Jan. 7, 1941. E. STEINLAUF 2,227,850

APPARATUS FOR THE MAKING OF PHOTOGRAPHIC CONTACT COPIES OF DOCUMENTS

Filed Sept. 1, 1939

FIG. 1

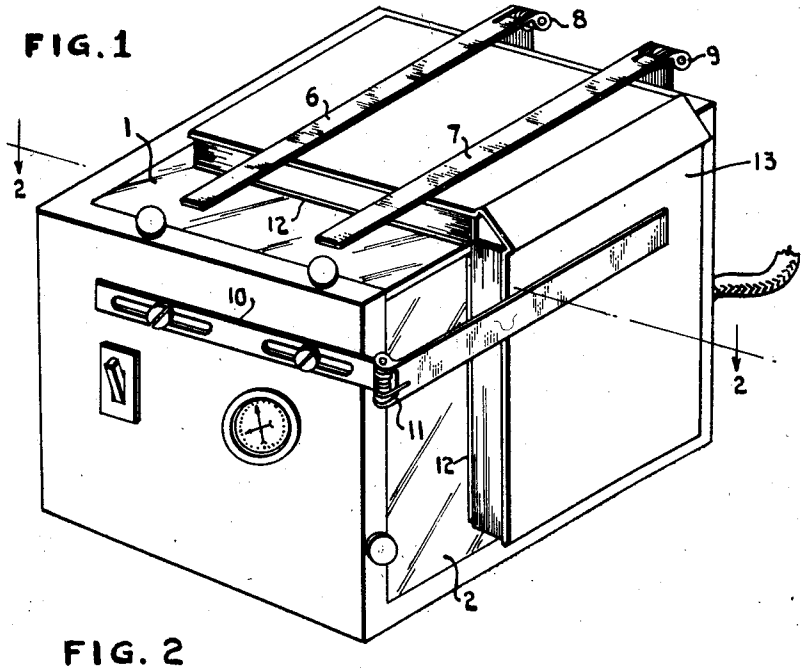


FIG. 2

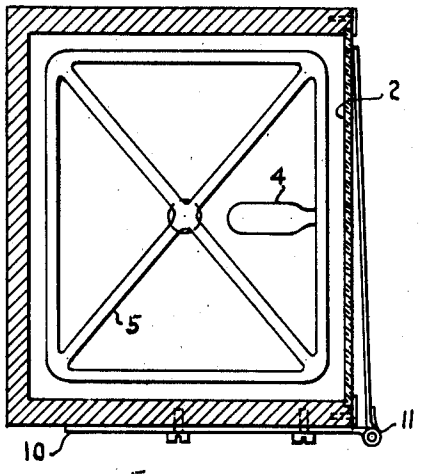
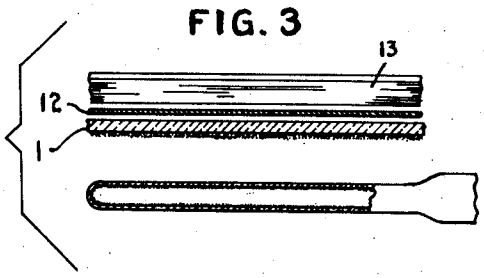


FIG. 3



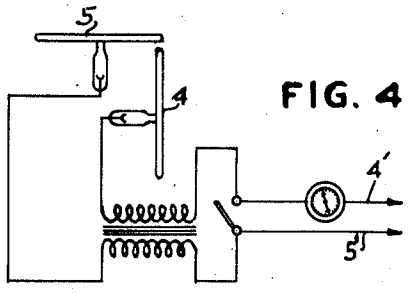


FIG. 4

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APPARATUS FOR THE MAKING OF PHOTOGRAPHIC CONTACT COPIES OF DOCUMENTS

Edüard Steinlauf, New York, N. Y., assignor to Luma Incorporated, Pittsburgh, Pa., a corporation of Pennsylvania

Application September 1, 1939, Serial No. 292,977

7 Claims. (Cl. 95—73)

My invention relates to that class of devices designed to offer the possibility to copy printed or written originals.

