

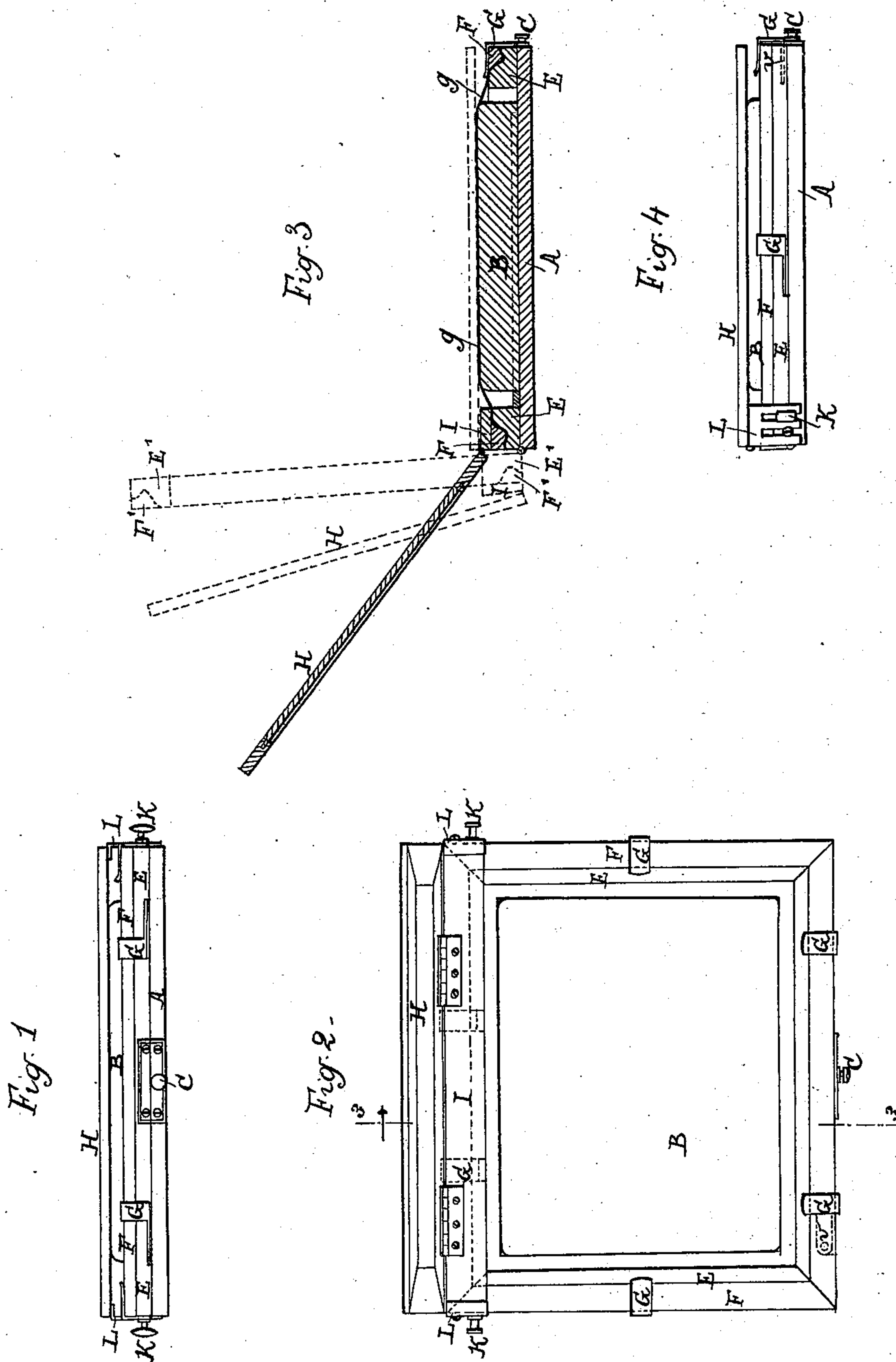
(No Model.)

C. RAYMOND.

# METHOD OF PHOTOGRAPHIC PRINTING IN FATTY INKS.

No. 377,498.

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INVENTOR:

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# UNITED STATES PATENT OFFICE.

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## METHOD OF PHOTOGRAPHIC PRINTING IN FATTY INKS.

SPECIFICATION forming part of Letters Patent No. 377,498, dated February 7, 1888.

Application filed March 7, 1887. Serial No. 229,901. (No model.)

*To all whom it may concern:*

Be it known that I, CLAUDE RAYMOND, a citizen of the French Republic, residing in Paris, France, have invented certain Improvements in Methods and Apparatus for Photographic Printing in Fatty Inks, of which the following is a specification.

