Nov. 13, 1934. A. G. OGDEN 1,980,287

METHOD OF PRODUCING COMPOSITIONS

Filed April 12, 1933 2 Sheets-Sheet 1

Fig. 1.

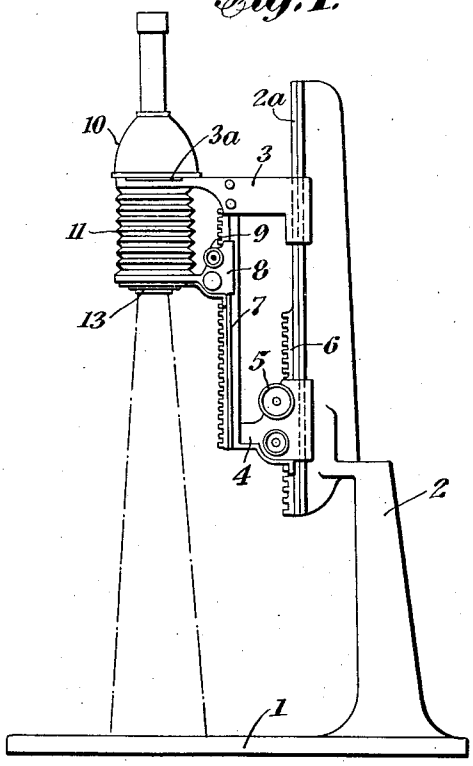


Fig. 2.

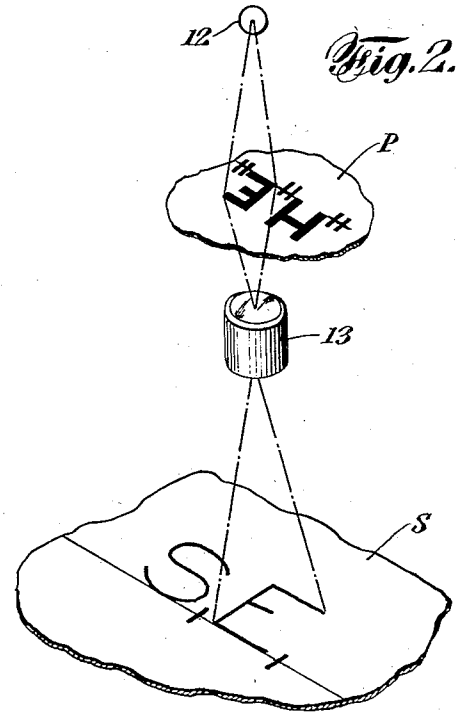


Fig. 3.

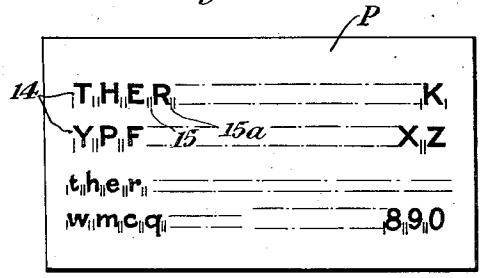


Fig. 4.



Fig 4a



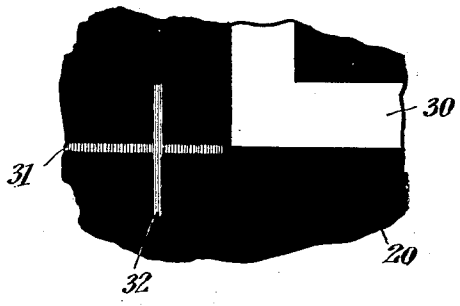
INVENTOR-
Ashley G. Ogden
BY
Ward, Crosby & Neal
ATTORNEY-

Nov. 13, 1934. A. G. OGDEN 1,980,287

METHOD OF PRODUCING COMPOSITIONS

Filed April 12, 1933 2 Sheets-Sheet 2

Fig. 6.



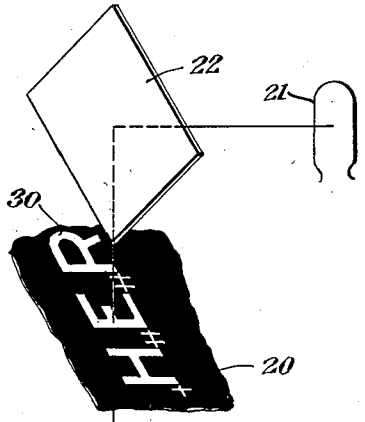


Fig. 5.