In the devices now employed for this purpose, it is difficult and in some cases impossible to make contact-copies of bound documents or books, etc., especially is this true if it is necessary to take the pages out of the book so as to reproduce a single leaf. It is also difficult and frequently impossible to expose large pages equally, that is entirely to their edges which must be done in order to obtain sharp lines.

My invention is designed to overcome all these objections.

My invention has for its principal object to provide an apparatus by means of which I can copy such material where it is bound in a book without having to take it apart.

A further object is to so construct the apparatus that a reproduction can be made of two pages of a book with but a single exposure.

A further object is to avoid the necessity of using a photographic lens.

A further object is to avoid the necessity of a dark room.

A further object is to accomplish these objects in a simple, economical manner, and to attain the desired result in a much shorter time than is possible with the apparatus employed at present for the photographic reproductions of printed or similar material.

It will be clear from the hereinafter contained description that the device may be of any size. In its preferred form, it consists of a box having its side wall or walls constructed of some material which allows the light to pass through it, such as glass, Cellophane, Lucite, or other materials of this kind. Upon these walls, through which the light passes, I spread an emulsion, such as zinc sulphite, calcium sulfite, strontium sulfide, radio-active sulphur zinc, or an appropriate amalgamation of these chemicals.

When the walls have been coated they form a light-filter which will store up light for a certain amount of time, which certain amount of light is equal over the whole surface. Within the box and below or adjacent these light-filters, I mount gas-filled, or luminescent electric glass tubes which are suitably connected to a transformer, so that they can be attached to any electric light system. The light emitted by these tubes is stored up by the adjacent light-filters.

Means to automatically control the electric current is provided.

Preferably I employ a clock which will automatically cut off the current at any desired lapse of time, usually ranging from 1 to 60 seconds, thereby enabling the operator to obtain the correct time required for the exposure. I have found it convenient to provide means which will press books, as well as loose leaves, tightly against the light-filters. In this manner I avoid all pleats or knits which will be thus ironed out.

My means of accomplishing the foregoing objects may be more readily understood by reference to the accompanying drawing which is hereunto annexed and forms a part of this specification in which:

Fig. 1 is an isometric view of a device embodying my invention;

Fig. 2 is a sectional view on the line 2—2 in Fig. 1, without the book;

Fig. 3 is a fragmentary detail view; and

Fig. 4 is a wiring diagram.

Similar reference numerals refer to similar parts throughout the entire specification.

As shown in the drawing, my invention comprises a box having top, bottom, end and side walls. The top wall 1, and the side wall 2, as illustrated, are formed of some suitable light transmitting material which has been treated with a suitable photo-luminous substance capable of storing up light when exposed to light and afterwards emitting the same with the same degree of intensity from all parts of its surface. Numerous formulae are known for such coating such as zinc sulphite, calcium sulfite, strontium sulfide, radio-active sulphur zinc, or an appropriate amalgation of these chemicals, any or all of which will operate satisfactorily for my purpose. The walls thus treated form a fluorescent screen or light-filter. Within the box and adjacent the fluorecent screen, I mount a plurality of electric gas filled tubes 4 and 5, which are connected by means of electrical conductors 4' and 5' to a source of electric current (not shown). On the corners of the box and above the top wall 1, I provide means to press and hold the article which is to be reproduced tightly against the sensitive photographic printing paper 4 which is placed upon the top wall 1 with the emulsion side uppermost.

As illustrated, these means comprise two or more arms 6 and 7 which are provided with spring hinges 8 and 9 which operate to hold the arms 6 and 7 tightly against the article to be reproduced. These spring hinges are of standard construction so that a detailed description of them is deemed unnecessary. A similar arm 10 is shown pressing on the side wall 2, as illus-

trated, only one is here shown, but it will be obvious any desired number may be used. This arm also is provided with a spring hinge 11 the extension of which is exerted to press the material to be copied tightly against the surface of the sensitized photographic papers 12.

Although I have shown a specific form of device for this purpose, I do not wish to be understood as limiting myself thereto, as numerous devices for accomplishing the same result will suggest themselves to persons skilled in the art. In the front of the box I have shown an automatic control for cutting off of the electric current. These automatic time actuated controls are so well known as to render a detailed description thereof superfluous.

