

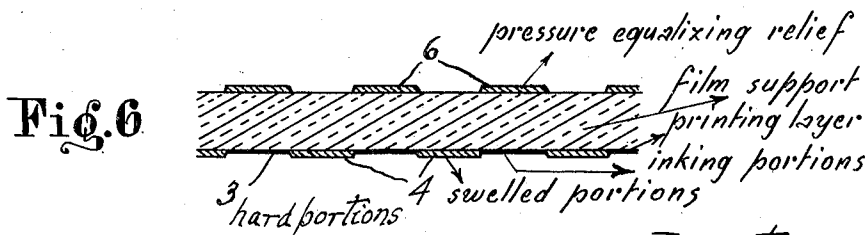
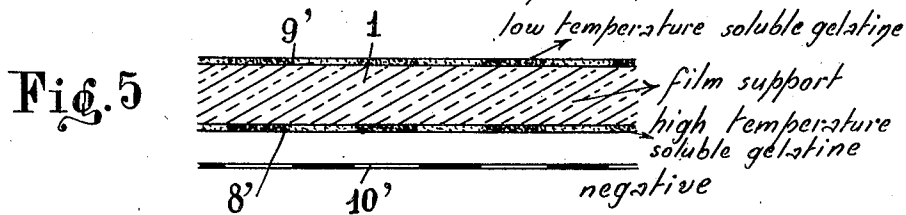
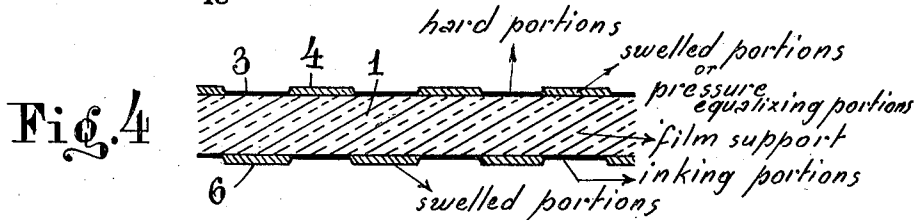
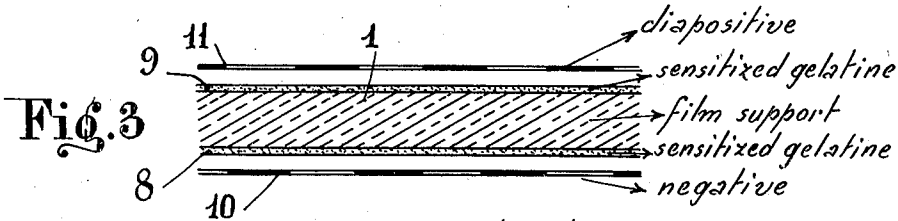
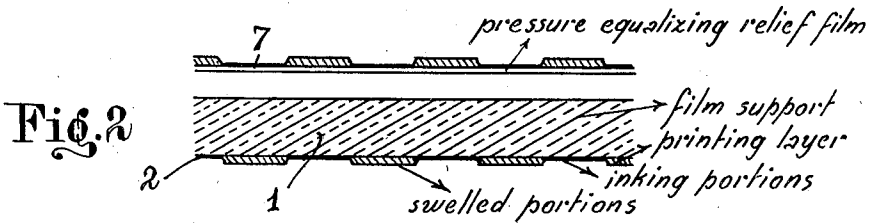
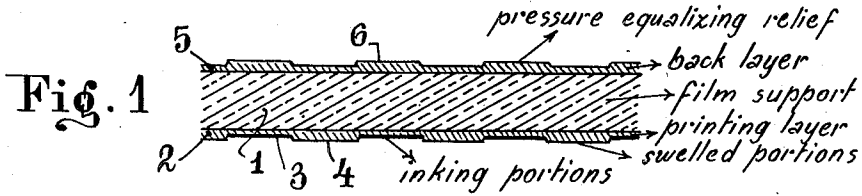
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M. DE'SPERATI

PHOTOCOLLOGRAPHIC PRINTING PLATE AND METHOD OF MAKING THE SAME

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Inventor:
Mariano de'Sperati,
by Emil Pomelycke,
Attorney.

UNITED STATES PATENT OFFICE.

MARIANO DE' SPERATI, OF TURIN, ITALY, ASSIGNOR TO ARGENTOGRAPHICA (U. S. A.) LIMITED, OF LONDON, ENGLAND.

PHOTOCOLLOGRAPHIC PRINTING PLATE AND METHOD OF MAKING THE SAME.

Application filed June 4, 1923, Serial No. 643,435, and in Italy January 19, 1923.

It is known that in a photocollographic printing plate ready for printing there are found white portions which are wet and swelled out, dark portions which are dry, and depressed and intermediate tones which are more or less raised or swelled according to their respective tone intensities.

This peculiar character of the plate gives rise to the well known drawback of the photocollographic printing process, that is, to exceedingly sharp prints at the beginning of the printing operation and to insufficiently sharp prints after about 100-150 prints have been obtained, the prints being thus uneven and unsatisfactory after a comparatively small number of them has been obtained.

