) which has been prepared by transmitted light from a continuous tone negative, can be superimposed upon a full line positive, or line picture or line drawing, for preparing a line negative which is photographically printed upon the sensitized surface of the plate to be etched. For example, the artist may prepare a line layout (not a wash drawing) of a decorative border or other accessory to an advertisement, indicating where the picture of the article is to appear. A screened positive of the picture of the article is prepared, retouched if necessary, and said screened positive is superimposed upon said drawing, in order to make the desired combination. This combina-

tion is then used (without a screen) for preparing the line negative, and this line negative is photographed upon the sensitized surface of the plate to be etched.

5 I claim:

1. In the art of producing a photo-mechanical printing plate, those steps which consist in transmitting light through a continuous-tone and light-permeable negative of the copy, and through
10 a lens and also through a screen, upon paper having a light-sensitive surface in order to produce a positive half-tone reproduction of said copy by transmitted light, manipulating said half-tone
15 positive by super-imposing upon portions thereof the corresponding portions of a second positive of the copy in black and white prepared without a screen, and preparing a negative from said
20 manipulated positive by means of reflected light and without the use of a screen.
2. In the art of producing a photo-mechanical printing plate, those steps which consist in producing a paper half-tone positive reproduction of the copy, retouching said half-tone positive while
25 it is dry, and super-imposing full line positive of a portion of said copy on the corresponding portion of said half-tone positive while it is dry.
3. In the art of producing a photo-mechanical printing plate, those steps which consist in producing a paper half-tone positive reproduction of

a portion of the subject to be printed by said plate, retouching said half-tone positive while it is dry, and superposing said dry half-tone positive on a full line positive of another portion of said subject, the assembled positives corresponding to the
5 entire subject.

4. In the art of producing a photo-mechanical printing plate, those steps which consist in transmitting light through a continuous-tone and light-permeable negative of the copy, and also
10 through a screen, upon a light sensitive surface having a paper base, in order to produce a positive half-tone reproduction of said copy by transmitted light, superimposing upon a portion of said
15 half-tone reproduction a corresponding continuous-line black and white portion while said half-tone positive is dry, and preparing a negative from said combined positive and without the use of a screen.

5. In the art of producing a photo-mechanical
20 printing plate, those steps which consist in preparing a screened positive having a paper base of a portion of the subject to be printed by said plate, by means of transmitted light from a continuous-
25 tone negative, and superposing a part of said screened positive while it is dry, upon the corresponding portion of a full line positive of said subject.

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