July 1, 1958 E. CARRANZA 2,841,493

AIR TYPE PRINTING PROCESS

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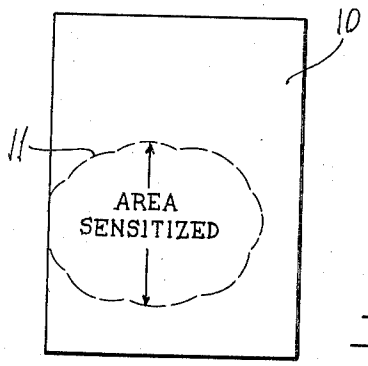


Fig. 1.



Fig. 2.

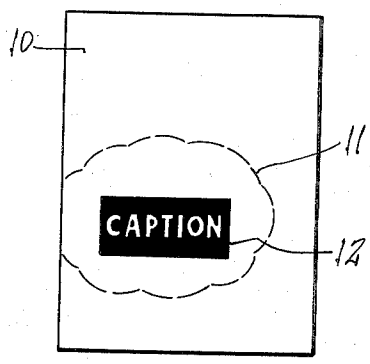


Fig. 3.

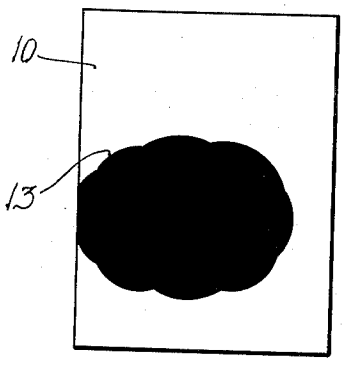


Fig. 4.

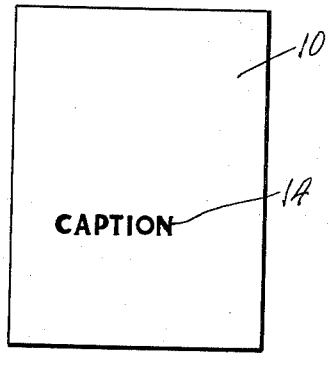


Fig. 5.

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AIR TYPE PRINTING PROCESS

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2 Claims. (Cl. 96—33)

This invention relates to a process for producing prints of type matter and other line work over colloidal surfaces, more specifically over photographic materials, after such photographic materials have been processed in the usual manner.

It is an object of the present invention to provide a process for producing prints of type matter and other line work over colloidal surfaces, and more particularly over photographic materials after such photographic materials have been processed in the usual manner which is simple, economical and efficient.

It is another object of the present invention to provide a printing process of the above type which is effected under subdued but comfortable light conditions and which eliminates the need for expensive or complicated chemical processes or preparations.

It is still another object of the present invention to provide a printing process of the above type wherein the required equipment is economical and easy to operate.

It is still another object of the present invention to provide a printing process of the above type which is particularly adapted for the graphic arts, such as rotagravure, offset, litho and other photomechanical processes. It can also be used in the preparation of art work for reproduction.

It is still another object of the present invention to provide a printing process of the above type by means of which line work can be printed over the surface of previously processed photographic work and thereby made insensitive to light; an entirely novel procedure, in this field.

It is still another object of the present invention to provide a printing process of the above type which includes the laying of pigments on the work by means of a blast of air, using an air brush and wherein the pigment is in the form of waterproof inks.

It is still another object of the present invention to provide a printing process of the above type which is faster, simpler, and more economical than regular photography.

It is still another object of the present invention to provide a printing process of the above type which is extremely flexible inasmuch as it can be applied to either photographic papers, plates or to either side of photographic films.

It is still another object of the present invention to provide a printing process of the above type wherein the resulting prints made on paper are blacker, sharper and more permanent than any photograph, the image being formed of carbon instead of silver.

It is still another object of the present invention to provide a printing process of the above type which may employ not only black waterproof ink but pigments of all colors in waterproof solution and wherein more than one impression can be made on the same paper, resulting in multicolored work.

It is another object of the present invention to provide

a process for producing prints of type matter and other line work over any surface which can be covered with a coat of plain gelatine, more specifically papers and plastics.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a top plan view of a negative about to be treated in accordance with the present invention and showing in dotted outline the area to be treated.

Fig. 2 is a top plan view of the line negative employed in the present instance.

