

Jan. 7, 1930.

R. S. HOPKINS

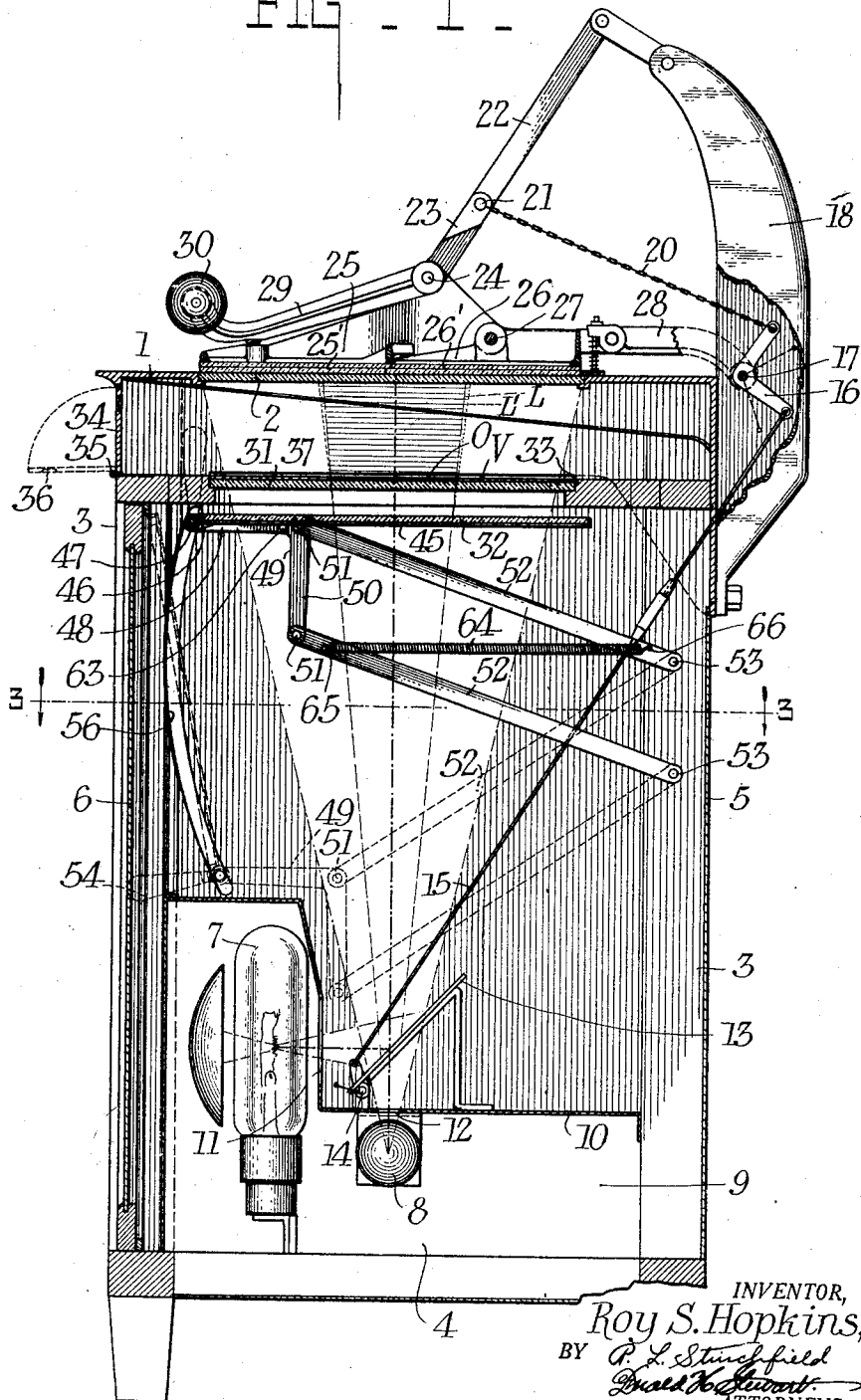
1,742,811

PHOTOGRAPHIC PRINTER VIGNETTING APPARATUS

Filed Dec. 10, 1926

3 Sheets-Sheet 1

FIG - 1 -



INVENTOR,
Roy S. Hopkins,
BY *P. L. Sturgesfield*
Dwight H. Stewart
ATTORNEYS.

