Oct. 29, 1940. G. SZASZ 2,219,667

PHOTOGRAPHIC COPYING

Original Filed Aug. 30, 1934

Fig. 1.

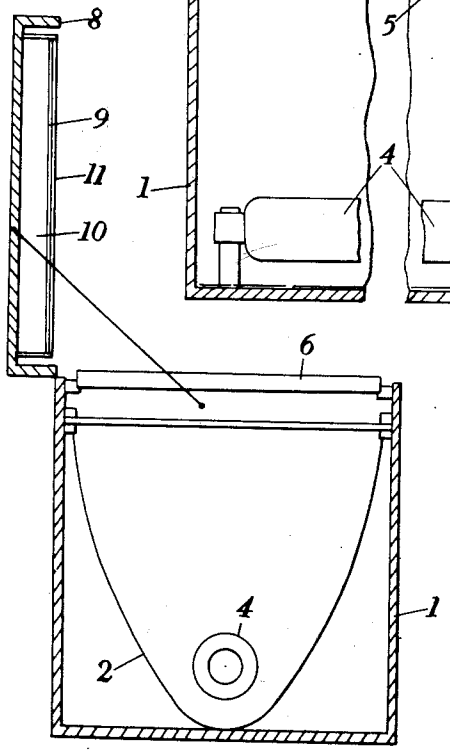


Fig. 2.

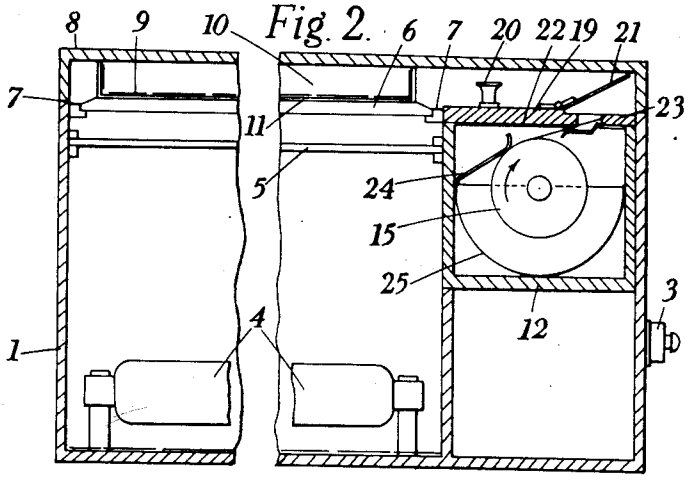


Fig. 3.

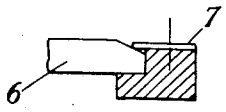


Fig. 5.

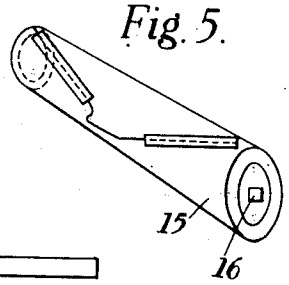
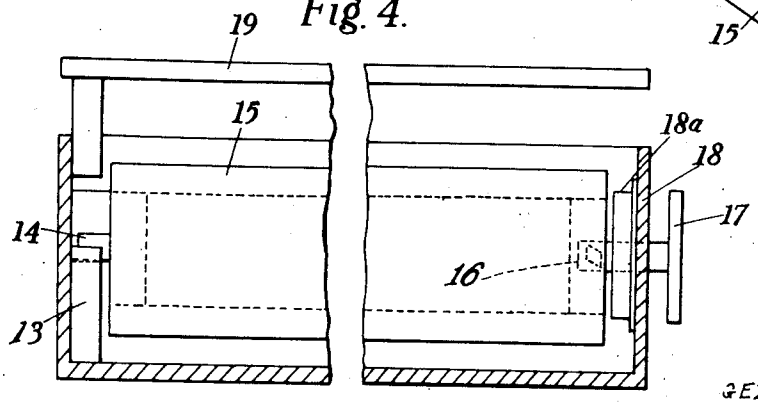


Fig. 4.