Fig. 3 is a top plan view of the negative of Fig. 1 showing the line negative of Fig. 2 in position thereon and ready for exposure.

Fig. 4 is a top plan view of the negative of Fig. 3 after the line negative has been removed and the drawing ink applied to the sensitized area.

Fig. 5 is a top plan view of the finished product.

The present invention resides in the fact that bichromated colloidal surfaces become impervious to liquids when exposed to light. Therefore, for example, if a gelatine-coated surface (such as a photographic film) is impregnated with a bichromate solution and allowed to dry, it will become sensitive to light and when exposed behind a line negative, an image will form composed of hardened and soft portions corresponding respectively to whether the said portions were exposed to the action of light or not. With such a selective surface, i. e., a surface composed of impervious and moisture-hungry areas, waterproof ink will remain on the surface even when wet. However, upon treating the surface with a weak hypochlorite solution, the soft portions of the gelatine will be dissolved and the ink will be removed while remaining over the hardened portions, which latter do not absorb the hypochlorite solution and which remain sharply delineated.

Essentially, the process consists of five operations as follows:

(1) Resensitizing photographic or other gelatine covever products with a solution of potassium bichromate;

(2) Exposing the material so sensitized to actinic light under a line negative;

(3) Covering the required areas completely with a thin coat of waterproof drawing ink or the like by means of an air brush;

(4) Dissolving the soft portions of the gelatine and thereby removing the unwanted inked or colored areas with a very weak solution of sodium hypochlorite;

(5) Rinsing the work in a solution of sodium hydrosulphite.

The use of hydrosulphite serves two purposes—namely, this solution bleaches out any traces of the yellow bichromate stains that may remain and it also stops further softening of the gelatine, of which the photographic emulsion is formed.

The following example is further illustrative of the invention, and it will be understood that the invention is not limited thereto:

Example

A negative from which a positive was obtained for the rotogravure process was treated, said positive containing a caption in white lettering over a dark background.

Sensitizing.—A solution of three percent potassium bichromate was prepared in advance (roughly, one ounce of bichromate to a quart of water). Such a solution

will keep almost indefinitely. The negative **10** (Fig. 1) was then placed over a clean, flat surface (preferably a plate of glass) and secured thereto by means of weights, waterproof Scotch tape or other suitable means. A swab of cotton was then dipped in the bichromate solution and applied only over the area **11** to be sensitized, for a period of about forty-five seconds (the solution being applied with a circular motion). Upon completion of this operation, the surplus liquid was removed from the surface of the negative **10** by quickly placing over it a piece of smooth, thin absorbent paper and applying a uniform soft pressure over the area **11**. The paper is then removed immediately and the negative dried by means of a current of air. (A good electric hair drier with heating elements can be employed.) With the above drying the sensitizing was completed, it being noted that this sensitizing may be done on either side of the film.

Printing.—Before placing the sensitized film **10** in the printing frame, it was rubbed thoroughly with a piece of dry cotton in order to remove any particles of dust or other matter. The film **10** was then placed in contact with the line negative **12** (Figs. 2 and 3) in a reliable printing frame that provides good contact (a vacuum printing frame was employed). Although a vacuum printing frame was employed, it will be understood that other types of frames may be used.

With the negative **10** and the sensitized area **11** covered with the line negative **12**, the assembly was then placed facing a reflecting photoflood light (No. RFL 2). With this type of lamp, an exposure of one minute and twelve inch distance was sufficient. The frame was then opened in subdued light and the film **10** removed therefrom. The film **10** was then placed over a plate of glass and held in position by pieces of Scotch tape at the margin.

Inking.—Waterproof drawing ink **13** (Fig. 4) was then evenly sprayed with an airbrush over the sensitized area **11**, completely covering the latter. Ordinary commercial black waterproof drawing ink was employed. The ink was sprayed as evenly as possible over the entire area **11** with a straight side-to-side motion, moving downwardly as the covering proceeded. No attempt was made to lay a solid black coat in one single spraying, but rather the area was covered lightly in successive sprayings. When the first spraying was dry, it was rubbed with a piece of dry cotton in order to keep the surface smooth. The ink was then sprayed for a second time in a similar manner again employing the cotton rub. This was repeated until the entire area was covered. The ink **13** was then dried by blowing until perfectly dry. (Unless the ink is perfectly dry, it is not waterproof, which latter condition is necessary to the operation of the process.) It will be noted that cracking of the inked surface outside the type or design will assist in the developing.

