Aug. 23, 1932. B. J. HALL 1,873,392

VAPOR LAMP APPARATUS

Filed Sept. 16, 1929

Fig. 1.

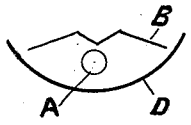


Fig. 2.

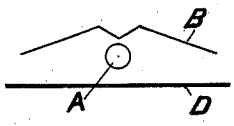


Fig. 4.

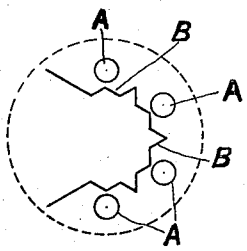


Fig. 3.

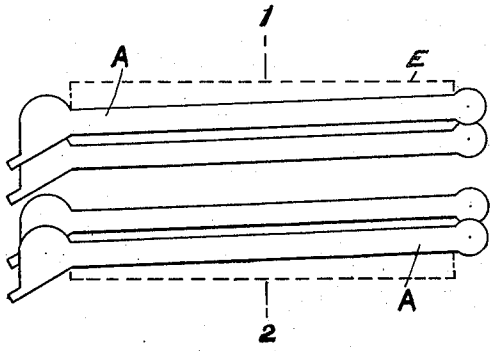


Fig. 6.

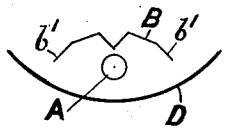


Fig. 5.

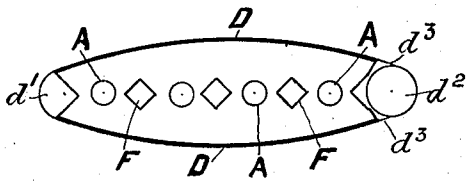
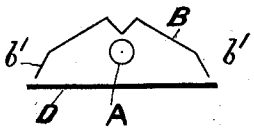


Fig. 7.



Inventor:
B. J. Hall
by Monroe E. Miller
Atty.

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UNITED STATES PATENT OFFICE

BENJAMIN JAMES HALL, OF LONDON, ENGLAND

VAPOR LAMP APPARATUS

Application filed September 16, 1929, Serial No. 392,953, and in Great Britain October 18, 1928.

This invention has reference to the construction and arrangement of apparatus employing mercury vapor lamps, and in particular refers to lamps used in connection with photographic printing, the object being to construct an apparatus whereby the lamps are so disposed that the rays of light are reflected, condensed or directed in such manner that the path to the objective is abbreviated and that otherwise waste rays shall impinge upon the objective and so materially increase the illuminating efficiency of the lamp as applied to the specific purpose.

Hitherto continuous copier apparatus employing mercury vapor lamps has been constructed by disposing the lamp or lamps inside a transparent revolving cylinder or besides a transparent flat or curved plate, in combination with reflectors, but in this construtcion it has been found that many of the rays of light pass off at angles so obtuse or reach the object by paths so lengthened that their illuminating power is of little or no value, and in addition a portion of the light is arrested by the surface of the original or other lamps arranged within the cylinder.

Now according to this ivnention in order to obtain maximum lighting efficiency in a printing frame, particularly a frame of which a transparent revolving cylinder forms a part, I provide each lamp with a **W** shape reflector so arranged that the rays of light shall be made to impinge on the adjacent surface of the cylinder only.

When illuminating the interior of a cylinder with one, two or more lamps, the lamps and reflectors can be fitted upon a central framework easily removable. such construction facilitates replacement and also admits of easy removal and package of the lamp and reflector unit in a separate case for transit and replacement without resort to special technical skill.

The lamps can be arranged spirally or tilted upon the central core in order to obtain the tilt which is found necessary in mercury vapor lamps.

In a modified form of printing frame I dispose the lamp or lamps between two transparent plates, and place between or at the side of each lamp one or more diamond shape reflectors arranged so as to cause all the rays of light to impinge directly on one or other of the glass surfaces, thus both plates are illuminated by direct rays of light as nearly as possible at right angles to their surfaces. These reflectors and lamps may be carried upon an easily removable central core or framework in the manner previously described.

In constructing a printing frame I use two flat or curved glass plates, preferably set in approximately horizontal position, but capable of being tilted to an angle. These plates are connected at one side by a jointing strip of wood or other material, and at their opposite side by a jointing strip, or revolvable roller and jointing strip combined.

The original and paper to be copied are carried over the surface of the one plate, around the revolvable roller, and over the surface of the other plate by means of a continuous band, or in the case of continuous rolls of copying paper, the paper itself may be used to carry the original to be copied.

