Aug. 8, 1939. E. JOLLASSE 2,168,481

APPARATUS FOR MAKING PRINTS

Filed Feb. 24, 1938

Fig. 1

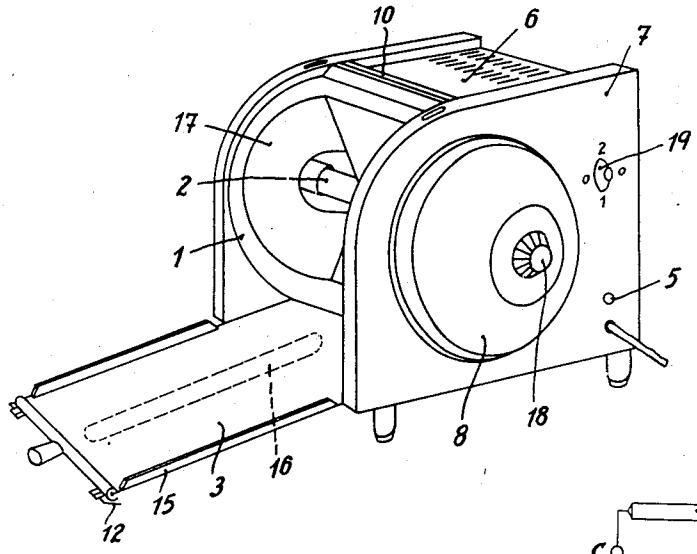


Fig. 2

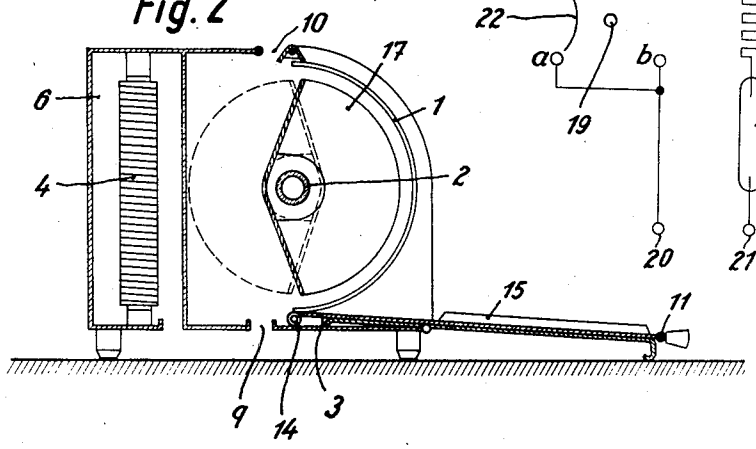


Fig. 5

Fig. 3

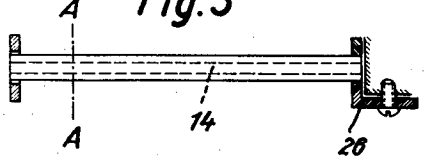
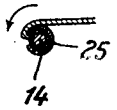


Fig. 4 (A÷A)



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APPARATUS FOR MAKING PRINTS

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15 Claims. (Cl. 95—77.5)

This invention relates to apparatus for making prints, such as, blue prints, tracings, heliographs or the like. The principal novelty of the present apparatus over previously known apparatus of this kind resides in the provision of a supporting surface for the light-sensitive paper and for the original subject to be reproduced in the form of a half cylinder which is of material permeable to light rays and the interior of which contains, preferably axially directed, an elongated light source, and wherein also the accessory instruments or apparatus required for supplying the source of light are located in a lateral part of the housing which is closed off from the semi-cylinder. It is particularly important that the axis of the half cylinder be horizontal and its two longitudinal edges be arranged approximately vertically one above the other. The advantage of this arrangement is that not only is the sensitive paper easily applied on the semi-cylinder, but also that the hot air is easily carried from the interior thereof in that, for example, ventilating openings are provided above and below parallel with the longitudinal edge of the semi-cylinder. In any other arrangement of the half cylinder, for example, in a vertical position of the axis, good ventilation can be obtained, but not easy application of the paper.