This is due to the fact that on transferring the inked image to the paper a greater pressure is exerted on the white portions than on the other ones and therefore the said white portions soon become dry, which renders it necessary to wet them again after some prints have been made. Consequently, the operation is slow.

According to the present invention said drawback is overcome or avoided by the fact that the rear surface of the film plate is provided with a relief complementary with respect to that existing on the printing surface of the same plate; that is, a raised surface whose different portions truly correspond with those of the printing surface but are depressed where the printing surface is raised, and raised where the printing surface is depressed.

By this method, there are produced, in register with the white raised portions of the printing plate, depressions on the rear face, while in register with the depressed dark portions of the printing surface the rear face shows raised or prominent portions.

In other words, on the rear surface of the plate is obtained a relief image compensating for the different thicknesses or reliefs of the printing surface of the film.

Therefore, with such a plate, during the printing operation the raised portions are subjected to a reduced pressure as compared with usual plates, because on the plate surface opposite the printing one there is a depression, and therefore the drying action at each printing operation is lessened. Further, the raised portions wear to a reduced extent owing to the same reason, and therefore the life of the plate is extended.

In the accompanying drawing:

Figure 1 is a fragmental sectional view of a plate constructed in accordance with the invention;

Fig. 2 shows in cross-section a photocollographic plate and a film, before the latter is applied to the rear face of the plate, to illustrate one method of producing the plate of Fig. 1;

Fig. 3 shows in section a film provided with sensitized layers on both faces, together with image-bearing films, for producing the plate of the invention;

Fig. 4 is a sectional view of the plate obtained with the arrangement shown in Fig. 3, after printing and treatment;

Fig. 5 is a sectional view of a film provided with sensitized layers on both faces, together with a negative bearing the image; and

Fig. 6 is a sectional view of the plate obtained after exposure under the conditions of Fig. 5 and washing.

The plate finished and ready for use, always comprises, as shown in Fig. 1, a support 1, generally of celluloid, one face of which has secured to it a layer 2 that constitutes the printing surface; this layer embodying hardened portions 3 which correspond to the white portions of the negative and are designed to take the ink, and swelled portions 4 corresponding to the dark portions of the negative and designed to repel the ink. The other face of the support has attached to it another layer 5 having portions or zones 6 in relief which are located thereon at the same points as the hardened portions 3 in the layer 2.

A plate according to the present invention may be obtained in the following manner: A diapositive is printed from a photographic negative and from said diapositive is obtained a relief image on a gelatin film or paper, the required relief being obtained by the known swelling processes. After obtaining from the same negative a photocollographic printing film or plate, said relief image is transferred to the rear surface of this plate, that is, to the face opposite to the ink printing surface of the plate, in true register with the image of said printing surface, to compensate for the different thicknesses of the inking and printing surface of the plate. This method is illustrated diagrammatically in Fig. 2, where 1 indicates the film support which carries the layer 2

that forms the printing surface. 7 indicates the relief film which is obtained from the diapositive and which, after treatment, will be applied to the rear face of the support 1 to produce the plate represented in Fig. 1.

The said auxiliary or relief image may also be obtained on the plate for photocollographic printing process in other ways.

Another way of obtaining the plate according to the present invention consists in making the plate support of a special film, this film being transparent but having a non-actinic colour, as red, green or dark yellow, and carrying two emulsion layers, one on each face. The one of said layers, which is intended to provide the printing surface, that is, the surface on which is produced the image to be inked and printed, must be very adherent to the support and consists of gelatin of medium hardness mixed with an antiseptic; the other layer is made of soft gelatin mixed with glycerine or with other colloidal substances for improving its swelling character.

Such a film, after being sensitized by an alkali bichromate bath, is supported on a glass plate lighted from below, said film being located between the negative to be printed, which is placed in contact with the first or medium-hard gelatin layer, and a diapositive produced from the same negative, this diapositive being in contact with the second or soft-gelatin layer.

Then the operator brings into accurate register with each other the image of the negative and that of the diapositive, use being made of a lens if required. Fig. 3 shows the film support 1, made of transparent celluloid for example and of a non-actinic colour, bearing the two emulsion layers 8 and 9; 10 indicates the negative before being applied to the layer 8 and 11 the diapositive before being applied to the layer 9. The three superposed films are now placed in a two-glass printing frame having means for exerting a pressure on the edges of the said glasses and films, care being taken to prevent the films from moving with respect to each other, and finally the plate is exposed to the light first on one side and then on the other; on each layer of said film is thus obtained an impression of the image located above it, that is, of the negative and of the diapositive respectively, because the exposure of each layer does not affect the other one in view of the non-actinic colour of the intermediate film.

The exposed film is then treated in slightly warm water for easily removing the soluble bichromate and for effecting a considerable swelling out of the auxiliary layer. Thereafter the plate is dried and finally it is prepared for the printing operation by placing it in a vertical receiver in the usual solution consisting of water, glycerine and

hygroscopic salts and leaving it therein for the required time. Finally the film is dried between blotting paper sheets and is mounted on the printing support members.