Instead of the revolvable roller a strip of polished wood or metal plate may be used, or the upper and lower glass plates may be made in one piece and bent to a curve to take the place of the polished wood or revolvable roller. In this case one support is needed for the other side of the plates.

In order that the invention may be clearly understood I have appended the accompanying drawing.

Fig. 1 shows diagrammatically a portion of a glass cylinder with my **W** shape reflector and a mercury vapor tube arranged therein.

Fig. 2 shows diagrammatically my **W** shape reflector and mercury vapor tube arranged over a flat glass plate.

Fig. 3 shows diagrammatically a number of mercury vapor tubes carried on a central core or framework.

Fig. 4 is a diagrammatic cross sectional view of Fig. 3 taken on the line 1—2 with the **W** shape reflectors arranged therein.

Fig. 5 illustrates diagrammatically a cross sectional view of a copier constructed according to this invention, showing curved

glass plates with diamond shape reflectors and mercury vapor lamps arranged therein.

Figs. 6 and 7 show diagrammatically a slightly modified form of the W shape reflector.

A represents the mercury tube, B the reflector, and D the illuminated surface.

Referring to Fig. 1 it will be seen the W shape reflector B is arranged about the mercury tube A so that the rays of light from this particular lamp are made to impinge only on the adjacent surface of the glass cylinder D, thereby concentrating the whole of such rays upon the objective, and consequently materially increasing the illuminating efficiency of the lamp for the specified purpose.

At Fig. 2 I have shown how the construction of the reflector B concentrates the whole of the rays of light from the lamp A on the adjacent surface of a flat glass plate D.

At Figs. 3 and 4 I have shown diagrammatically how a plurality of mercury vapor tubes A and W shape reflectors B, when illuminating the interior of a glass cylinder, may be fitted upon a central framework represented at E, so as to be easily removable. The mounting of the mercury tubes and reflectors on a central framework so as to constitute one unit, facilitates removal and replacement, thereby enabling the lamps and reflectors to be separately packed for transit or other purposes, and easily replaced by an unskilled person.

In some cases I may find it advantageous to add a wing b' on either side of the W shape reflector as shown by Figs. 6 and 7.

In the modification illustrated at Fig. 5 I have shown diagrammatically a printing frame comprising two curved transparent glass plates D, the mercury vapor tubes A being disposed between said plates A, and diamond shape reflectors F arranged at the sides of each lamp. Preferably the plates D are set in approximately horizontal position but capable of being tilted to an angle, and are connected at one side by a jointing strip d' of wood or other material, and at the opposite side by a revolvable roller d^2. Or they may be connected at both sides by a jointing strip, or at one side by a jointing strip and revolvable roller combined.

The original to be copied and the paper are carried over the surface of the one plate, around the revolvable roller d^2, and over the surface of the other plate by means of a continuous band d^3. Or in the case of continuous rolls of copying paper, the paper itself may be used to carry the original to be copied.

Instead of the revolvable roller d^2 I may use a strip of polished wood or a metal plate. Or the upper and lower plates D may be made in one piece and bent to a curve to take the place of the revolvable roller d^2 or equivalent. In this case one jointing strip d' is needed for the other side of the plates.

In order to obtain an improved reflecting surface I may construct my reflectors of brass or other suitable metal and have the reflecting portions plated with chromium and polished.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The combination in a vapor lamp apparatus; of a supporting frame, reflectors carried by said frame and providing a plurality of intersecting plane surfaces defining outwardly disposed parallel apices, and elongated vapor lamps arranged parallel to and opposite said outwardly disposed apices.

2. The combination in a vapor lamp apparatus; of a supporting frame, reflectors carried by said frame and providing a plurality of intersecting plane surfaces defining outwardly disposed parallel apices, and elongated vapor lamps arranged parallel to and opposite alternate ones of said outwardly disposed apices.

3. The combination in a vapor lamp apparatus; of a supporting frame, reflectors carried by said frame and providing a plurality of intersecting plane surfaces defining outwardly disposed apices, lamps arranged between said reflectors and opposite the apices.

4. The combination in a vapor lamp apparatus; of a supporting frame, a plurality of parallel and substantially horizontally disposed reflectors carried by said frame, each of said reflectors providing a plurality of intersecting plane surfaces defining outwardly disposed apices and each of said reflectors having a pair of oppositely disposed apices lying in a horizontal plane, and elongated vapor lamps arranged parallel to and between said oppositely disposed apices.

BENJAMIN JAMES HALL.