Jan. 7, 1930.

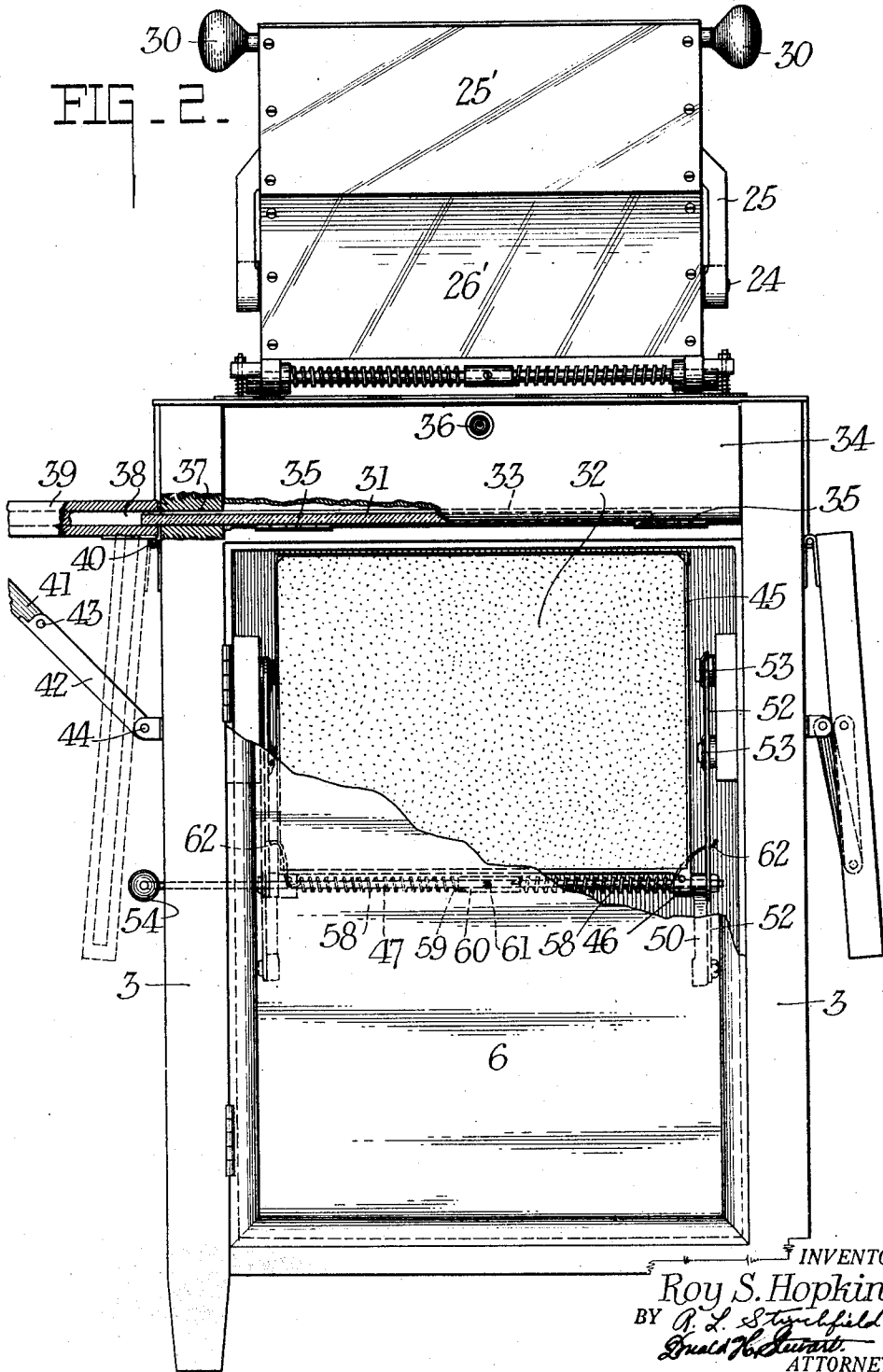
R. S. HOPKINS

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PHOTOGRAPHIC PRINTER VIGNETTING APPARATUS

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3 Sheets-Sheet 2



INVENTOR,
Roy S. Hopkins,
BY *Q. L. Stymel*
Quach & Stymel
ATTORNEYS.