Many other objects and advantages of the invention will become apparent from the following detailed description and drawing.

In the accompanying drawing,

Fig. 1 is a perspective view;

Fig. 2 is a longitudinal section through the assembled apparatus; while

Figs. 3 and 4 are sectional views of constructive details on section lines III—III and IV—IV; and

Fig. 5 shows the circuit and connections of the ray source for different intensities of light.

In Figs. 1 and 2, numeral 1 designates a half cylinder of material permeable to light rays, for example of glass or other transparent material. Inasmuch as ordinary print paper has a light-sensitive maximum in the long wave ultraviolet or in the violet or blue spectral range, it is sufficient if the cylinder is made of a material permeable for these wave lengths. The elongated ray source 2 is located at the interior of the semi-cylinder, preferably at its axis. The original to be copied together with the sensitive paper is placed outside on the cylinder surface and applied firmly thereagainst by a pressing cloth 3. The ray source 2 is for the most part a high actinic radiator, particularly a high pressure mercury lamp with fixed, activated electrodes, although use can be made of any other desired source of rays. The accessory parts, for example the rheostat 4, ignition or sparking means 5, switch and the like, necessary for operating the discharge tube, are placed in a chamber 6, one limiting wall of which is approximately equal in height to the cross section of the half cylinder along the axis. The chamber 6 and the half cylinder 1 are formed as a unit, this unity being particularly emphasized by the lateral walls 7, closing off both chamber 6 and cylinder 1 at their ends simultaneously.

The size of the apparatus is determined by that of the original to be copied, so that the length of the cylinder is equal to the greatest admissible narrow side of the original, while the magnitude of the longitudinal side of the original determines the diameter of the half cylinder, or vice versa. As the entire cylinder surface must be irradiated it is necessary to make the ray source 2 as long as possible. It is generally sufficient if the illuminating portion of the source, that is, the lighting tube, is about the same length as the semi-cylinder. By means of the lateral extensions provided by the retaining devices and cover sleeves provided at both ends of the tube the ray source will have a length greater than the spacing of the end walls. The end walls are therefore provided with openings serving on the one hand to allow insertion of the tube and from which, on the other hand, the ends of said tube project. The openings are closed by the caps 8 so that nothing can come in contact with the ray source and the leads for the electric current.

In view of the considerable load on the tube and quantity of heat produced thereby, good aeration must be provided for the interior of the half cylinder. In the arrangement according to the invention this is easily possible by the de-aerating slots 9 and 10 provided above and below parallel with the longitudinal edges of the semi-cylinder. In view of the fact that, according to the invention, the two longitudinal edges of the half cylinder are approximately vertically superposed a good chimney action or draft is provided. As one of the ventilating openings is placed at the highest point, the hot air cannot accumulate. Without this provision there is danger of the glass cylinder cracking.

As previously stated, the sensitive paper and the original are applied against the half cylinder by means of the pressing cloth 3 which is attached at its lower end to a transverse rod. The latter is spread out at its free end by means of a rod 11 extending therethrough. Its free end is provided with spaced hooks 12 which engage in

openings, depressions, eyelets, or the like of the housing and the cloth 3 is pressed firmly against the half cylinder. In order that the cloth 3 can be stretched taut each time it becomes slack, the lower end thereof may be wound about the rod to which it is attached by rotating said rod about its axis and the rod can then be clamped fast to the housing.

A plate 15 is attached to the front of the housing by means of a hinge and said plate is of about the same dimensions as the cloth, so that the latter, when not placed on the cylinder, can be spread out over the surface of plate 15. In this condition the sensitized paper and the original are placed on the cloth 3, then raised and applied on the cylinder. Plate 15 can be folded up when the apparatus is not in use.