Development.—A solution of sodium hypochlorite was prepared as follows: One ounce of five percent sodium hypochlorite was poured into a quart jar (employing the commercial solution curently employed for bleaching, and which comes in approximately 5%). Good results were obtained with both products marketed under the trade names of Dazzle and Chlorox. The jar was then filled with water to make one quart of solution.

The negative was then developed by removing the ink that had been deposited over the soft parts of the gelatine, that is, the ink covering the areas not affected by the powerful light of the photoflood. The lettering or design **14** represented by the clear parts in the line negative which permitted the light to harden those parts of the print **10** were not removed by this operation but remained clearly attached thereon (Fig. 5). The operation was performed upon a shadow box with running water (although an ordinary pane of glass was found to serve the same purpose, provided there is at hand an evenly illuminated area over which to observe the progress of the operation by transmitted light). The film **10** to be developed was placed in plain water for about a minute, using a photographic tray, during which time the unhardened portions of the print **10** underwent swelling. The print was then immersed in the tray containing the hypochlorite solution for a few seconds at a time, returning to the plain water bath. This was repeated until it was noticed that the ink **13** started to disintegrate from the surface. From then on the operation was watched carefully in order not to soften the emulsion unduly. The film was placed over a pane of glass (with a light underneath) and the print touched very lightly with a sweeping motion with the tip of a two-inch flat camel hair brush well soaked in water. During this operation, the appearance of the type was observed, and this operation was continued until all the unwanted ink **13** had been removed and the lettering **14** appeared clear and sharp. (Although a brush was employed, a piece of cotton may be used.) The print **10** was then given a last rinsing in clean water to complete the development.

Clearing and fixing.—The print was then immersed in a solution of sodium hydrosulphite (one teaspoonful for each pint of water) for about ten seconds with constant agitation. The hydrosulphite solution was then discarded.

The negative **10** was then dried rapidly with the hair drier (without heat) being careful not to rub or touch the image **14**. (Warm air may be used after the surface is free from water and shows signs of having started to dry.)

The above process may be employed in rotogravure, photolithography and the preparation of art work.

In rotogravure, the process may be employed for printing line work on negatives from which positives with white lettering are to be obtained, replacing the present method of making and laying over thin film positives. The process may also be used for opaquing of line work already on the negative but which appears to have insufficient density. At present most of this work is done by hand and as such is slow and imperfect. The process may also be employed for the printing of line work on positives whenever this is desirable. The process may also be used to make negatives from work drawn or printed on translucent materials and for making positive line work on clear films devoid of any pictures, as well as strippers. Finally, although the work is firmly set on the film, it can be removed without affecting other parts of the film. This is clearly not possible in photography.

In photolithography, the process can be used for making negatives of drawings made on translucent materials, as well as negatives of type and line work printed on similar materials.

In the preparation of art work, the process may be used to print all kinds of lettering over photographs for reproduction instead of attempting to do the work by hand. In addition, the artist may produce a number of prints from the same negative.

While the invention has been described with reference to various examples and embodiments, it will be apparent to those skilled in the art that various modificatitons may be made and equivalents substituted therefor, without departing from the principles and true nature of the present invention.

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

1. A process for producing prints of type matter and other line work over surfaces coated with a proteinaceous colloid, comprising treating said surfaces with an aqueous solution of potassium bichromate, exposing the surfaces so treated to actinic light under a line negative, covering the areas so treated with a coat of waterproof drawing ink, removing the unwanted ink in the unexposed areas with a weak aqueous solution of sodium hypochlorite, and rinsing the treated surfaces in an aqueous solution of sodium hydrosulphite.

2. A process for producing prints of type matter and other line work over gelatine coated surfaces, comprising treating said surfaces with an aqueous solution of potassium bichromate, to sensitize said surfaces, drying the treated surfaces in air currents, exposing the treated surfaces to actinic light under a line negative, covering the areas so treated with a thin coat of waterproof ink, removing the unwanted ink in the unexposed areas by means of an aqueous solution of sodium hypochlorite, and rinsing the treated surfaces in an aqueous solution of sodium hydrosulphite, said potassium bichromate solution containing approximately one ounce of potassium to a quart of water, solution of sodium hydrosulphite containing approximately one teaspoonful of sodium hydrosulphite to a pint of water.

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