Jan. 7, 1930.

R. S. HOPKINS

1,742,811

PHOTOGRAPHIC PRINTER VIGNETTING APPARATUS

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3 Sheets-Sheet 3

FIG - 3 -

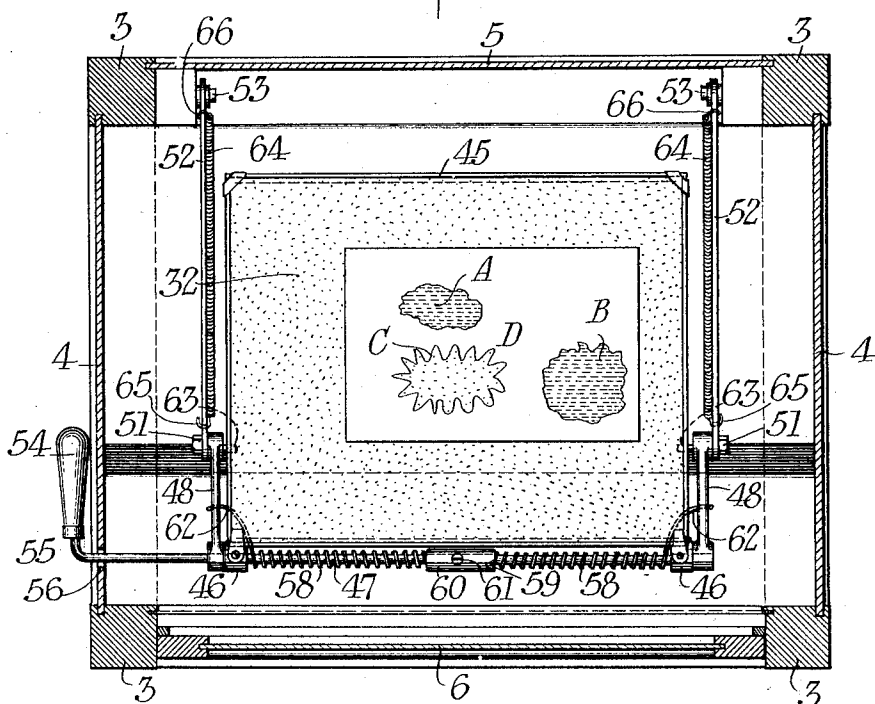


FIG. 4 -

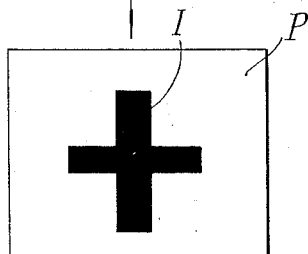
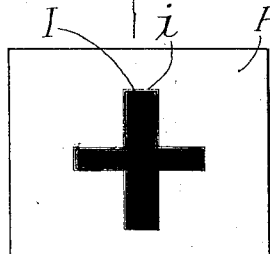


FIG. 5 -



INVENTOR,
Roy S. Hopkins,
BY *R. L. Stinchfield*
Donald H. Stinchfield
ATTORNEYS.

UNITED STATES PATENT OFFICE

ROY S. HOPKINS, OF ROCHESTER, NEW YORK, ASSIGNOR TO EASTMAN KODAK COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK

PHOTOGRAPHIC-PRINTER VIGNETTING APPARATUS

Application filed December 10, 1926. Serial No. 153,881.

This invention relates to photography and more particularly to photographic printing machines, and has for its object to provide a simple, efficient, and easily operated vignetting device therefor. Another object is to provide a device by which the contrast and degree of sharpness of both over all or part of the entire area of the print may be altered or modified. Another object is to provide an adjustable screen movable from the outside of the printer, for altering definition. Another object is to provide a slidable screen, and a screen holder. Another object is to provide a swinging screen holder which may also be angularly adjusted relative to the printing panel and which may be turned into an inoperative position with respect thereto. Another object is to provide a printing light giving a beam of diverging rays with means for altering the angle of the light rays for effecting definition of a print. Another object is to provide a plurality of screens which cooperate to produce a desired effect. Another object is to provide relative movement between several screens for altering the vignetting produced by one of the screens. Another object is to provide suitable mounts for the screens enabling them to be moved and adjusted to secure the above mentioned results. Other objects will appear hereinafter from the specification, the novel features being particularly pointed out in the claims at the end thereof.

