ABSTRACT OF THE DISCLOSURE

A composition method and apparatus is provided in which a translucent composition sheet is placed between two light sources. The sheet is sensitive to the light from only one of the sources. A composition pattern is positioned between the sheet and the source to which the sheet is not sensitive so that it can be observed from the other side of the sheet. A composition element is placed between the sheet and the other light source so that the same element is used both to position the image on the composition sheet and to produce the image. Moveable shades for shielding other portions of the composition sheet are provided as a device for positioning elongated elements relative to the sheet.

This invention relates generally to methods of and apparatus for composing printed material and more specifically, to a method of and apparatus for imposing images on selected areas of a paper or film which is sensitive to radiant energy.

Composition of printed material such as, for example, display advertisements, has been accomplished by a variety of methods which produce a film product which in turn may be used to make plates for lithographic printing, relief or letter press printing, intaglio or gravure printing or stencils for screen process printing. In one commonly used process, often referred to as the "paste-up" process, a composite layout is prepared which includes a plurality of paper or film negatives of type material and of line or half-tone art work which are assembled on an opaque paper base or in openings for the film which have been cut in the paper base according to a predetermined design. The paper or film negatives are then fastened to the paper base with transparent tape or glue. The resulting composite layout is photographed to produce a composition which may subsequently be used to make plates for printing.

The foregoing process is obviously cumbersome and time consuming due to the necessity of careful measurement and cutting of the paper base. Furthermore, its use causes imperfections in the resulting composition, particularly at the edges of the various negatives used in preparing the composite layout, which imperfections must be compensated for by retouching. Accordingly, a need has arisen for an improved method and apparatus for producing compositions suitable for use in various printing processes.

It is, therefore, an important object of this invention to provide a simplified and rapid method of composing printed material.

A further object of the invention is to provide a method of and apparatus for reproducing compositions which will not require extensive retouching before being used to produce plates for printing.

A still further object of the invention is to provide a method of and apparatus for producing compositions in which each element of the composition may be imposed separately on selected areas of a film or paper which is sensitive to radiant energy.

Yet another object of the invention is to provide a composition method and apparatus in which there will be no necessity for such time consuming operations as measuring positions of elements, cutting holes in a paper base or gluing or taping elements to the base.

Another object of the invention is to provide an improved device for producing compositions which is relatively simple in operation and construction.

Other objects and advantages of the invention will become apparent from the following description when considered in conjunction with the accompanying drawings, in which:

FIGURE 1 is an exploded schematic view showing the relative positions of various elements used in practicing the invention;

FIGURE 2 is an end elevational view of the improved apparatus with a part of the casing removed;

FIGURE 3 is a top plan view of the apparatus shown in FIGURE 2 with the exposure lamp and support omitted for clarity;

FIGURE 4 is a fragmentary sectional view taken along line 4—4 of FIGURE 3;

FIGURE 5 is a front elevational view of the apparatus shown in FIGURE 2;

FIGURE 6 is a top plan view of a removable slide adapted for use with the apparatus shown in FIGURES 2, 3, 4 and 5;

FIGURE 7 is a sectional view taken along line 7—7 of FIGURE 6.

In accordance with the present invention, the improved method of producing a composition generally includes the steps of supporting a composition sheet 10 of radiation sensitive material in a predetermined position, positioning an element or composition 11 on the composition sheet adjacent to a predetermined portion of the sheet 10, exposing said portion and element to radiation to which the sheet is sensitive while shielding the remainder of the sheet from such radiation and repeating the positioning and exposing steps with respect to other elements of the composition and other portions of the sheet to complete the composition. To facilitate visual observation of the positions of elements with respect to the sheet, the sheet is illuminated by a source of light to which the sheet is insensitive. Finally, after exposure of the desired portions, the composition sheet is developed, resulting in a composition which may be used to produce plates for printing.

More specifically, the composition sheet may be a film or paper which is insensitive to selected wavelengths of visible light and is sensitive to other forms of radiation. A material which has been found to be suitable for this purpose is a paper designated as "Fotoretile—Translucent Contact" by its manufacturer Fotoretile Incorporated of Chicago, Illinois.