INVENTOR
GEZA SZASZ
BY
Pennie, Davis, Marvin & Edmonds.
ATTORNEY

Patented Oct. 29, 1940 2,219,667

UNITED STATES PATENT OFFICE

2,219,667

PHOTOGRAPHIC COPYING

Geza Szasz, New York, N. Y., assignor to Electro-Copyst, Inc., New York, N. Y., a corporation of New York

Application August 30, 1934, Serial No. 742,078. Renewed December 20, 1938. In Germany September 5, 1933

5 Claims. (Cl. 95—5)

This invention relates to photographic copying, for instance, of documents having strongly contrasting lines, and particularly to photographic reflex-copying.

Various attempts have already been made to provide photographic copying, but these have not been successful in practice more particularly on the ground of difficulties encountered in operation. Thus for instance the time taken in making photographic copies has necessarily been inconveniently long and moreover known processes have necessitated the use of a dark room or equivalent precautions to avoid adversely affecting the light-sensitive paper during loading of the apparatus or the actual copying process.

One of the objects of the present invention is to provide a process whereby reflex copying operations may be carried out in daylight or artificial light and without the aid of a dark room.

A further object is to provide a process whereby reflex-copies may be made in a relatively short time and free from any image of the structure of the fibres of the paper or other carrier for the sensitised emulsion, which image in known processes has led to blurring of fine lines and speckling of large areas.

Another object of the present invention is to provide a photographic medium adapted for use in a photographic copying operation carried out under subdued daylight or ordinary artificial light, the light-sensitive material thereof being of such low general light sensitivity as to be capable of being handled in such light without fogging, and being sensitized to light of long wave length to enable printing by long wave length light.

With the above and other objects in view the present invention resides in photographic copying involving the steps and features hereinafter described and claimed in the appended claims.

In carrying out a process according to this invention I employ light having a large long-wave content, for example light obtained from a tungsten filament electric lamp fed with over-voltage, and cause said light to pass through a filter which absorbs light of short wave length, said filtered light then being permitted to pass through a light sensitive paper capable of reproducing strong contrasts; on to a document to be copied and thence back on the light-sensitive surface of said paper, said surface being of low general light sensitivity and consisting chiefly of silver chloride. After exposure, as described, the latent image on the light sensitive paper is developed out and fixed in the usual manner except that no dark room is required.

The light-sensitive emulsion includes a sensitiser for light of long wave-length, that is in the yellow and red portions of the spectrum, such as erythrosin, and in order to decrease the general sensitivity of the emulsion a densitiser may also be added such for example as saffranine which possesses the additional advantage of being optically sensitive.

The apparatus for printing according to this invention may comprise a box-like container housing a reflector of rectangular longitudinal cross-section and parabolic transverse cross-section, a glass plate located over said reflector and forming a working surface, provision for supporting a tubular electric lamp along the focal line of said reflector, a light filter for absorbing light of short wave-length located between said light source and said glass plate and a container for light-sensitive paper from which a length of paper may be drawn when required.

The aforesaid box-like container is preferably fitted with a hinged lid carrying a pressure plate adapted to press the document to be copied and the light sensitive paper on to the above mentioned glass plate.

The aforesaid glass plate is so mounted in the box-like container that the side walls of the latter do not project above the working surface of the former and the lid is so mounted that it can be moved into a position in which it does not project above said surface or it may be mounted so as to be easily removable. In this way provision is made whereby documents of an area greater than that of said container may be copied.

The aforesaid housing for the light sensitive paper located within the main container includes a slot through which the paper may be drawn and two overlapping strips, between which said paper is threaded, cover said aperture. One of said strips serves as a guide for the paper and the other serves as a knife for severing a length when desired. The aforesaid slot may be further covered by means of a movable flap so as to afford a further safe-guard against the entry of light.

The filter employed in carrying out my invention is preferably a yellow one although in some cases a red filter may be employed.

In order that my invention may be well understood I will now describe one suitable form of

apparatus with reference to the accompanying drawing, in which—

Figure 1 is a cross-section of the apparatus with its lid in a raised position.