I have used by way of illustration a printing machine of the point light source type, such as is shown and fully described in my copending applications for printing machines, Serial No. 129,230, filed August 14, 1926, and Serial No. 153,882, filed December 10, 1926. This type of machine is particularly suitable for use with the vignetting mechanism to be hereinafter described, but it is to be understood that features of my vignetting mechanism may be readily adapted to other types of apparatus.

Coming now to the drawings wherein like reference characters denote like parts throughout,—

Fig. 1 is a part section and part side elevation of a printer having a vignetting mechanism

constructed in accordance with and illustrating a preferred form of my invention;

Fig. 2 is a part section and part front elevation of the printer and vignetting mechanism, shown in Fig. 1;

Fig. 3 is a section on approximately the line 3—3 of Fig. 1, but with part of the vignetting apparatus in a different position; and

Figs. 4 and 5 are diagrammatic views showing results which may be obtained with my vignetting apparatus.

As fully described in the second of my above mentioned copending applications, the printing machine may consist of a table 1, in the top of which is mounted a printing panel 2, which is customarily a sheet of heavy glass. The table top is supported by legs 3, and the side walls 4, rear wall 5, and the front door 6 constitute a housing which encloses the printing lamp 7 and the pilot lamp 8.

These lamps are both carried in a compartment 9 formed by a wall 10, in which there are two windows 11 and 12, these windows being adapted to restrict the light beams coming from the lamps to a relatively small area so that these lamps may be considered to produce a point light source.

A mirror 13 may be swung about a pivot 14 upon a rod 15 attached to a bell crank lever 16, which is pivoted at 17 to a bracket 18. A chain 20 connects the bell crank lever with the joint 21 of a toggle comprising links 22 and 23, the latter toggle arm being pivoted at 24 to a platen consisting of sections 25 and 26 hinged together at 27 and carried by a link 28. The platen faces 25' and 26' are preferably of red pyroxylin. Arm 23 of the toggle also carries an arm 29 supporting the platen operating handle 30. When the platen is moved by handle 30, the mirror is also moved.

When the parts are in the position shown in Fig. 1, the printing light from lamp 7 passes through window 11, and is reflected by the mirror 13 upwardly towards the printing panel 2. The mask 11 restricts the light rays so that they follow substantially straight

paths toward the printing panel from the mirror.

Lamp 8 is so positioned that when the mirror 13 closes the window 11 light rays may pass through the window 12, and advance past the mirror support through substantially the same path as the light rays from lamp 7 reflected by mirror 13.

Coming now to the vignetting apparatus,—this preferably consists of at least two screens here shown as 31 and 32. Screen 31 may slide in a slideway 33 formed in the top of the printing cabinet. Access may be obtained through the door 34 hinged at 35 to the printer, and having a handle 36 by which the door may be opened.

From Fig. 2, it should be noted that the slideway is continued at 37 through side wall 4 of the printing cabinet, and that there is a second slideway 38 carried by member 39 hinged at 40 to the cabinet and movable about this hinge from a position in the slideway 38 forms a continuation of slideway 33, to a position in which the slideway lies at an angle to the side of the machine, as shown in broken lines. A brace formed of two parts 41 and 42 hinged together at 43 and to the cabinet at 44 may be used to support member 39. The top of this member forms a shelf.

When it is desired to use the screen 31 the shelf may be raised and the screen may be slid from the slideway 38 into 33. The screen 31 preferably consists of a sheet of plate glass. It is chiefly used for holding vignetting material, such as masks, cards, cotton, or other light modifying materials.

In Fig. 3 a vignetting sheet D is shown, this card is of translucent material as tissue paper, and is provided with two darkened areas A and B, and one cutout area C. If a sharp image of the vignette is required, this sheet may be placed on the screen 31 just beneath the printing panel. Since the printing light comes from a very small area, there is so little diffusion that a sharp image will result even though the vignetting material is spaced some distance from the printing panel. Obviously parts of a negative may be given additional exposure through a cutout as C, or parts may be held back as by darkened areas as A or B. Opaque screens may be used. Tissue paper and cotton are most widely used for vignetting.