This paper is insensitive to wavelengths of light passed by ruby or amber colored filters and hence may be observed by such light, which may be conveniently provided as will be hereinafter described. The paper is sensitive to ultraviolet light produced by a conventional fluorescent lamp which also may be conveniently provided. Further, the paper is insensitive to the wavelengths of light produced by incandescent bulbs and hence may be handled under normal room lighting provided by such bulbs. In addition, it is structured on an 80 gram base and is therefore translucent to light. As a result the light source used for observation may be conveniently placed on the opposite side of the sheet from the operator as will be hereinafter described. Since this paper which is suitable for use in practicing the invention is sensitive to a particular form of light, the invention will hereinafter be described with reference to exposure of the sheet to such light. It will be understood that other forms of radiant energy might be utilized in conjunction with other materials without departing from the scope of the invention.
It has been found to be convenient in practicing the invention to support the composition sheet \(10\) on a flat translucent panel \(12\) which is illuminated from below by sources of visible light to which the sheet is insensitive and translucent while the operator and the source of radiation to which the sheet is sensitive are positioned above the sheet. This arrangement is preferred in accordance with more detailed aspects of the invention, although it will be apparent that other arrangements could also be used.

Furthermore, a desirable form of the different elements of the composition has been found to be films \(13\) bearing the desired images either in negative or positive form, depending on whether the resulting composition is to be positive or negative respectively. These may be prepared by a number of well known processes such as photographic typesetting. Underdeveloped Eastman Autopositive Projection film, manufactured by the Eastman Kodak Company of Rochester, New York, which provides a brown, translucent image to facilitate viewing of the sheet through the film has been found to be suitable for this purpose and the invention will be described, for convenience, in connection with such film. Of course other types of films or even other means of providing the elements, such as stencil outlines, might be used to practice the invention.

For purposes of explanation, the method is described hereinafter in connection with novel apparatus for practicing the method. Generally, such apparatus includes a casing \(14\) having a horizontal upper surface \(15\) including the translucent portion \(12\) on which the composition sheet \(10\) is supported. Within the casing is a mounted light source \(16\) which produces light to which the sheet is insensitive and by means of which the relative positions of the composition sheet and elements may be observed from above the upper surface \(15\). A radiation source \(18\), shown in the drawings as an ultra-violet exposure lamp is mounted above the upper surface \(15\) for movement parallel thereto. A shielding means \(20\) is provided between the exposure lamp \(18\) and the composition sheet \(10\) for shielding selected areas of the composition sheet which are not to be exposed to light from the exposure lamp while at the same time permitting observation of the composition sheet.

More specifically, the illustrated casing \(14\) includes a light box supported on vertical front and rear walls \(22\) and side walls \(27\) and having a lower surface \(24\) and the generally horizontal upper surface \(15\), which as shown is at a convenient height for viewing from above by an operator. Placed within the light box is the light source \(16\), which in this instance includes three 40 watt fluorescent tubes \(26\) extending horizontally across the casing between the side walls \(27\). The tubes are covered by filter sleeves \(28\) which are of an amber or ruby translucent acetate and pass only light to which the composition sheet is insensitive.

The upper surface \(15\) of the casing includes two opaque side panels \(30\) and the translucent top panel \(12\), which is centrally located and preferably is of frosted glass to diffuse the light from the fluorescent tubes \(26\). In the illustrated embodiment, a circular clear glass disc \(34\) of \(1/4\) inch thick plate glass and approximately the same width as the top panel is disposed above and parallel to the top panel \(12\). The disc is suitably mounted for rotational movement in a circular track \(36\) which is mounted on the upper surface \(15\) of the casing \(14\). The track \(36\) and disc \(34\) may be suitably calibrated so that the angle of rotation of the disc may be accurately determined and means (not shown) may be provided for locking the disc \(34\) in any particular angular position desired. The disc has removably mounted on it, in operation of the device, a grid sheet \(35\) of clear acetate having grid lines of a suitable dimension thereon. The composition sheet \(10\) rests upon this grid sheet and the disc in operation of the device. Other purposes and advantages of the rotatable disc \(34\), in connection with the imposing of elongated elements of the composition on the sheet, will become apparent by reference with the description of other portions of the apparatus.