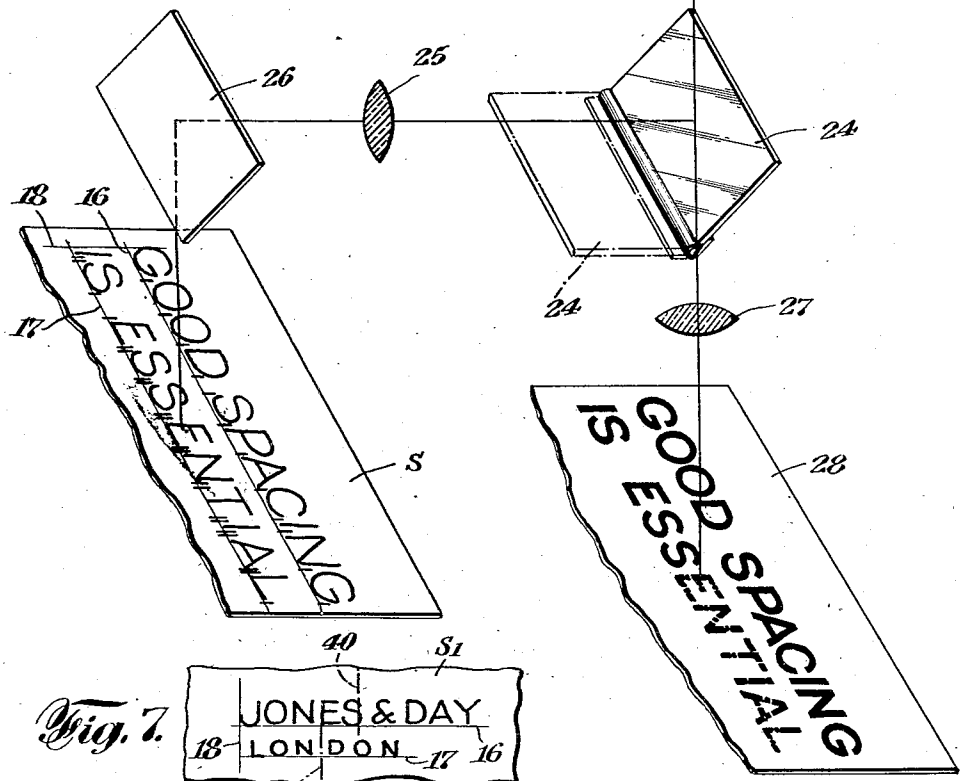
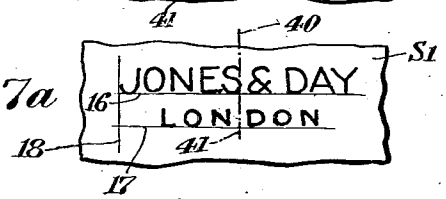


Fig. 7.

Fig. 7a



INVENTOR
Ashley G. Ogden
BY
Ward, Crosby & Neal
ATTORNEYS

Patented Nov. 13, 1934 1,980,287

UNITED STATES PATENT OFFICE

1,980,287

METHOD OF PRODUCING COMPOSITIONS

Ashley G. Ogden, Miami, Fla., assignor to General Printing Ink Corporation, New York, N. Y., a corporation of Delaware

Application April 12, 1933, Serial No. 665,757

11 Claims. (Cl. 95—4.5)

My invention relates to the photo-composing art and has particular reference to methods of preparing compositions for printing or other purposes.

Important features of my invention involve the spacing of characters in a line, the justification of composition lines, and the centering of composition lines one with respect to another.

Various other advantages, characteristics and features of my invention will become apparent from the following detailed description taken in connection with the accompanying drawings.

My invention resides in the composition-producing methods, system and arrangements of the character hereinafter described and claimed.