The second screen 32 is preferably a ground glass screen, although other material such as a tissue paper or tracing cloth covered glass may be used if desired, it being only necessary to diffuse the light as it passes through the screen. This screen is preferably supported in a frame 45 affixed to a pair of lugs 46, these lugs being mounted upon a shaft 47 which is carried by the arms 48 of bell crank levers 49, the other arms 50 of which are supported vertically by the studs 51 passing through the parallel levers 52, which in turn

are carried by studs 53 suitably attached to the printing machine frame.

A handle 54 may be provided on the end of an arm 55 extending out through an arcuated slot 56 in the printer side wall 4, this arm being an extension of shaft 47. Screen 32 may, therefore, be moved by shaft 47 through handle 54, and when the parts are in the position shown in Fig. 1 in dashed lines may be moved so as to lie outside the path of light rays passing to the platen.

It is useful to adjust screen 32 angularly with respect to screen 31 and the printing panel 2 so that the light passing to one side may be more diffused than that passing to the other side. In order to hold the screen at any set angle there are two springs 58 encircling the shaft 47, the inner ends 59 of these springs are attached to a sleeve 60 which may be set to vary the tension on the springs by means of turning and adjusting by the set screw 61. The outer ends of the springs 62 are fastened in the lugs 46. The downward movement of the screen 32 with respect to the bell crank lever is limited by pins 63 which extend into the path of the screen, as best shown in Fig. 3.

The screen 32 is used at different distances from the printing panel, and in order to retain the screen in any desired set position coil springs 64 attached at 65 to one side of parallel links and at 66 to the other side are provided so that as the screen is lowered the tension on the spring will be increased, thus overcoming the force of gravity.

The operation of my vignetting mechanism may be as follows: If straight prints are required the screen 31 may be slid into the shelf 39 out of the bounds of the light beam passing to the printing panel. The screen 32 may be folded against door 6, as shown in Fig. 1. With the parts so arranged a relatively sharp image be produced, as shown diagrammatically in Fig. 4, where the print P has received the image I of a cross.

If a slightly softened or a slightly less sharp image is desired, the screen 32 by means of handle 54 may be swung about shaft 47 and may be moved by parallel links 52 to its lowermost position. On the other hand if the maximum diffusion is required, the screen is raised to its uppermost position. In this position the light rays are bent from their normal straight paths so that softening of the image will result. This is shown diagrammatically in Fig. 5 where the image I has been made on the print P with the edges of the images I diffused.

The degree of diffusion can be instantly altered by raising or lowering the screen 32, the higher the screen the greater the diffusion. If desired a series of screens 32 may be provided with different characteristics; thus the surface may be roughened by

grinding or sandblasting to different degrees. I find, however, in practice that with a single screen arranged to move a suitable distance with respect to the printing panel that any useful degree of diffusion may be obtained with a single sheet of ordinary ground glass where point light source is used for printing.

If portions of the negative are to be held back in printing and at the same time softened images are desired, paper, cards, or other vignetting materials may be placed directly on screen 32, such a card being shown at D in Fig. 3. Where the vignette is to be placed on screen 32, it is necessary to make a light modifying portion of the material of somewhat smaller size than the area which it is desired to correct in the negative; since the light rays coming from the lamp form a cone-shaped beam.

If, however, it is desired to produce a sharp image and still to modify the light intensity used for printing certain areas of the negative, vignetting material may be placed on the screen 31, as shown in Fig. 1, where the vignetting paper sheet V is shown as provided with a partially opaque portion O to reduce the light intensity of the central portion of the negative. With the screen 32 in the position shown in Fig. 1 a considerable softening of the edges of the vignetting are obtained as indicated by the dashed lines and the dotted lines at L and L'. This is usually required, but if it is necessary to provide a sharp edge at the vignetting screen 32 may be swung out of the light path into the position shown in dashed lines. It will thus be seen that the wide variety of different prints and vignettes may be obtained without any alteration in the negative or the printing paper. Moreover, the effect of the work can be readily obtained before printing by looking down upon the printing panel with the vignetting material in place and with the pilot lamp 8 lighted; and the vignetting may be viewed during printing directly through the red pyroxylin platen sections 25' and 26'.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is,—

1. In a vignetting mechanism, the combination with a support having a printing panel therein, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel, and a pair of parallel links for supporting the screen, pivotal connections between the screen and the links and between the links and a support whereby the screen may be swung on the links.