The exposure lamp \(18\) in the illustrated apparatus is a 150 watt fluorescent tube positioned approximately one foot above the disc \(34\) and extending from side to side across the casing \(14\). The exposure lamp is mounted on a movable carriage \(38\) so that it may be moved along a path parallel to the upper surface \(15\) between the front and the rear of the panel \(12\). The carriage, as illustrated, includes two base members \(40\) located above the opaque side panels \(30\), a lamp support \(42\) and a reflecting lamp shade \(44\) which concentrates light from the exposure lamp in the area directly below the lamp. The lamp support \(42\) also carries suitable electrical wiring (not shown) to connect the lamp to a source of electrical power through a foot pedal \(48\) mounted on the lower front portion of the casing \(14\) and a timer \(50\) so that the lamp may be turned on by operation of the foot pedal and automatically be turned off after the passage of a predetermined exposure time. An exposure time of two seconds has been found to be satisfactory using the 150 watt lamp one foot above the composition sheet and the materials for the composition sheet and element previously described herein.

As illustrated, the base members \(40\) rest upon carriage tracks \(52\) which are mounted on each side of the upper surface \(15\) of the casing \(14\) and extend between the front and the rear of the casing. The tracks \(52\) are shown in the form of toothed racks which mesh with the teeth of two pinion wheels \(54\) provided on each base member and function to both support and guide the base members \(40\) of the carriage \(38\) in movement between the front and rear of the upper surface \(15\).

The shielding means \(20\) for shielding selected areas of the composition sheet from exposure, in the illustrated apparatus, generally comprises shades formed of a flexible material such as acetate which is opaque to light to which the composition sheet is sensitive but which is translucent to light produced by the light sources used for observation. In this instance, amber or ruby colored shades having the same optical properties as the filter sleeves \(28\) are utilized. More specifically the shielding means \(20\) of the illustrated apparatus includes a set of front and rear masking shades \(56\) and a set of side masking shades \(58\). Each set of shades is movable across the upper surface \(15\) of the casing \(14\) and over the composition sheet \(10\) when it is resting on the disc \(34\) and is associated with the base members \(40\) of the carriage \(38\) in a manner to be described in detail below.

The front and rear masking shades \(56\) each are in the form of flexible acetate sheets, as described above, which are slightly wider than the top panel \(12\) and are longer than the distance between the front and rear of the upper surface \(15\). The front edge of the front masking shade and the rear end of the rear masking shade therefore extend over the front and rear edges of the upper surface \(15\) of the casing \(14\) respectively and into the vertical shade channels \(60\) located on the inner sides of the front and rear walls \(22\) of the casing \(14\). Weights \(62\) are attached to the dependent or remote edges of the shades and the adjacent edges are attached to rods \(64\) which extend across the upper surface of the casing. The rods \(64\) are adapted to be connected to the base members of the carriage so that the areas of the composition sheet \(10\) which are not substantially directly below the exposure lamp may be shielded from its light.

In the illustrated apparatus connection this the rods \(64\) to the base members \(40\) is accomplished by means of a horizontal flange \(66\) on each base member adjacent to the center of the upper surface \(15\). The flanges \(66\) are positioned slightly above the elevation of the upper surface of the disc \(34\) and have upwardly extending teeth \(68\) forming a plurality of rod slots \(70\) in which the ends of the rods may
be disposed. The size of the area of the composition sheet 10 which is not shielded by the front and rear masking shades may thus be adjusted by suitable choice of the particular rod slots 70 in which the rods 64 are inserted. Furthermore, as the carriage is moved between the front and rear of the upper surface the location of the unshielded space between the rods 64 may be adjusted as desired in this direction.