Figure 2 is a longitudinal cross sectional view of the apparatus with the lid closed.

Figure 3 is an enlarged sectional view of a detail of the apparatus,

Figure 4 is a longitudinal section of the paper container with the lid raised and

Figure 5 is a perspective view of the paper roll.

Referring to the figures the apparatus comprises a portable box-like container 1 divided into two compartments. In one of these compartments a reflector 2 is provided, said reflector being of parabolic transverse cross-section and rectangular longitudinal cross-section and extending the whole length of the compartment.

A tubular light source 4, controlled by a switch 3, is located on the focal line of the reflector 2 and may consist of an electric incandescent lamp preferably having a tungsten filament. Said light source is fed with over-voltage so that the light contains a large amount of rays of long wave-length.

The light reflector 2 is covered by a dispersion plate 5 which is coloured yellow so as to form a filter for any light of short wave-length issuing from the source 4. Said plate 5 is uniformly illuminated by means of the reflector 2 and is also illuminated by the direct rays from the light-source 4 and I find that owing to the efficiency of the illuminating system and the use of an emulsion containing a sensitizer for light of long wave length I can employ less intense light sources than those hitherto necessary with a consequent reduction in the development of heat.

The top of the box 1 is covered by a plate 6 of clear glass spaced from the dispersion plate 5 and the upper surface of said plate 6 projects above the edges of the box. Said plate 6 is secured in an easily removable manner by bars 7 in such a way that its upper face projects above the level of said bars. This can be achieved by bevelling the end edges of the plate 6 in the manner shown in Figure 3 of the drawing.

The box 1 has a hinged lid 8, which can be supported in a vertical position by means of stays so as to form a screen protecting the plate 5 from bright light whilst the sensitised paper is positioned thereon, emulsion uppermost. The aforesaid stays of the lid 8 are releasable, so that said lid can be moved backwards into a horizontal position in a plane which is lower than that of the upper surface of the plate 6 so that parts or sections, for instance of maps that are larger than the working surface of the apparatus can be copied. The application pressure in such cases is applied by any suitable means for example by means of weights although when copying documents which do not extend beyond the area of the plate 6 the lid is adapted to provide the necessary pressure. For this purpose said lid carries a plate 9 of glass or metal, the outer face of which is flat and corresponds with the upper surface of the plate 6. Behind the rigid plate 9 is a cushion 10, for example of porous rubber, with the aid of which the plate 9 may be pressed elastically against the plate 6. The working surface of the plate 9 is covered with a layer 11 of felt or the like to produce a uniform bearing pressure between the plates 6 and 9 even if a foreign body, such as a book clip or the like, lies between them. The layer 11 has the further advantage that it prevents any suction or draught which may otherwise be caused on raising the lid and which might result for example in the pages of a book being turned over.

The other compartment of the box 1 is in the form of a container 12, the long walls, bottom, front wall and rear wall of which are firmly connected together. On the rear wall a bearing block 13 is secured, which serves as support for the journal 14 of a paper roll 15. The opposite end of the paper roll 15 has a square recess 16 into which fits a journal 17 provided in the wall of the receptacle. The journal 17 is mounted in the front wall 18. As the two ends of the paper roll 15 are formed differently, the roll cannot be wrongly inserted in the compartment. A locking device 18a is provided for preventing inadvertent reverse movement of the paper roll 15. The lid 19 of the compartment containing the paper roll 15 is removable in an upward direction, and is generally secured by screws 20. In the lid 19 a flap 21 is provided, which is normally pressed under the action of a spring against the surface of the lid 19. The lid 19 further carries a half bearing corresponding to the half bearing of the block 13, and has on its lower surface strips 22 and 23 which engage one over the other. One of these strips is formed as a cutting off device, and the other as a guide for the paper as it is drawn from the roll 15. The protective paper for the roll 15 is folded inwards at its front end and cut obliquely in front. After removing the first wrappings consisting of protective paper, the light-sensitive paper can be drawn off, as required, and separated by the cutting edge of the bar 22. The narrow slit between the bars 22 and 23 is closed in a light-tight manner by the flap 21, so that on pulling off the paper, only a few millimetres of the unused paper can be reached by light, and these only by a small amount of light. There is consequently no more paper spoiled than is otherwise wasted in cutting. A leaf-spring 24, fastened inside the box, bears with its free end against the point of lead-off of the paper from the roll 15, so that even when the diameter of the roll diminishes, the paper web is held in the desired position, and its unintentional slipping out of the slot between the bars 22 and 23 is prevented. The spring 24 can be pressed aside, after lifting up the cover 19, in order to permit of the insertion of a new paper roll. Said paper roll is fittted by passing the recess 16 over the journal 17, and locating its journal 14 in the bearing block 13. When the cover 19 is put on, the roll 15 is held in the desired working position and any incorrect fitting of the roll in the compartment is impossible. Linings 25 which are concentric with the paper roll 15 are provided inside the box, and prevent the leading end of the paper from catching in the inside corners of the box or casing.