Since it has been found that too much light passes through a white cloth, whereby the operators are dazzled, the cloth may be blackened on the back or made of opaque material. In order, however, that the change in color of the sensitized paper shall be recognized and the light cut off, a small portion of the cloth is left transparent, for example by not blackening a narrow strip 16 or, if the cloth itself is opaque, by providing openings therein. It is, however, possible, instead of these measures, to place an additional screen of opaque material outside of the cloth, this being provided with the necessary observation openings.

Inasmuch as a high pressure mercury lamp cannot be lighted anew for each individual exposure, a rotary screen 17 is provided which, by means of an outwardly accessible handle 18, can be oscillated about the axis of the ray source or of the half cylinder 1 and serves for screening the copying surface. This dark position is shown on Fig. 2 by dotted lines, while the full lines show the other position in which the screen acts as a reflector which is so constructed that it uniformly distributes the radiation reflected by it on the copying surface. In addition, a reflector is provided approximately perpendicularly at each end of the light source, the function of which is to illuminate the marginal portions of the copying surface. The screen 17 therefore is composed of an angular bent plate which is shown in Fig. 2 in sectional view, and two lateral surfaces which have the form or a sector of a circle. These lateral surfaces are shown in full view.

For simplification the rotary shutter or screen 17 can be connected with a clockwork, not shown, so that the surface to be irradiated is free to be irradiated only for a time which is set in advance.

When powerful light sources are used for making prints, with a high pressure mercury lamp with a charge of 400–500 watts, the irradiating periods are 20–30 seconds, for example, the papers used for the production of reflex copies being considerably more sensitive, so that short irradiating periods are obtained with the same light source. For this reason a switch arrangement is built in the apparatus by means of which the charge of the light source can be reduced. This can be done, for example, by interposing an additional resistance of several 100 ohms in the circuit of the discharge tube, so that the mercury tube burns as a low pressure arc and with a current intensity of less than 1 ampere. According to the invention the additional resistance is to be calculated so that the intensity is reduced to less than one tenth. Instead of the resistance the connection can also take place otherwise, for example by reducing the net potential by means of a transformer. The shifting to the different stages of intensity can also be effected by means of the switch 19 which may serve to connect in and disconnect the ray source.

The source is cut out when the switch indicator is in the two positions marked "0" (Fig. 1), while position "1", with the additional auxiliary resistance connected in, gives the lowest intensity, and position "2" the highest. Fig. 5 shows diagrammatically the operation of switch 19. The line potential is connected at the terminals 20 and 21. In the position "1" the contacts *a* and *c* of switch 19 are connected together by the contact yoke or bridge 22; in position "2" the contacts *b* and *d*, while in the "out" position the contacts *a* and *b* or *c* and *d* are connected with each other, so that in both these cases there is no potential at the discharge tube. The main resistance is designated by 23 in Fig. 5, the auxiliary resistance of several 100 ohms by 24. Figs. 3 and 4 show the tensioning device for the cloth 3 in greater detail. Cloth 3 has a seam at the end which covers the rod 14, which cloth is firmly attached to the rod by means of a resilient sleeve 25 slid thereover. The length of the cloth can be adjusted as desired by turning the rod 14 which is retained by screwing on a clamping member 26 which presses the rod firmly against the housing of the apparatus.

I claim:

1. Apparatus for making prints on light-sensitive sheets comprising a housing having a semi-cylindrical light transmissive surface disposed with a substantially horizontal axis and having one longitudinal edge superposed above the other, an elongated light source disposed substantially along the axis of the semi-cylindrical surface, said housing being provided with ventilating openings extending substantially along the longitudinal edges of the semi-cylindrical surface and substantially coextensive therewith.

2. Apparatus according to claim 1 in which the superposed edge of the semi-cylindrical surface is substantially vertically above the other edge thereof.

3. Apparatus according to claim 1 in which the source of light is a high pressure mercury lamp having fixed electrodes.

4. Apparatus according to claim 1 in which the housing includes end walls which close ends of the semi-cylindrical portion and the other portion of the housing.