The side masking shades 58 are formed of a material similar to that of the front and rear masking shades 56. The side masking shades are similar in form to conventional window shades, being mounted on rollers 72 which may be similar to conventional window shade rollers and having transverse rods 73 at their extremities by which the shades may be grasped for movement. The rollers in turn are mounted on the base members 40 of the carriage 38 with their axes parallel to the sides of the upper surface 15 of the casing 14 so that rolling and unrolling of the side shades adjusts the size and shape of the unshielded area of the upper surface in the direction parallel to the front and rear of the casing 14. The side shades 58 are wider than the maximum distance between the rod slots 70 so that when the side shades 58 are unrolled and the front and rear shades 56 are positioned on the table by the rods 64 being disposed in the rod slots 70, the surface under the two sets of shades will be continuously shielded from the light of the exposure lamps. The side shades 58 are also made longer than the width of the top panel 12 so that the unshielded area may be positioned anywhere between the sides of the panel as well as being adjusted in size by suitable positioning of the side shades. As shown, the side shades 58, when unrolled, are positioned below the flanges 66 and hence are also below the front and rear masking shades 56.

The flanges 66 perform a second function in addition to providing a means of attaching the front and rear masking shades 56 to the base member 40. This function is to support, in its operative position, a border slide 74 which is a removable portion of the illustrated apparatus particularly useful, in conjunction with the rotatable disc 34, for imposing images of elongated elements of a composition such as lines or decorative borders.

The illustrated border slide 74 which is shown in FIGURES 6 and 7 comprises a sliding casing 76 which is generally in the form of an elongated rectangular parallelepiped having a substantially flat horizontal handle at each end. The dimensions of the border slide casing 76 and handles 78 are such that when the handles 78 are disposed upon the flanges 66 the lower surface of the casing 76 is adjacent to the composition sheet 10 when the sheet is disposed upon the disc 34. Border slots 80 are provided in the upper and lower surface of the slide casing 76 and extend longitudinally thereof in vertical alignment with one another. Cut off shades 82 made of a material similar to the shades previously described are movably mounted below the border slot 80 in the upper surface of the slide casing 76 on side shade rollers 84 positioned at each end of the slide casing. The cut off shades 82 are also attached to shade handles 86 which interlock with and are movable along the edges of the upper border slot. The cut off shades are thus movable parallel to the front of the casing in a manner which is similar to the side shades so that the unshielded area below the exposure lamp 18 and border slots 80 may be adjusted in size and position. Film rollers 88 are positioned within the slide casing 76 on each side of the border slots 80 and are rotatably mounted on each end of the slide casing. Each roller 88 includes roller handles 90 mounted outside the ends of the slide casing, by means of which the rollers may be rotated. Movement of the film roll 92 which has a series of elongated images of all desired types of lines and decorative borders extending parallel to the border slots. Rotation of the film rollers 88 by movement of the roller handles 90 causes selected lines or borders on the film roll 92 to be positioned between the two border slots 80. The portion of the film roll which includes the selected line or border is held adjacent to the lower border slot and, in operation, the selected line or border on the film roll 92 is advanced in a direction parallel to the borders on the film roll 92 to be positioned between the two border slots 80.

In operation of the described apparatus for performing the method, the grid sheet 35 is fixed on the disc 34 and a pattern 96 for the composition made of a transluent material is fixed on the grid in alignment therewith. The pattern may be either exact or approximate depending on the criticality of the spacing for the particular finished composition. The composition sheet 10 is then fixed over the pattern 96 by taping or otherwise fastening it to the edges of the disc 34 or corners of the composition sheet where no images are to be parallel to the front of the casing 14. The pattern is turned on throughout the operation so that the operator is able to observe at all times the relative positions of the pattern 96, grid sheet 35 and the elements 11 of the composition on the translucent film 13. This is possible because all of the materials which are positioned between the operator and the light sources transmit the light from the source 16.

The advantages of the cooperation of the rotatable disc and border slide are apparent in operations where borders or lines are to appear in the composition. In such instances the border slide 74 is positioned upon the flanges 66 and the film rollers 88 are positioned so that the desired line or border is aligned with the border slots 80 and adjacent to the composition sheet 10. The front and rear masking shades 56 are drawn up and secured in position by placing the rods 64 in rod slots 70 suitably chosen so that only the portion of the composition sheet 10 below the border slots 80 may be exposed to light from the exposure lamp 18.