My invention relates to the printing of photographs in permanent inks, such as the fatty inks used by lithographers. Such printing has heretofore been done from plates of chrome-gelatine, bedded on glass or other solid material, the process of printing being essentially the same as lithographic printing.

My improved process permits of the direct utilization of a sheet of gelatine as the printing-plate, being based on the use of gelatinized parchment-paper similar to that now in actual use for auto-copying of manuscripts and the like in black. This gelatinized parchment-paper, prepared in the particular condition required for its special use, is plunged in a sensitizing-bath of bichromate of potash, perchloride of iron, nitrate of uranium, &c., and after sensitization it is left to dry in the dark, after having applied it to a polished plate of glass or other material, the gelatine against the glass. This sheet of bichromated parchment-paper is then placed in the photographic-printing frame under the negative plate which is to be reproduced, and the whole is exposed to diffused light. When the light has acted sufficiently on the bichromated gelatine of the paper, the paper is disengaged in water, and on it is found the image to be printed in relief and sunken. In order to employ this plate of gelatinized paper for direct printing, it is moistened somewhat, the degree of humidity varying with the accentuation of the relief that it is desired to obtain, and it is stretched on a special frame, where care is taken to maintain the desired degree of humidity, and where it serves directly as the printing-plate.

In order that my invention may be well understood, I will now proceed to describe the special method of preparation of the sheets of gelatinized parchment-paper and the method of their employment for photographic printing.

1. *Preparation of the gelatinized parchment-paper.*—I take some gelatine of good quality, free from fatty matter, and soak it in a quan-

tity of water sufficient to make it swell thoroughly—such, for instance, as five parts of water to one part of gelatine. The gelatine thus swelled is dissolved in a “bain-marie” or water-jacketed bath, where it is maintained during forty minutes at a temperature of 75° centigrade. I then add to it a small quantity of water saturated with alum (about one-tenth as much alum as water) and two and a half per cent. of a saturated solution of borax. I then spread the gelatine on the parchment-paper or other paper, or other flexible support, by the means already in use for the preparation of gelatine paper designed to be used for auto-copying. The gelatinized paper is then dried in an oven heated to 25° or 30° centigrade and passed between rollers. The cooking of the gelatine at the temperature indicated and the addition of alum and borax during the cooking produce a perfect adherence of the gelatine to the paper, which is necessary to enable it to be used for direct and continuous printing with fatty inks after having transformed it into a printing-plate by means of photography. The paper thus prepared is not liable to deterioration, and may be used at any time.

2. *Preparation of the printing-plates.*—The gelatinized paper is cut to the desired size and is sensitized by soaking during one or two minutes in a two per cent. bath of bichromate of potash, or in any convenient sensitizing-bath. The bichromated sheet is then applied on a glass plate, the gelatine on the glass, and put away to dry in the dark. The sheet may be known to be sufficiently dry when it detaches itself easily from the glass, this taking usually five or six hours. The sheet of gelatinized parchment thus bichromated and dried is placed in a pressure-frame on the negative plate to be reproduced, being squeezed hard in order to establish perfect contact of the sheet with the negative plate, and the whole is exposed to diffused light for a suitable time. It may generally be ascertained that the exposure to the light is sufficient when all the half-tints of the negative are seen in dark brown on light yellow, of which it is easy to assure oneself by lifting up from time to time the sheet of gelatine paper above the negative—an operation to which it readily lends itself by reason of its flexibility. When the im-



age is clearly seen on the bichromated sheet, the latter is removed from the photographic pressure-frame and is washed in a basin filled with ordinary water. The sheet of parchment-paper is thus washed till the parchment has resumed its original tint in the whites, taking care to change the water every half-hour or so as long as it is yellowed by the dissolving of the bichromate. After being thoroughly washed the sheet of paper is dried in the open air, and constitutes a printing-plate capable of giving direct impression by means of fatty inks. It is by reason of the special preparation of the coating of gelatine for my paper that I am able to avoid the use of the stove for the bichromatizing of the sheets of paper, and it is also to this preparation of the gelatine that is due the property of receiving and reproducing the middle tints with all their nicety.

3. *Use of the printing plates for printing with fatty inks.*—The sheet of gelatinized parchment-paper constituting the printing-surface is soaked fifteen or twenty minutes in ordinary water in order to swell the gelatine to the extent required by the degree of accentuation that is desirable to obtain a good impression. If the sheet of paper is used immediately after the bichromating, the drying may be arrested at the moment when the moisture is just such as to permit of its direct employment for printing without subjecting it to previous soaking.