For an understanding of my invention, reference is to be had to the accompanying drawings, in which:

Figure 1 is an elevational view of a projector utilizable for layout purposes;

Fig. 2 is an enlarged diagrammatic view of the projector arrangement shown in Fig. 1;

Fig. 3 is a plan view of a character-bearing plate;

Figs. 4 and 4*a* are plan views of layout sheets constructed in accordance with the invention;

Fig. 5 is a diagrammatic perspective view of a photo-lettering arrangement;

Fig. 6 is a fragmentary, enlarged plan view of a part of the character-bearing plate of Fig. 5; and

Figs. 7 and 7*a* are plan views of layout sheets as constructed in accordance with the invention.

As stated above, the invention relates generally to the photo-composing art. More specifically, the invention involves the preparation of a layout sheet which constitutes a pattern, as regards spacing of letters, justification of lines, etc., utilizable for laying out the composition on a suitable light-sensitive surface.

With the foregoing in mind, reference is to be had to Fig. 1 where there is shown a projector arrangement which comprises a base 1 having a standard 2 upstanding therefrom. The standard 2 comprises vertical track members 2*a* projecting from opposite sides thereof. Slidably mounted on the track members 2*a* are upper and lower members 3 and 4, the latter carrying a pinion controlled by a knob 5, the pinion meshing with a rack member 6 disposed on one face of the standard 2.

The lower slide member 4 carries an upwardly extending rack member 7 which is secured to the upper slide member 3. This rack member 7 forms a track for a slide member 8 which carries a pinion controlled by a knob 9, the pinion meshing with the rack teeth of said member 7.

The upper slide member 3 forms a support for a lamp housing 10 and for the upper end of a bellows 11, the lower end of which is supported by the slide member 8. Disposed interiorly of the lamp housing 10 is a lamp 12, Fig. 2, and the lower end of the bellows 11 carries an objective lens 13, Figs. 1 and 2.

The upper slide member 3 is provided with a channel 3*a* which is adapted to receive a character-bearing plate P such, for example, as shown in Fig. 3, said plate P, therefore, being supported immediately below the lamp housing 10 between the lamp 12 and the objective lens 13, Fig. 2.

As clearly appears from a consideration of Fig. 1, rotation of the knob 5 causes the slide member 4 to move vertically along the upright 2. As a result, corresponding movement is imparted to the rack member 7, the slide member 3 and the various parts carried thereby. In this manner, the lamp housing 10, bellows 11 and objective lens 13 may be moved as a unit toward or from the base 1. Rotation imparted to the knob 9 effects vertical movement of the slide member 8 along the rack member 7 and, accordingly, the objective lens 13 may be moved toward or from the base 1, such movement of the lens 13 resulting in expansion or contraction of the bellows 11.

In accordance with the invention, the plate P is transparent to light rays except in two respects, namely, as regards rows 14 of characters formed thereon and spacing marks 15, 15*a* at the opposite respective sides of each character, each of the aforesaid characters and spacing marks being defined by substantially opaque sections of the plate P. As indicated, the characters of the plate P may be the upper and lower case letters of the alphabet and the single digit numerals.

In the printing art, it is well understood that the horizontal dimension of the area assigned to one letter in a line of reading matter should differ substantially from the corresponding horizontal dimension of the area of another letter. Thus, if the printed composition is to be of artistic appearance, the space to be occupied by the letter "H", obviously, is much greater than the space to be occupied by the letter "I". The spacing marks 15, 15*a* on opposite sides of each of the characters are positioned in accordance with this prior art knowledge concerning the spacing of letters.

To produce a layout sheet, the plate P is positioned in the channel 3*a* of the slide member 3 so

that it lies in the direct field of the objective lens 13. Then, by operating the knob 5, the plate P is positioned a selected distance from the base 1 and, by subsequent operation imparted to the knob 9, the objective lens 13 is moved with respect to the plate P until the images of the characters thereon come to a sharp focus at the upper surface of said base 1.

The operator now takes a piece of paper known as a "layout sheet" and, after horizontal base lines for the lines of the printed composition have been marked thereon, this layout sheet is disposed upon the base 1. In Fig. 4, such a layout sheet is shown at S with base lines 16 and 17 thereon. The layout sheet S should have a line 18 near its left hand margin which is perpendicular to the base lines 16 and 17, and which is to define the left hand edge of the printed composition.