There is thus obtained a plate (Fig. 4) the printing surface of which is formed by zones or portions 3 and 4 which are hardened and swelled, respectively, and the opposite surface of which comprises relief portions 6; this relief layer being swelled where the inking layer is dry, and vice-versa.

A further embodiment of the method according to the present invention consists in using a translucent film having a gelatin layer on both surfaces; one of said layers is made of a gelatin which is more easily dissolved than the other one, and the said first layer is intended to provide the said back or relief image, while the second layer provides the inking and printing image. By way of example the first layer is made of a gelatin dissolving in water at 40° C. while the second layer is of gelatin dissolving at 50° C.

The two layer film thus obtained is then sensitized in an alkali bichromate bath and then is exposed to light under a negative, with its main layer adjacent to the negative; after the exposure the gelatin of both layers is left soluble in register with dark portions of the negative, while it is made insoluble in both layers in their portions in register with white or transparent portions of the negative. Fig. 5 shows a film comprising a transparent or translucent support 1 with a sensitized layer on each face thereof, the layer 8' being soluble at a higher temperature than the layer 9'; 10' indicates the negative before being arranged against the layer 8' of the film to print thereon by the action of light.

Then the plate is treated to dissolve the soluble gelatin of the auxiliary layer, by means of a bath of water at 40° C. while the main layer is left wholly unaffected owing to its character as above described, it being only deprived of the sensitizing bichromate left soluble after the exposure; the said auxiliary layer is thus removed in register with the dark portions of the negative (that is in register with the white or swelling portions of the printing layer) while it is left more or less unaffected in register with the transparent portions of the negative and hence in register with the dark and depressed portions of the printing layer. This final plate is represented in Fig. 6, where the printing surface is formed by hardened portions 3 which have undergone the action of light, and portions 4 which have not been subjected to light and which are swelled; the rear surface comprises relief portions 6 which in this case are formed by the insoluble gelatine remaining which has been exposed to light through the negative

and the transparent or translucent support, and which, in consequence, has not been dissolved in the warm water bath.

The printing process is carried out as usual, the layer of the plate intended to provide the printing image being caused to swell out, inked and printed in the well known manner.

No claim is made herein for the special film which is utilized in producing the plate, since such film forms the subject matter of a division of the present case filed November 28, 1925, No. 72,012.

What I claim as my invention and desire to secure by United States Letters Patent is:—

1. A method of producing plates for photocollographic printing, comprising the steps of forming, on one face of a flexible support, a printing surface whereon the image consists of dry portions capable of taking greasy ink and swelled portions which repel such ink; and forming, on the opposite face, a relief image complementary to the image on the printing surface, the depressed portions of said relief image registering with the swelled portions of the printing surface, and the relief portions registering with the dry portions of the surface.

2. A method of producing plates for photocollographic printing, comprising the steps of forming, on one face of a flexible support, a printing surface whereon the image consists of dry portions capable of taking greasy ink and swelled portions which repel such ink; and photomechanically forming, on the opposite face, a surface embodying the same image in intaglio and in relief, and in which the portions in intaglio register with the swelled portions of the printing surface, and the portions in relief register with the dry portions of the printing surface.

3. A method of producing plates for photocollographic printing, comprising the steps of forming, on one face of a flexible plate which is provided on each of its faces with a layer of sensitized emulsion, a printing surface whereon the image consists of dry portions capable of taking greasy ink and swelled portions which repel such ink; and forming, in the layer on the opposite face, by exposing it to light, the same image in

intaglio and relief and in which the portions in intaglio register with the swelled portions of the printing surface, and the portions in relief register with the dry portions of the printing surface.

4. A method of producing plates for photocollographic printing, comprising the steps of forming, on one face of a flexible plate which is provided on each of its faces with a layer of sensitized gelatin, a printing surface whereon the image consists of dry portions capable of taking greasy ink and swelled portions which repel such ink; and forming, in the layer on the opposite face, by exposing it to light, the same image in intaglio and relief and in which the portions in intaglio register with the swelled portions of the printing surface, and the portions in relief register with the dry portions of the printing surface.

5. A method of producing plates for photocollographic printing, comprising the steps of exposing to light, behind a negative, a transparent, flexible support which is provided on both faces with layers of sensitized gelatin having different degrees of solubility, to print on said layers; treating the less soluble layer to form thereon an image consisting of portions capable of taking greasy ink and swelled portions which repel such ink; and treating the support in such a way as to dissolve those portions of the more soluble layer which have not become insolubilized by the action of the light, so as to obtain, on the corresponding face of the support, depressed portions which register with the swelled portions of the printing surface, and portions in relief which register with the dry portions of the printing surface.

6. A flexible photocollographic printing plate, bearing on one face an image which consists of portions designed to remain dry and capable of taking greasy ink, and other portions adapted to swell when moist and repel such ink; the other face bearing the same image in intaglio and in relief, the portions in relief registering with the dry portions of the first face, and the portions in intaglio registering with the swelled portions of said first face.

In testimony whereof I affix my signature.

MARIANO DE' SPERATI.