The horizontally disposed lines and borders are first imposed on the composition sheet 10 by moving the carriage 40 successively to positions where the line or border aligned with the border slots 80 is aligned with its proper position as shown on the pattern 96. The length of the line and its position on a horizontal axis is determined by adjusting the positions of the cut off shades 82. The foot pedal 48 is then pressed, which actuates the exposure lamps 18 for the predetermimined time to which the timer 50 is set, and a latent image of the line or border is thereby imposed on the composition sheet 10. Where lines are to be of the same length, as for example top and bottom borders of an advertisement, it is preferable to impose them one after the other to avoid unnecessary adjustment of the cut-off shades.

The vertical lines and borders may then be imposed by rotating the disc 90. Vertical lines or borders on the pattern 96 will then be positioned between the lines and their image may be imposed on the composition sheet just as were the horizontal lines and borders. If lines having a vertical orientation are desired, the disc 34 may be rotated to and fixed in any angular position so that such lines may be aligned with the slots 80 in the border slide 74. After this step is finished the border slide 74 is removed from the carriage 38.

The remainder of the composition will consist of type or line or halftone artwork or both. Films 13 are prepared of the elements 11 of the composition of both types. The rods 64 attached to the front and rear masking shades 56 are then placed in the rod slots 70 on the flanges 66 so that the opening between them is as large as possible. The carriage 40 is moved to a position such that the opening between the front and rear shade is above the position of an element 11 of the composition to be imposed as shown by the pattern 80. A film 13 bearing an image of this element 11 is then placed in alignment with the pattern 96 on the composition sheet 10. The front and rear masking shades 56 are moved closer together so as to cover areas which are not to be exposed and the edges of the film. Similarly, the side shades 58 are rotated out to cover remaining areas which are not to be exposed and other
edges of the film. The film is held in position by hand, outside of the area to be exposed, while the foot pedal actuating the exposure lamp is depressed for the predetermined exposure time.

3. A method of producing a composition on a composition sheet comprising

(a) positioning the composition sheet between a source of light of wavelengths to which the sheet is translucent but not sensitive and a source of radiant energy of a form to which the sheet is translucent and sensitive,

(b) positioning a composition pattern at least partially translucent to the light produced by said light source between said composition sheet and said light source so that said pattern is observable on the opposite side of said composition sheet from said pattern, utilizing light from said light source,

(c) positioning an element of the composition adjacent to a portion of the composition sheet in accordance with the pattern and on the opposite side of the composition sheet from the pattern, utilizing light from said light source which strikes said composition element, and

(d) exposing said portion of composition sheet and said composition element to the radiant energy from said radiant energy source so that a latent image of said element is produced on said composition sheet in accordance with the pattern while, during the exposure, shielding the remainder of said sheet from such radiant energy.

4. A method of producing a composition on a composition sheet comprising

(a) positioning the composition sheet between a first source of light of wavelengths to which the sheet is translucent but not sensitive and a second source of light of wavelengths to which the sheet is translucent and sensitive,

(b) positioning a composition pattern at least partially translucent to the light produced by said first light source between said composition sheet and said light source so that said pattern is observable on the opposite side of said composition sheet from said pattern,

(c) positioning a composition pattern in accordance with the pattern and on the opposite side of the composition sheet from the pattern, utilizing light from said light source which strikes said composition element,

(d) exposing said composition sheet and said composition element to the radiant energy from said radiant energy source so that a latent image of said element is produced on said composition sheet in accordance with the pattern while, during the exposure, shielding the portions of said sheet on which no images are to be produced from such light.

5. A method of producing a composition on a translucent composition sheet which is sensitive to a selected form of radiant energy, said method comprising the steps of

(a) exposing the sheet to a source of light of wavelengths to which the sheet is translucent but not sensitive,

(b) positioning a translucent composition pattern between said composition sheet and said light source so that said pattern is observable on the opposite side of said composition sheet from said pattern,

(c) positioning an element of the composition adjacent to a portion of the composition sheet in accordance with the pattern and on the opposite side of the composition sheet from the pattern utilizing light from said light source,

(d) exposing said portion of said composition sheet and said element to said selected form of radiant energy from said light source.