5. Apparatus according to claim 1 in which the housing includes end walls which close ends of the semi-cylindrical portion and the other portion of the housing, said end walls having openings for insertion and removal of the light source, and removable caps closing said end openings.

6. Apparatus according to claim 1 and a presser cloth for applying a light-sensitive sheet and original subject against the light transmissive semi-cylindrical surface.

7. Apparatus according to claim 1 and a presser cloth for applying a light-sensitive sheet and original subject against the light transmissive semi-cylindrical surface, one end of said cloth being attached to the housing, the free end of said cloth having a transverse rod therein, hooks on said rod, and eyelets in said housing in which said

hooks are adapted to engage to hold said cloth pressed on the semi-cylindrical surface.

8. Apparatus according to claim 1 and a presser cloth for applying a light-sensitive sheet and original subject against the light transmissive semi-cylindrical surface, a bar extending axially of the housing adjacent the lower edge of the semi-cylindrical portion, said bar being rotatably mounted, one end of said cloth being attached to said rod, a clip for clamping the cloth to said rod, whereby when said rod is rotated the cloth is wound thereon and tensioned, and means for securing said rod against unwinding.

9. Apparatus according to claim 1 and a presser cloth for applying a light-sensitive sheet and original subject against the light transmissive semi-cylindrical surface, and a plate hinged to said housing for supporting said cloth and work sheets in flat position, said plate being foldable against the housing when the apparatus is not in use.

10. Apparatus according to claim 1 and a presser cloth for applying a light-sensitive sheet and original subject against the light transmissive semi-cylindrical surface, said cloth being opaque over most of its area and having a small transparent area through which the light-sensitive sheet may be observed.

11. Apparatus according to claim 1, a screen rotatably mounted in said housing on the axis of the half cylinder of material permeable to light rays the said screen screening the light transmissive copying portion when the work sheets are being applied and removed, and a handle for moving said screen.

12. Apparatus according to claim 1, a screen rotatably mounted in said housing on the axis of the half cylinder of material permeable to light rays the said screen screening the light transmissive copying portion when the work sheets are being applied and removed, and a handle for moving said screen, said screen having a reflective inner surface adapted to evenly reflect the light to the copying surface.

13. Apparatus according to claim 1, a screen rotatably mounted in said housing on the axis of the half cylinder of material permeable to light rays the said screen screening the light transmissive copying portion when the work sheets are being applied and removed, a handle for moving said screen, said screen having a reflective inner surface adapted to evenly reflect the light to the copying surface, and reflectors at the ends of the elongated light source for reflecting light to the copying surface.

14. Apparatus for making prints on light sensitive sheets comprising a housing having a light permeable wall, a continuously operating mercury vapour lamp providing high intensity light in said housing, a screen, means for moving said screen between said lamp and light permeable wall and from between said lamp and wall at predetermined fixed time intervals, an electric circuit in which said lamp is connected, a multiple switch in said circuit, and a resistance having connections with said switch so that said resistance can be connected in or out of the lamp circuit to alter the light intensity to allow operation of the machine with light sensitive sheets of different sensitivity with equal time periods of exposure to the light.

15. Apparatus for making prints on light sensitive sheets comprising a housing having a light permeable wall, a mercury vapour lamp in said housing which operates with a supply of current above a certain potential as a high pressure lamp producing a high actinic ray radiation and below a certain potential as a low pressure lamp producing a low actinic ray radiation, circuits for supplying current from a source to said lamp, a multiple switch connected in said circuits for controlling the supply of current through said circuits, a resistance in one of the circuits connected with said switch, a screen, means for moving said screen to and from between said lamp and light permeable wall, whereby said lamp can be operated as a high pressure lamp with high actinic ray generation when using photo-sensitive sheets of low sensitivity when the current is supplied through the circuit not having the resistance therein and as a low pressure lamp of low actinic ray generation when the current is supplied through the circuit having the resistance therein for operation with photo-sensitive sheets of high sensitivity.

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