Assuming that the respective first and second lines of the composition are to be "Good spacing" and "Is essential", the operator shifts the layout sheet on the base 1 to such position that the left hand edge of the image of the first letter, i. e., the upper case letter "G" coincides with the line 18, said layout sheet S being so positioned that said image is in vertical position with the bottom thereof coinciding with the base line 16. With a pencil, the operator now traces a mark in coincidence with the image of the right hand spacing mark 15*a* of the letter "G".

The layout sheet S is now shifted until the image of the second letter "O" is immediately at the right of the area just assigned to the image of the letter "G". With said image of the letter "O" disposed vertically in normal upright position, and with the base thereof coinciding with the base line 16, the position of the layout sheet S is adjusted until the image of the left hand spacing mark 15 of said letter "O" coincides with the mark previously placed on the layout sheet to define the position of the right hand spacing mark 15*a* of the letter "G". When the image of the letter "O" has thus been positioned, the operator places a mark on the layout sheet S incoincidence with the right hand spacing mark 15*a* of said letter "O".

In the manner described above, the operator proceeds with the preparation of the layout sheet. In each instance, the image of a left hand spacing mark of one letter is alined with the mark previously placed on the layout sheet to define the right hand spacing mark of the antecedent letter. The important feature of this operation involves the marking of the spacing mark images on the layout sheet S to thereby determine the areas assigned to the respective letters of the composition. Fig. 4 is illustrative of a layout sheet which has thus been prepared in accordance with the invention and, as will be noted, the letter assigned to each area has been outlined therein to assist the operator in the subsequent use of said layout sheet.

As shown in Fig. 4, the spacing operation produces two lines of unequal length. In case it is desired to "justify" these lines, i. e., to so rearrange the letter spacing that the lines are of equal length, the operator may proceed as follows:

It will be noted that the second line is a distance x shorter than the first line. The second line contains eleven letters and one space or twelve areas in all. Obviously, the length of the second line may be increased to that of the first line by adding $\frac{1}{12}x$ to each area in the second line. To accomplish this in an advantageous manner, the operator erases all of the second line with the exception of the first letter "I" and the right hand spacing mark thereof. The image of the next letter "S" is brought to its approximate position in the manner hereinbefore described but the image of the left hand spacing mark 15 of said letter "S" is placed, not in coincidence with the right hand spacing mark image 15*a* of the letter "I", but a distance $\frac{1}{12}x$ therefrom, Fig. 4*a*. By repeating this operation for each area of the second line, a distance $\frac{1}{12}x$ is added to each area and it results, therefore, that the completion of the spacing operation last described effects the production of a second line which is justified as regards the first line. Obviously, the distance x which the second line is to lengthen may be allotted otherwise than as above described to the various areas thereof. Thus, a distance substantially greater than $\frac{1}{12}x$ may be allotted to the space between the two words, in which case the remaining distance to be made up may be subdivided among all or nearly all of the letter areas.

The sheet S of Fig. 4*a* may be considered as constituting an example of a completed layout sheet which is to form the pattern for printing a duplicate of the layout on any suitable light-sensitive surface, or equivalent. For this purpose, there may be utilized a photo-lettering machine such, for example, as disclosed in my U. S. Letters Patent No. 1,893,439, granted January 3, 1933.

A machine of the character last noted is diagrammatically illustrated in Fig. 5 as comprising a plate 20 having a row of characters thereon, said plate being reciprocatory in a horizontal plane and transversely of the axis of a beam of light which emanates from a lamp 21 and is reflected vertically downward by a mirror 22. Below the plate 20, the aforesaid beam of light may pass through a condensing lens arrangement 23 and then be deflected in a horizontal direction by a mirror 24 so as to pass through an objective lens 25. After passing through the lens last noted, the beam of light engages a mirror 26 and is deflected vertically downward into engagement with the aforesaid layout sheet S of Fig. 4*a* which is supported upon a suitable layout table, not shown. Alternatively, the mirror 24 may be moved to the position shown by the broken lines of Fig. 5 wherein it is out of the path of the light beam, the latter, therefore, passing through an objective lens 27 and engaging a suitable light-sensitive surface 28 disposed in a light-tight housing, not shown.