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posure, shielding the remainder of said sheet from such radiation, and
(e) repeating step (c) and step (d) in succession using other ele-
ments of the composition sheet adjacent to other portions of the composition sheet so that a latent
image of the composition is imposed on the composi-
tion sheet.

6. A method of producing a composition on a trans-
lucent composition sheet which is sensitive to selected
wavelengths of light, said method comprising the steps of
(a) exposing said sheet to a source of light of wave-
lengths to which the sheet is not sensitive,
(b) positioning a translucent composition pattern be-
tween said composition sheet and said light source
so that said pattern is observable on the opposite side
of said composition sheet, and
(c) means for shielding the remainder of said com-
position sheet from such radiation, and
(d) repeating step (c) and step (d) in succession using
other elements of the composition sheet adjacent to other
portions of the composition sheet.

7. For use in a composition producing apparatus, means
for positioning an elongated element of the composition
adjacent a radiation sensitive composition sheet com-
promising
(a) an elongated casing having aligned longitudinal
slots in its upper and lower surfaces defining an aper-
ture said casing including means for positioning said
casing between a radiation source and the composi-
tion sheet with the lower surface of said casing posi-
tioned adjacent the composition sheet,
(b) means for aligning an elongated image on a film
roll with said aperture, and
(c) means positioned outside of said aperture for secur-
ing the image of the film roll adjacent to the lower
surface of said casing.

8. Apparatus for producing a composition on a trans-
lucent composition sheet sensitive to selected forms of
radiant energy, said apparatus comprising
(a) a light source adapted to produce light to which
the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant en-
ergy to which the composition sheet is sensitive,
(c) means for supporting the composition sheet be-
tween said light source and said radiation source,
(d) means for supporting a translucent composition
pattern between said composition sheet and said
radiation source, so that said pattern is observable on the side
of said sheet opposite from said pattern utilizing light from
said light source,
(e) means for supporting a selected element of the
composition adjacent to a portion of the composition
sheet and between the composition sheet and said
radiation source,
(f) means for positioning said selected element in ac-
cordance with the composition pattern utilizing light from
said light source,
(g) means for exposing said element and said adja-
cent portion to radiation from said radiation source
so that a latent image of said element is imposed
on said adjacent portion, and
(h) means for shielding the remainder of said com-
position sheet from such radiation from said radia-
tion source during the exposure of said portion and
said element.

9. Apparatus for producing on a translucent composi-
tion sheet sensitive to selected forms of radiant energy
a composition made up of a plurality of different ele-
ments, said apparatus comprising
(a) a light source adapted to produce light to which
the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant en-
ergy to which the composition sheet is sensitive,
(c) supporting means for supporting the composition
sheet between said light source and said radiation
source and for supporting a translucent composition
pattern between the composition sheet and said light
source so that said pattern is observable on the side
of said sheet opposite from said pattern by light from
said light source,
(d) means for positioning one of said elements adjacent
to a portion of said composition sheet and between
the composition sheet and said radiation source,
(e) means for moving the composition sheet and pat-
tern relative to said element so that the element is
located in different positions from the composition pattern
utilizing light from said light source,
(f) means for exposing said element and adjacent
portion of said sheet to radiation from said radia-
tion source so that a latent image of said element is
imposed on said composition sheet, and
(g) means for shielding the remainder of said com-
position sheet from such radiation from said radia-
tion source during the exposure of said portion and
said element.

10. Apparatus for producing, on a translucent composi-
tion sheet sensitive to radiant energy a composition hav-
ing different elements, said apparatus comprising
(a) a light source adapted to produce light to which
the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant en-
ergy to which the composition sheet is sensitive,
(c) a translucent viewing surface adapted to support the
composition sheet between said light source and said
radiation source, and a translucent composition pat-
tern between the composition sheet and said light
source, a selected one of said elements adjacent to a
portion of the composition sheet and between the
composition sheet and said radiation source in ac-
cordance with the composition pattern,
(d) movable shade means disposed between said view-
sing surface and said radiation source, said shade
means being translucent to light produced by said
light source and opaque to radiation produced by
said radiation source so as to shield selected portions of
the composition sheet from exposure without pre-
venting observation of the alignment of the elements
and the composition pattern,
(e) means for actuating said radiation source so as to
expose a selected portion of the composition sheet
not shielded by said shade means to radiation from
said radiation source whereby a latent image of the
element is imposed on said selected portion.