The use in combination of the various features described and claimed herein enables reflex copies of a greatly improved quality to be produced at will either in daylight or artificial light.

I claim:

1. As an article of manufacture, a photographic medium adapted for use in a photographic copying operation carried out under subdued daylight or ordinary artificial light, comprising a carrier and a light-sensitive emulsion layer coated thereon, the light-sensitive material of said emulsion consisting chiefly of silver chloride, and said emulsion containing a desensitizer rendering the emulsion of such low general light sensitivity as to be capable of being handled in subdued daylight without fogging and containing a sensitiz-

ing dye rendering the emulsion sensitive to light of long wave length.

2. As an article of manufacture, a photographic medium adapted for use in a photographic copying operation carried out under subdued daylight or ordinary artificial light, comprising a carrier and a light-sensitive developing-out emulsion layer capable of reproducing strong contrasts coated thereon, the light-sensitive material of said emulsion consisting chiefly of silver chloride, and said emulsion containing a densensitizer rendering the emulsion of such low general light sensitivity as to be capable of being handled in subdued daylight without fogging and containing a sensitizing dye rendering the emulsion sensitive to light of wave length at least as long as yellow.

3. A photographic reflex-copying process carried out under subdued daylight or ordinary artificial light without the aid of a dark room, said process comprising passing a printing light having a large long wave length content through a carrier bearing a light-sensitive photographic emulsion layer onto a document to be copied, said document being in direct contact with said emulsion, and reflecting said light back from said document onto said emulsion and thereby exposing the emulsion, the light-sensitive material of said emulsion consisting chiefly of silver chloride, and said emulsion being rendered of such low general light sensitivity as to be capable of being handled in subdued daylight without fogging by the incorporation therein of a desensitizer, and being sensitized for light of long wave length.

4. A photographic reflex-copying process carried out under subdued daylight or ordinary artificial light without the aid of a dark room, said process comprising passing a printing light having a large long wave length content through a carrier bearing a light-sensitive photographic emulsion layer onto a document to be copied, said document being in direct contact with said emulsion, and reflecting said light back from said document onto said emulsion and thereby exposing the emulsion, the light-sensitive material of said emulsion consisting chiefly of silver chloride, and said emulsion being rendered of such low general light sensitivity as to be capable of being handled in subdued daylight without fogging by the incorporation therein of a densensitizer, and being sensitized for light of long wave length by the incorporation therein of a sensitizing dye.

5. A photographic reflex-copying process carried out under subdued daylight or ordinary artificial light without the aid of a dark room, said process comprising passing a printing light having a large long wave length content through a carrier bearing a light-sensitive photographic emulsion layer onto a document to be copied, said document being in direct contact with said emulsion, reflecting said light back from said document onto said emulsion and thereby exposing the emulsion, and then developing the latent image thus formed, the light-sensitive material of said emulsion consisting chiefly of silver chloride, and said emulsion being rendered of such low general light sensitivity as to be capable of being handled in subdued dawlight without fogging by the incorporation therein of a desensitizer, and being sensitized for light of wave length at least as long as yellow by the incorporation therein of a sensitizing dye.

GEZA SZASZ.