When the layout sheet S is to be prepared, the operator selects a plate P from a stock of such plates which carries letters of the style desired for the printed composition. With the selected plate P in the channel 3*a* of the projector of Fig. 1, the operator, by reference to a table of calibrations, sets the slide members 4 and 8 at such positions with respect to scales, not shown, on the respective standards 2 and 7 that the images of the selected letters on the base 1 are sharply focused and of a height which has already been preselected. Having fulfilled these requirements, the operator proceeds with the preparation of the layout sheet in the manner hereinbefore described.

A stock of the plates 20 is provided and one of these is a mate of the plate P which, as described above, was selected for the projector of Fig. 1. It is this mate of the plate P which is disposed in the photo-lettering machine diagrammatically illustrated in Fig. 5. When this has been done,

the lenses 23, 25 and 27 are set longitudinally along their respective light paths by reference to scales associated, respectively, therewith, these scales being related in a predetermined known manner to the scale of the slide member 8 as referred to above. The mirror 26 is adjustable toward and from the objective lens 25 and the light-sensitive surface 28 is also adjustable toward and from the objective lens 27. The positions of the mirror 26 and the light-sensitive surface 28, then, control the lengths of the respective light paths and these positions are selected by reference to scales which are related in a predetermined known manner to the scale of the slide member 4.

Assuming that the above noted requirements have been fulfilled, the operator places the layout sheet S of Fig. 4*a* on a selected section of the layout table of Fig. 5. This layout table and light-sensitive surface 28 are movable together as a unit and these parts are so related that the position which any image takes on the layout table corresponds with the position which a corresponding image takes on the light-sensitive surface 28 assuming that the other parts of the photo-lettering machine remain unchanged in position. Accordingly, with said layout sheet S temporarily secured in selected position on the layout table in any suitable manner, the operator may proceed with the printing operation in the manner hereinafter described.

Before describing this operation, however, it should be noted that the character-bearing plate 20 is opaque to light rays except (1) for the transparent sections thereof which outline the respective characters indicated at 30, Figs. 5 and 6, and (2) the lines 31 and 32 which are colored red, the line 31 defining the base line of the row of characters and the lines 32 defining spacing marks at opposite respective sides of each character corresponding with the hereinbefore described spacing marks 15, 15*a*.

The printing operation is initiated by shifting the plate 20 to position the first letter "G" symmetrically in and with respect to the axis of the projecting light beam emanating from the lamp 21. The layout table and the light-sensitive surface 28 are then moved as a unit transversely with respect to the axis of the projecting light beam until the red image line 31 defining the base of the row of characters on the plate 20 is in coincidence with the base line 16 on the layout sheet S. As described in my aforesaid Letters Patent, the various projector parts shown in Fig. 5 may be moved as a unit longitudinally with respect to the layout table and the light-sensitive film 28. This movement is provided for letter spacing purposes and, by such movement, the red image spacing marks on opposite sides of the letter "G" on the plate 20 are brought into coincidence with the corresponding spacing marks of the letter "G" on the layout sheet S. When this has been accomplished, the operator swings the mirror 24 on its axis to the position indicated by the broken lines in Fig. 5 and, in so doing, an image of the letter "G" on the plate 20 is formed on the light-sensitive surface 28.

The operator now returns the mirror 24 to the position shown by full lines in Fig. 5 and then shifts the plate 20 to bring the second letter "O" into proper position with respect to the axis of the projecting light beam whereupon the various projector parts described above are moved as a unit longitudinally of the layout table and the light-sensitive surface 28 until the red image spacing marks of said letter "O" come into coincidence with the spacing marks at the opposite respective sides of the first letter "O" on the layout sheet S. The mirror 24 is now shifted to perform the printing operation described above.

In the manner thus described, the positioning and printing operations are repeated step-by-step until the first row of characters have been formed on the light-sensitive surface 28. The layout table and the light-sensitive surface 28 are then shifted transversely with respect to the axis of the projecting light beam until the base line 17 on the layout sheet S comes into coincidence with the red image line 31 of the character-bearing plate 20. Thereupon, the operator proceeds with the formation of the second row of characters on the light-sensitive surface 28.

After completion of the operation described above, the light-sensitive surface 28 is removed from its housing, developed and subsequently used for printing purposes in a manner well understood in the art.