Whatever may be the means employed for obtaining a printing-plate of gelatinized paper having the humidity needed for a good impression, it is to be drawn over the stretching-frame represented in the annexed drawings.

Figure 1 is a front elevation of this frame. Fig. 2 is a plan of it. Fig. 3 is a transverse section on the line 3 3 in Fig. 2, and Fig. 4 is a side elevation.

This apparatus is composed of a bottom board, A, an articulated frame-work, E F, thereon, and a block, B, arranged on the board A inside of the frame. This block is of wood covered with a sheet of zinc, or, what is better, is a block of marble. The frame may be fixed to the board A by a bolt, C. The frame E F is composed of two parts, E and F, which fit together, the one entering the other, in order to hold in the crack between them the sheet of gelatinized parchment-paper. The two parts E and F of the frame are held together by means of swinging clamps G G, each of which is pivoted on a screw, v, on the under side of the lower part of the frame.

In order to put the sheet of gelatine paper in place, the frame E F, which is hinged at the back, is turned up to the position shown in dotted lines at E' F' in Fig. 3; then the two parts are opened (by turning out the clamps G G) and the sheet of gelatine paper is inserted between them. They are then closed together, thereby clamping the paper and straining it tightly, and they are held together by turning in the clamps G G. The frame E F is then turned

down onto the bottom board, A, and is there fastened by the bolt C. As the block B projects above the frame, the paper is thus stretched tightly over the top of the block, the surface of which is perfectly flat.

In order that the sheet of gelatinized parchment shall be maintained at the proper degree of moisture, it is of advantage to interpose between the block and the sheet a layer of paper or other material saturated with water, glycerine, ammonia, or other liquid, according to the needs of the work, and which, without interrupting the printing, serves to maintain the uniformity of the impressions. Being thus placed and stretched, the sheet of gelatine paper is now ready for the printing. It is inked with a roller charged with a very little ink and applied over it in all directions until the image appears complete in all its half-tints. A discharging-roller is then passed over it in order to take up the excess of ink and bring the plate back to the degree of inking that approaches closest to the nicety of impression that is sought after. The blank paper to be printed on is laid on the surface thus inked, and over it is placed a blanket or felt and a plate, and the whole is subjected to pressure in a copying-press or a mechanical printing-press.

The drawings show the apparatus with a plate or lid, H, connected to it. This plate is hinged to a little bar, I, which has at its ends pieces L L, of metal, which are fixed to the frame by means of thumb-screws K K, engaging vertical slots therein. This lid or plate being turned down on the sheet of paper, after the latter has been laid on the gelatine surface and after the cushion of felt has been laid on it, the apparatus is put in the press. The lid H may, if desired, be provided on its under side with pieces of card-board or other material, which shall serve to hold the paper to be printed on and retain it in the proper position.

The printing of photographic images by this process may be done with fatty inks of any kind whatever. The printing-sheet may be stretched over a block or plate of marble, zinc, or other material. The gelatine may be caused to adhere to any other flexible support in place of parchment-paper—such, for example, as suitable woven fabrics.

What I claim as my invention is the following-defined novel features appertaining to the art of reproducing photographic images in printing-inks, the same being substantially as hereinabove specified, namely:

1. The improved method of photographic printing which consists in coating a flexible supporting-sheet with gelatine, sensitizing the gelatine, exposing the sensitized sheet to the action of light, desensitizing the exposed sheet, stretching the same over an impression-block, and printing therefrom with fatty inks.

2. The improved method of photographic printing which consists in exposing a flexible sheet coated with sensitized gelatine, washing and swelling the same, drying it sufficiently,



stretching it while in a damp condition over a printing-block, and printing from it with fatty ink.

3. The improved method of photographic printing which consists in exposing a sensitized flexible gelatinized sheet, washing and drying it, spreading a dampened absorbent material over an impression-block, stretching the gelatinized printing-sheet over said absorbent, whereby it is kept moist, and printing from it with fatty ink.

4. The improved photo-ink-printing apparatus consisting of the combination of a bottom board, a stretching-frame, and an impression-block mounted on said board within said frame, with its upper surface projecting above the plane of the flexible sheet stretched therein,

and with fastenings for holding said frame and board.

5. The combination of a bottom board, an impression-block mounted thereon, a stretching-frame, in two parts, fitting over said block, fastenings for joining said parts together and for holding said frame to the board, a removable bar applied across the rear of said frame, and a lid hinged to said bar.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CLAUDE RAYMOND.

Witnesses:

ROBT. M. HOOPER,  
AMAND RITTER.