2. In a vignetting mechanism, the combination with a printing panel, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel,

a shaft supporting an edge of the screen, a mount for the shaft in which the shaft is adapted to turn to alter the angle of the screen relative to the printing panel, and means for moving the mount to and from the panel.

3. In a vignetting mechanism, the combination with a support having a printing panel therein, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel, a shaft supporting an edge of the screen, a mount for the shaft in which the shaft is adapted to turn carriers for said mount including a pair of parallel links pivotally attached to the mount and to the support.

4. In a vignetting mechanism, the combination with a printing panel mounted in a housing, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel, a shaft supporting an edge of the screen, a mount for the shaft in which the shaft is adapted to turn carriers for said mount including a bell crank lever, a support for the bell crank lever including a pair of links pivotally attached to the support for the bell crank lever and to the housing.

5. In a vignetting mechanism, the combination with a printing panel, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel, a shaft supporting an edge of the screen, a mount for the shaft in which the shaft is adapted to turn and a counterbalancing spring engaging the shaft and screen adapted to support the screen in different positions relative to the panel.

6. In a vignetting mechanism, the combination with a printing panel, of a light source spaced therefrom, a light modifying screen between the lamp and printing panel, a shaft supporting an edge of the screen, a mount for the shaft in which the shaft is adapted to turn and a counterbalancing spring having an end anchored to the shaft and an end anchored to the screen adapted to hold the screen in different positions when the shaft is moved in its support.

7. In a vignetting device, the combination with a printing panel and a source of light, a light modifying screen, a mount for supporting the screen including a spaced bell crank lever, a pair of parallel links for carrying the bell crank lever, and a spring cooperating with the links and adapted to retain the screen in a set position.

8. In a vignetting device, the combination with a printing panel, and a source of light, a light modifying screen, a mount for supporting the screen including a spaced bell crank lever, a pair of parallel links for carrying the bell crank lever, and a spring, one end of the spring being attached to one parallel

link and the other end of the spring being attached near the end of the other parallel link whereby the spring tension is altered as the links are moved.

5 9. In a vignetting device, the combination with a printing panel, of a light spaced from the panel, and a plurality of screens mounted therebetween, a slideway in which one screen may move, a movable carrier for the other
10 screen, means for moving the screen on its carrier from a position in which it may intercept light rays from the lamp to the panel, and a holder forming an extension of the slideway into which the first mentioned screen
15 may be slid, whereby uninterrupted light beams may pass from the lamp to the printing panel.

20 10. In a vignetting device, the combination with a printing panel, of a light spaced from the panel, a fixed slideway beneath the panel, a hinged member carrying a slideway, a screen
25 slidable to and from the slideways, and means for supporting the hinged member with its slideway in or out of alignment with the fixed slideway.

30 11. In a vignetting device, the combination with a printing panel, of a light spaced from the printing panel, of a mask for restricting the light to a divergent beam of rays, and for
35 obscuring other light rays from the lamp, said light rays passing from a restricted light source to the panel in a normal straight line, a light diffusing screen adapted to intercept the light beam whereby the normal straight
40 path of the light rays may be altered, and means for adjusting the screen angularly of the panel, whereby the path of some of the light rays will be altered more than that of others.

45 12. In a vignetting device, the combination with a printing panel, of a light spaced from the printing panel, of a mask for restricting the light to a divergent beam of rays, and for obscuring other light rays from the lamp,
50 said light rays passing from a restricted light source to the panel in a normal straight line, a light diffusing screen adapted to intercept the light beam whereby the normal straight path of the light rays may be altered, and
55 means for moving the screen to and from the panel and angularly thereof whereby the alteration in the path of the light rays from the normal path may be increased or diminished.

60 13. In a vignetting device, the combination with a printing panel, of a printing lamp spaced therefrom, said printing lamp being of the point light source type, means for
65 vignetting including at least two screens, a light diffusing medium carried by one screen, the other screen being adapted to support vignetting material in a relatively fixed position relative to the printing panel, and
70 a movable mount for carrying the first men-

tioned screen upon which it may be moved to alter the light modifying characteristics of the vignette.

Signed at Rochester, New York this 6th day of December, 1926.

ROY S. HOPKINS.

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