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PRINTING MACHINE LAMP HOUSE

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5 Claims. (Cl. 88—24)

This invention relates to photographic print-
ing machines and particularly to the construc-
tion of the optical arrangement by which a light
beam is passed to a printing station. One ob-
5 ject of my invention is to provide a printing ma-
chine with a lamp of high intensity and with
means for promptly carrying off the heat gen-
erated by the lamp. Another object of my in-
vention is to provide a lamp-house with a suit-
10 able chimney for conducting off the heat and for
preventing light from passing from the lamp to
photographic paper used with the printing ma-
chine. Another object of my invention is to pro-
vide a lamp-house in which the lamp can be
15 easily replaced and a lamp-house in which the
various optical elements can be readily cleaned
and adjusted and other objects will appear from
the following specification, the novel features
being particularly pointed out in the claims at
20 the end thereof.

In photographic printing machines in which
a series of enlarged prints can be made rapidly
from a series of small negatives it is necessary to
have an intense and yet diffused light source, in
25 order to obtain satisfactory short exposures. In
my copending application Serial No. 751,165,
filed November 2, 1934 for Enlarged printer, and
which has become Patent No. 2,033,712, dated
March 10, 1936, a preferred form of printing ma-
30 chine is shown in which the lamp-house, which
is the subject of the present application, is used.
This application is a division of the copending
application above referred to.

Coming now to the drawing, wherein like ref-
erence characters denote like parts throughout:
Fig. 1 is an enlarged fragmentary sectional
view through a portion of a printing machine il-
lustrating my improved form of lamp-house.

Fig. 2 is a fragmentary section showing the top
40 of a printing machine and illustrating the loca-
tion of my lamp-house with regard to the print-
ing machine top.

Fig. 3 is a side elevation of portions of a print-
ing machine shown in my copending application
45 and illustrating the location of the lamp-house,
and

Fig. 4 is a view of a mask which may be used to
control the light beam from the lamp-house.

In accordance with my invention, the printing
50 machine may be provided with a flat top 1, from
which a bracket 2 extends upwardly to support
various parts of the projection printer described
in full in my copending application Serial No.
751,165. Between the arms of this bracket there
55 is an opening 3 in the table top 1 through which
a lamp chimney 4 projects upwardly a material
distance, as is shown in Fig. 3. In front of the
bracket 2 an opening 5 is provided in the table
top 1 for supporting a masking plate 6 which con-
60 trols the size of the light beam and which is here-

inafter referred to as the printing aperture.
This aperture 7 is of a size approximately the
size of the exposure areas on the negative to be
printed and it is designed to mask off the edges
of the print so that a clear border may be ob-
tained on the print.

The printing mask 6, as shown in Fig. 4, is
preferably provided with an aperture 8 which
can be used for locating the mask relative to the
printer top 1 by engaging a pin 9 which is car-
ried by an annular member 10 recessed to re-
ceive the masking plate 6 flush with the printer
top 1, as best shown in Fig. 1. The annular
member 10 carries a downwardly extending flange
11, which supports a pair of condenser lenses 12.
This ring is attached to a boss 13 formed in the
upper wall 14 of the lamp-house designated
broadly as 15. At the forward end of the lamp-
house there is a slotted member 16 adapted to
receive a screw 17, on which a wing-nut 18 is
20 mounted, this nut being adapted to hold the
lamp-house 15 in the desired position when a
fork 19 on the rear wall 20 of the lamp-house
has been properly engaged with the screw 21,
which also carries a spacing-nut 22 and a pair
25 of nuts 23 for holding the lamp-house in place.

On the rear wall of a lamp-house there is an
arm 24 fastened to the bottom wall 25 and tend-
ing to spring in the direction shown by the arrow.
A screw 26 opposes this springing movement and
30 may be used for adjusting the reflector 27 to and
from the lamp 28 and its filament 29. The lamp
may be carried by a socket 30 supported on a
bottom wall 25 of the lamp-house which is pref-
erably provided with an opening or slot 25' into
35 which air can freely enter.

Directly above the lamp 28 and in the wall 14
of the lamp-house is an opening 127 to receive
the lower end of the lamp chimney 4. This
chimney preferably is provided with a bead 4'
40 adapted to rest on the edge of the opening 127.
Thus, while the lamp is in operation, air may cir-
culate freely through the opening 25' about the
lamp 28 and the warm air will be carried off
through the chimney 4 at a point spaced a ma-
45 terial distance from the printing aperture 7.
This has many advantages, among which are
that heat is eliminated from the printing ap-
erture as far as possible and negatives position-
ed for printing will not become so warm that they
50 will blister or buckle. In front of the lamp fila-
ment 29 there are a pair of condenser lenses 32
carried by a suitable support 33. A space is also
provided for one or more sheets of ground or opal
glass at 34 and 34', since it is preferable to dif-
55 fuse the light rays so that scratches or other im-
perfections in the negatives will not be so ap-
parent in the enlargements made therefrom.