The operation of my invention is as follows: Under a diffuse light, the sheet of photographic chlorbromide paper 12 is placed on the walls 1 and 2, the emulsion part being turned upward. The spring pressed arms 6, 7 and 10 having been first elevated, and held in that position, an open book 13 is then placed upon the emulsion-side of the photopaper. The arms are then released and the book 13,—together with the photographic paper,—will be pressed tightly and equally on the light-filter. The electric current is then connected by a standard switch when the current will light the tubes.

Thereby the light-filters, situated above, start storing up light. The rays of this light will be emitted and will pass light through the chlorbromide paper 12 and be absorbed by the dark spots of the pages of the book. While the bare and lighter parts of the pages will reflect the light against the chlor-bromide paper 12 with the result that an exact reproduction will be obtained due to the fact that the latent activation of the fluorescent screen is equal throughout its entire surface and the further fact that the article to be reproduced is tightly held against the photographic paper 12. After a few seconds the electric current will automatically be cut off. The photopaper 12 may be put into a developing solution, such as for instance, MQ, whereby a negative will be formed. By treating it with a fixing solution this negative will be made lightproof. After drying the negative, any desired amount of positive copies may be reproduced in the usual way.

Instead of the photo-paper 12, photo-plates, films or other photograph material which is sensitive to light may be used. In this way, for instance, can be made diapositives (lantern slides) on glass-plates for the purpose of mass copying.

Having described my invention, what I regard as new and desire to secure by Letters Patent is:

1. In a device of the character described to reproduce on sensitized paper printed or other material; a box having connected top, end and side walls, two of said connected walls being formed of material which will transmit light rays, said two walls being treated with a phosphorescent emulsion for storing light for a period of time and then emitting it, spring pressed arms to hold the material to be reproduced tightly against said sensitized paper on the transparent walls, a light source in said box, means to connect same to a supply of electric current and an automatic time control in the connecting means.

2. In a device of the character described to reproduce on sensitized paper printed or other material; a box having connected top, end and side walls, two of said connected walls which are at right angles to each other being formed of light transmitting material treated with a phosphorescent emulsion for storing light for a period of time and then emitting it, means to hold the material to be reproduced tightly against said sensitized paper on said right angle walls, a light source in said box, means to connect same to a supply of electric current and an automatic time control in the connecting means.

3. In a device of the character described to reproduce on sensitized paper printed or other material; a box having connected top, end and side walls; the top and one side wall being formed of light transmitting material treated with a phosphorescent emulsion, means to hold the material to be reproduced tightly against said sensitized paper when it is placed on the light transmitting walls, a light source in said box and means to connect same to a source of electric current.

4. In a device of the character described to reproduce on sensitized paper printed or other material; a box having top, end and side walls; the top and one side wall being formed of light transmitting material treated with a phosphorescent emulsion, spring actuated means to hold the article to be reproduced tightly against the sensitized paper when it is placed on the light transmitting walls, a light source in said box, means to connect same to a source of electric current and an automatic time control in the line.

5. In a device of the character described to reproduce on sensitized paper printed or other material; a box having top, end and side walls; the top and one side wall being formed of light transmitting material treated with a phosphorescent emulsion, means to hold the article to be reproduced tightly against the sensitized paper, when it is placed on the light transmitting walls, a plurality of gas filled luminescent electric glass tubes in said box, means to connect same to a source of electric current and an automatic time control in the line.

6. In a device of the character described to reproduce on sensitized paper printed or other material; a box having connected top, end and side walls, two of said connected walls being formed of material which will transmit light rays, said two walls being treated with a phosphorescent emulsion for storing light for a period of time and then emitting it, spring pressed arms to hold the article to be reproduced tightly against said sensitized paper on said treated walls, a plurality of gas filled luminescent electric glass tubes in said box, and means to connect same to a supply of electric current.

7. In a device of the character described to reproduce on sensitized paper printed or other material in book form; a container having connected top, end and side walls, a plurality of gas filled luminescent electric glass tubes therein, two connected walls of said container which are at angles to each other, being transparent and having a coating of fluorescent material, means to connect said tubes to a source of electric current, a sensitized paper on each transparent wall and means to hold two pages of said book to be reproduced which is opened at an angle and one page held against one sheet of said sensitized paper and the other against the other sheet of sensitized paper.

EDÚARD STEINLAUF.