The lines 31 and 32 are formed in red on the character-bearing plate 20 so that these lines may be readily observed on the layout sheet. Inasmuch, however, as they are formed from red, images thereof are not formed on the light-sensitive plate 28.

In commercial practice, the characters on any plate P are usually substantially smaller such, for example, as one-third the height of the characters on that plate 20 which is to be used in configuration with said plate P. This is advantageous because the small size of characters renders possible the use of a relatively small plate P in the projector of Fig. 1. With such a small plate, it results that the illuminated area on the base 1 is likewise small, this contributing greatly to the ease of operation in preparing the layout sheet. From the foregoing, it follows that the image of any letter as formed by the projector lens 13 is of the same size as the image of the same letter as formed by the photo-lettering machine lens 25, this being true despite the fact that the letters on the plate P are only about one-third as tall as the letters of the plate 20. This effect may be obtained with lenses of the same focal length if the projector and photo-lettering machine light paths are of the proper unequal length. If this condition is not fulfilled, it will be necessary to use lenses of different focal length.

In Fig. 7, I have illustrated a layout sheet having thereon the first line "Jones & Day" and the second line "London". As will be noted, the first line is of greater length than the second line and both lines start from a common margin line.

In the event that it is desired to center the second line with respect to the first line, the operator may draw a center line 40 through the first line and a center line 41 through the second line. Then, with the projector of Fig. 1, the operator may lay out on the left of the center line 40 those characters of the second line which are at the left of the line 41 while at the right of the center line 40 will be placed those characters of the second line which are at the right of the line 41. The layout sheet S1, as thus modified, is shown in Fig. 7*a* as ready for use in the photo-lettering machine of Fig. 5.

An alternative way of justifying the lines of the printed composition involves disposition of the layout sheet S of Fig. 4 on the layout table

of the photo-lettering machine of Fig. 5. After images of the first line letters have been formed step-by-step on the light-sensitive surface 28 in the manner hereinbefore described, the operator moves the layout table and the light-sensitive surface 28 transversely with respect to the light beam axis until the red image line 31 coincides with the base line 17 of the layout sheet S. Then, after the distance x has been measured and after it has been ascertained that there are 12 areas in the second line, the operator proceeds with the printing operation in the usual manner as hereinbefore described, the distance $\frac{1}{12}x$ being added to each area. As a result, the length of the second line on the light-sensitive surface 28 is the same as the first line even though the length of the second line on the layout sheet S is shorter than said first line.

The disposition of the center lines of each line of printed matter on a common center line may be effected in a preferred manner different from that hereinbefore described. Thus, a scale may be provided on the layout table and, with the layout sheet S1 secured to said layout table, the operator observes the scale reading of the center line 40 of the line "Jones & Day". Then, after the printing operation has been effected for the first line, the layout sheet S1 may be shifted to bring the center line 41 of the word "London" to the same scale reading as previously was taken by the center line 40. With the layout sheet in the position last noted, the operator may proceed with the printing operation whereby, as will be obvious, the arrangement of the first and second lines on the light-sensitive surface 28 takes the relation shown in Fig. 7*a* and not as in Fig. 7.

It will be understood that, as regards some of its phases, the invention is not to be limited to the use of the projector of Figs. 1 and 2 for preparing the layout sheet. Thus, if desired, the operator may dispense with said projector and prepare the layout sheet by using a pair of dividers and a suitable set of master characters having spacing marks associated therewith.

Although I have described the spreading of letters in order to secure line justification, it will be obvious to one skilled in the art that the same principles may be followed when the length of line of letter is to be shortened to a desired extent.

As disclosed above, my invention contemplates the formation of compositions from alphabet letters and numerals and it is to be understood that the use of any other designs, indicia or representations are within the scope of the invention.

While the invention has been described with respect to certain particular preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In the art of preparing compositions, the method which comprises marking on a layout sheet the areas assigned to successive letters of a composition to thereby form a predetermined layout, and projecting images onto a light-sensitive surface in accordance with the designations of said predetermined layout.

2. In the art of preparing compositions, the method which comprises projecting images of characters onto a layout sheet, marking on said layout sheet the positions of selected images to form a predetermined layout, and projecting images of other characters onto a light-sensitive surface in accordance with the designations of said predetermined layout.