After the light passes through the condenser
lens 32 and through the diffusing medium, it is 60

reflected at right angles upwardly through the condensor lenses 12 by means of a mirror 35. The bottom of this mirror is positioned by pins 36 extending in from the side walls 37 of the lamp-house and the top of the mirror 35 can be adjusted by means of a screw 38. By turning this screw, the relation of the mirror to the optical axis of the lamp and condensers is altered.

The mirror 35 is carried by a spring 39 having four arms 40 engaging the four edges of the mirror. Thus, this spring permits the mirror to move the limited distance necessary to properly adjust the light beam.

With a lamp-house constructed as above described, if a lamp 28 should need to be replaced, it is only necessary to remove the lamp chimney 8, unscrew the lamp and place a fresh one in place. When a lamp has been so positioned, it may be necessary to re-adjust the reflector 27 and possibly the mirror 35, although these adjustments when once made will ordinarily properly take care of different lamps intended for the same machine.

If, after use, the various parts of the optical system require cleaning, it is a simple matter to release the wing-nut 18 and slide the fork 19 away from its supporting screw 21, so that the lamp-house can be removed as a unit to facilitate cleaning the condensing lenses 32 and 12, the mirror 35 and the opal or ground glass plates 34 and 34'.

The size of the light beam can be controlled by any of various sizes of negatives to be printed on this particular machine by providing a series of masking plates 6 with the proper sized openings. The masks should all be of the same thickness, so as to lie flush with the table top 1 and they should be provided with a locating aperture 8, so that the opening in the mask will be properly positioned for use in connection with the movable negative holder shown in my copending application Serial No. 14,330 filed April 2, 1935.

I have described a preferred embodiment of my invention, but various changes can be made without departing from it and I consider as within the scope of my invention all such changes as may come within the scope of my appended claims.

Having thus described my invention, what I declare is new and desire to secure by Letters Patent of the United States is:

1. In a photographic printing machine, the combination with a support having a printing aperture and heat aperture therein, of a lamp house removably mounted beneath the support and comprising an elongated enclosure with a pair of spaced apertures registering with the printing and heat apertures in the support, a lamp mounted beneath the heat aperture, an optical system including a mirror in said housing adapted to reflect light rays through said printing aperture, and releasable means for holding the lamp house in position on the support.

2. In a photographic printing machine, the combination with a support having a printing aperture and heat aperture therein, of a unitary and removable lamp house mounted beneath the support and comprising an elongated enclosure with a pair of spaced apertures registering with the printing and heat apertures in the support and having slotted end members, a lamp mounted beneath the heat aperture, and an optical system including a mirror in said housing adapted to

reflect light rays through said printing aperture and means for removably attaching the lamp house with said apertures in registration and including screws carried by the support, and nuts for holding the slotted members on the screws.

3. In a photographic printing machine, the combination with a support having a printing aperture and heat aperture therein, of a unitary and removable lamp house mounted beneath the support and comprising an elongated enclosure with a pair of spaced apertures registering with the printing and heat apertures in the support and including slotted end members, an annular flange projecting from the heat apertures and from the printing aperture adapted to cooperate to position the lamp house, means for securing the lamp house to the support including a pair of spaced screws depending from the support adapted to be engaged by the slotted end members, and nuts for holding the slotted end members on the screws.

4. In a photographic printing machine, the combination with a support, of a lamp chimney extending upwardly from said support from one side thereof, a printing aperture spaced from the lamp chimney, a unitary and removable lamp-house adapted to be mounted on an opposite side of said support from the lamp chimney and comprising an elongated box-like housing including a top member slotted at both ends, cooperating elements on the support and lamp house and including an annular flange and opening for locating the lamp house relative to the support, a lamp in said lamp house adjacent the chimney opening therein, means for admitting air in the lamp house adjacent the lamp whereby heat from the lamp may pass up through the chimney, means for reflecting light rays toward the printing aperture spaced from the printing lamp, two lamp house carrying members extending downwardly from the support, one member including spaced projections between which the slotted lamp house may pass, the other including a wing nut for holding the other slotted end of the lamp house whereby the lamp house may be moved by removing a single wing nut.

5. In a photographic printing machine, the combination with an apertured support, one aperture constituting a heat opening and one aperture constituting a printing aperture, the apertures being spaced apart, of a lamp house adapted to be carried by the support, said lamp house including an elongated unitary closure having a top wall slotted at both ends, a lamp in one end thereof mounted beneath the heat opening, an opening adjacent the lamp for ventilating the lamp house, a partition in the lamp house separating the lamp end of the lamp house from the remainder thereof, means for directing light rays from the lamp to the opposite end of the lamp house, and means for reflecting said light rays up through the printing aperture in the support, whereby a negative positioned over said printing aperture may be kept relatively cool and the major portion of the heat may be conducted from the lamp through the heat opening spaced therefrom, and means depending from the support adapted to be engaged by the slotted ends of the lamp house, at least one of such means including a manually operable member for holding the lamp house on the depending means.

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