11. The apparatus of claim 10 wherein said movable
shade means comprises two pairs of shades, each pair be-
ing movable at right angles to the other.

12. Apparatus for producing on a translucent composi-
tion sheet sensitive to radiant energy a composition hav-
ing different elements, said apparatus comprising
(a) a light source adapted to produce light to which
the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant en-
ergy to which the composition sheet is sensitive,
(c) a translucent viewing surface adapted to support the
composition sheet between said light source and said
radiation source and to support a translucent
composition pattern between the composition sheet and said light source,
(d) means for positioning an elongated element of the composition adjacent to the composition sheet and between the composition sheet and said radiation source,
(e) said translucent viewing surface having a rotatable portion so as to permit the elongated element to be positioned in accordance with the composition pattern,
(f) movable shade means disposed between the composition sheet and said radiation source, said shade means being translucent to light produced by said light source and opaque to radiation produced by said radiation source so as to shield selected portions of the composition sheet from exposure without preventing observation of the alignment of the elements and the composition pattern,
(g) means for actuating said radiation source so as to expose a selected portion of the composition sheet not shielded by said shade means to radiation from said radiation source whereby a latent image of the element is imposed on said selected portion.

13. Apparatus for producing on a translucent composition sheet sensitive to radiant energy a composition having different elements, said apparatus comprising
(a) a light source adapted to produce light to which the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant energy to which the composition sheet is sensitive,
(c) a translucent viewing surface adapted to support the composition sheet between said light source and said radiation source, a translucent composition pattern between the composition sheet and said light source, and an element of the composition adjacent to a portion of the composition sheet and between the composition sheet and said radiation source in accordance with the composition pattern,
(d) movable shade means disposed between the composition sheet and said radiation source, said shade means being translucent to light produced by said light source and opaque to radiation produced by said radiation source so as to shield selected portions of the composition sheet from exposure without preventing observation of the alignment of the elements and the composition pattern,
(e) carriage means connected to said viewing surface and movable parallel thereto, said carriage means carrying said radiation source and at least a portion of said movable shade means, and
(f) means for actuating said radiation source so as to expose a selected portion of the composition sheet not shielded by said shade means to radiation from said radiation source whereby a latent image of the element is imposed on said selected portion.

14. Apparatus for producing on a translucent composition sheet sensitive to radiant energy a composition having different elements, said apparatus comprising
(a) a light source adapted to produce light to which the composition sheet is not sensitive,
(b) a radiation source adapted to produce radiant energy to which the composition sheet is sensitive,
(c) a translucent viewing surface adapted to support the composition sheet between said light source and said radiation source and to support a translucent composition pattern between the composition sheet and said light source,
(d) means for positioning an elongated element of the composition adjacent to the composition sheet and between the composition sheet and said radiation source,
(e) means for moving the composition sheet and pattern relative to said elongated element so that the elongated element is located in different positions in accordance with the composition pattern,
(f) movable shade means disposed between the composition sheet and said radiation source, said shade means being translucent to light produced by said light source and opaque to radiation produced by said radiation source so as to shield selected portions of the composition sheet from exposure without preventing observation of the alignment of the elements and the composition pattern,
(g) carriage means connected to said viewing surface and movable parallel thereto, said carriage means supporting said radiation source, at least a portion of said movable shade means, and said means for positioning an elongated element of the composition, and
(h) means for actuating said radiation source so as to expose a selected portion of the composition sheet not shielded by said shade means to radiation from said radiation source whereby a latent image of the element is imposed on said selected portion.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,368,470

Frank G. Higgason, Jr.

February 13, 1968

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, line 57, for "second" read -- second source --.

Signed and sealed this 6th day of May 1969.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

Commissioner of Patents