3. In the art of preparing compositions, the method which comprises projecting images of characters onto a layout sheet, marking on said layout sheet the positions of selected images to form a predetermined layout, and projecting images of other characters substantially larger than said first named characters onto a light-sensitive surface in accordance with the designations of said predetermined layout.

4. In the art of preparing compositions involving the use of a layout sheet having spaced marks previously arranged thereon to define the areas assigned to the respective composition letters, the method which comprises projecting onto said layout sheet the images of spacing marks disposed on opposite respective sides of the letter assigned to one of said areas, moving the spacing mark images to bring them into coincidence with the respective marks at the opposite sides of said one area, and forming an image of said letter on a light-sensitive surface.

5. In the art of preparing compositions involving the use of a layout sheet having spaced marks previously arranged thereon to define the areas assigned to the respective composition letters, the method which comprises projecting onto said layout sheet the images of spacing marks disposed on opposite respective sides of the letter assigned to one of said areas, moving the spacing mark images to bring them into coincidence with the respective marks at the opposite sides of said one area, forming an image of said letter on a light-sensitive surface, projecting onto said layout sheet the images of spacing marks disposed on opposite sides of the letter assigned to an area immediately adjacent said one area, positioning the image of the spacing mark at the left side of said second letter in coincidence with the spacing mark at the right side of said one area, and forming an image of said second letter on a light-sensitive surface.

6. In the art of preparing compositions involving the use of a layout sheet having spaced marks previously arranged thereon to define the areas assigned to the respective composition letters, the method which comprises projecting onto said layout sheet the images of spacing marks disposed on opposite respective sides of the letter assigned to one of said areas, moving the spacing mark images to bring them into coincidence with the respective marks at the opposite sides of said one area, forming an image of said letter on a light-sensitive surface, projecting onto said layout sheet the images of spacing marks disposed on opposite sides of the letter assigned to an area immediately adjacent said one area, positioning the image of the spacing mark at the left side of said second letter a predetermined distance from the spacing mark at the right side of said one area, and forming an image of said second letter on a light-sensitive surface.

7. In the art of preparing compositions involving the use of a layout sheet having thereon a number of composition lines of unequal length, the method which comprises projecting onto a

light-sensitive surface images corresponding with and spaced in accordance with the letters of one of said lines, moving said layout sheet longitudinally with respect to said light-sensitive surface until the center of another composition line coincides with the position taken by the center of said one line while in projection position, and projecting onto said light-sensitive surface images corresponding with and spaced in accordance with the letter spacing of said second line.

8. The method of preparing a layout sheet destined for subsequent use in a photo-printing machine, which comprises projecting onto said sheet the images of spacing marks disposed on opposite respective sides of the first letter of a composition, forming marks on said layout sheet coincident with the respective spacing mark images to define the area assigned to said first letter, projecting onto said sheet the images of spacing marks disposed on opposite respective sides of the second letter of said composition, effecting relative movement between said second letter and said layout sheet to position the left spacing mark image of said second letter in coincidence with the mark at the right of the first letter area, and forming a mark on said layout sheet coincident with the right spacing mark image of said second letter.

9. The method of preparing a layout sheet destined for subsequent use in a photo-printing machine, which comprises projecting onto said sheet the images of spacing marks disposed on opposite respective sides of the first letter of a composition, forming marks on said layout sheet coincident with the respective spacing mark images to define the area assigned to said first letter, projecting onto said sheet the images of spacing marks disposed on opposite respective sides of the second letter of said composition, effecting relative movement between said second letter and said layout sheet to position the left spacing mark image of said second letter a predetermined distance from the mark at the right of the first letter area, and forming a mark on said layout sheet coincident with the right spacing mark image of said second letter.

10. In the art of preparing a layout sheet having thereon spacing marks definitive of the area assigned to one letter of a composition, the step which consists in positioning the left spacing mark of the area assigned to the following letter a predetermined distance from the right spacing mark of said first named area.

11. The method of preparing a layout sheet, which comprises projecting the images of a plurality of different characters onto a layout sheet, moving said layout sheet to locate the image of a selected character in predetermined position thereon, marking the position of said image, and moving said layout sheet to locate the image of another selected character in predetermined position thereon.

ASHLEY G. OGDEN.