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E. BASSIST

2,344,487

METHOD OF PREPARING PRINTING PLATES

Filed Nov. 11, 1942

Fig. 1.

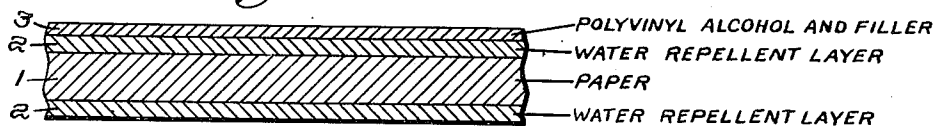


Fig. 2.

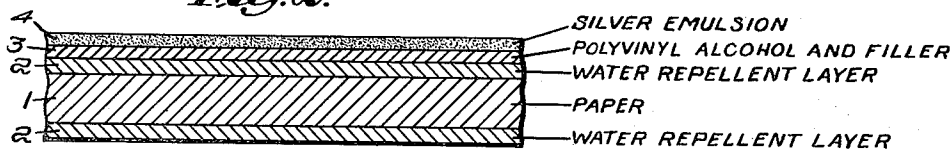


Fig. 3.

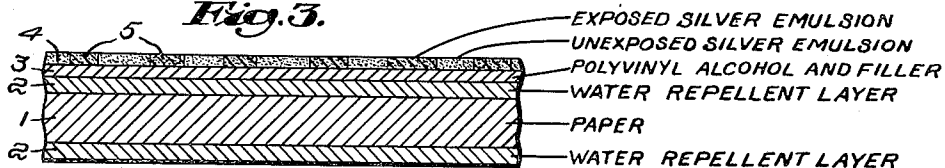


Fig. 4.

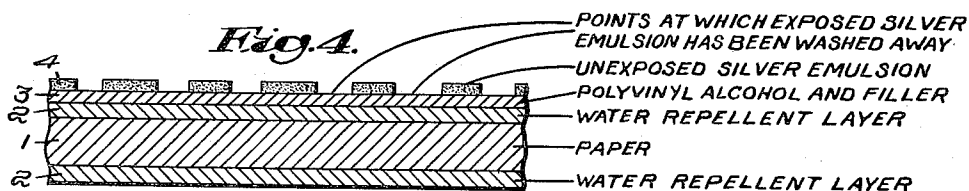


Fig. 5.

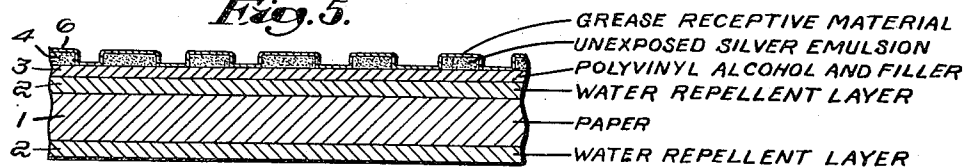
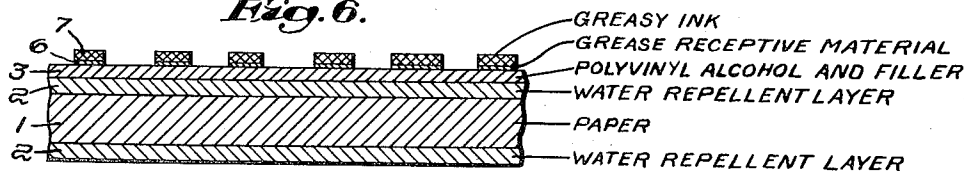


Fig. 6.



Inventor:

Ellis Bassist

by

Mumma H. Hamilton

Attorney

UNITED STATES PATENT OFFICE

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METHOD OF PREPARING PRINTING PLATES

Ellis Bassist, Brookline, Mass., assignor to William Craig Toland, Brookline, Mass., as trustee

Application November 11, 1942, Serial No. 465,256

10 Claims. (Cl. 95—5.4)

This invention relates to preparation of printing members and more especially to a process of making a planographic printing plate from a light-sensitive element of the type which includes a surface coating of a photosensitive silver halide emulsion.

An object of the invention is to improve methods of preparing printing members and to devise a simplified process of making a planographic printing plate. Another object of the invention is to provide a method of treating a photosensitive silver emulsion coating to form grease-receptive printing portions with a view to eliminating labor and equipment commonly employed in making planographic printing plates. Another object of the invention is to provide a simple, cheap, and fast method of making a planographic printing plate.

In the accompanying drawing:

Figure 1 is a view in cross section diagrammatically illustrating a planographic printing plate element employed in the method of the invention;

Fig. 2 is another cross sectional view illustrating a step of applying a photosensitive emulsion to a base element of the type illustrated in Fig. 1;

Fig. 3 is a cross sectional view illustrating another step of photographically exposing a photosensitive silver emulsion coating similar to that indicated in Fig. 2;

Fig. 4 is a cross sectional view illustrating a further step in the method of the invention; and

Fig. 5 is a cross sectional view illustrating still another step in the method referred to.

Fig. 6 is a cross sectional view illustrating a printing plate made in accordance with the method of the invention.

The invention generally includes an improved method of treating a photosensitive silver emulsion coating while supported on a water-receptive planographic base, whereby photographically exposed areas of the silver emulsion coating are dissolved away, while unexposed portions of the coating at this point are retained and then later dissolved away. Thereafter, the plate is developed to form grease-receptive portions anchored to the planographic base at points corresponding to those areas from which the photographically exposed portions of the silver emulsion were first removed.

In a preferred embodiment of the invention, I employ a planographic base element of the type described and claimed in my copending

applications, Ser. No. 429,672 filed February 5, 1942, and Ser. No. 414,254 filed August 9, 1941. If desired, other lithographic base elements may be employed, as colloidal surfaces and others.

The planographic base disclosed in these copending applications includes a specially sized paper element 1, which is treated at either side with a water-repellent material 2, and which is further provided at least at one side thereof with an outer coating 3 of a water-receptive printing body. The water-receptive coating 3 is made up of water-swellaible polyvinyl alcohol and a finely divided filler such as a clay.

As has been set forth in the applications referred to, the paper, by reason of the presence of the water-repellent material, is adapted to resist stretching and shrinking when subjected to water, as employed in the development and use of a planographic printing plate. The polyvinyl alcohol and clay coating is attached to one of the water-repellent layers sufficiently strongly to withstand separation when subjected to the stresses encountered in lithographic printing operations, and the coating is further adapted to receive grease-receptive materials at selected points, and at other points to be rendered water-receptive in accordance with conventional lithographic printing principles.

In carrying out the method of the invention, a planographic base element of the character above noted is provided with a surface coating 4 of a photosensitive silver emulsion which is attached to the coating 3 of polyvinyl alcohol and clay (Fig. 2). The photosensitive coating 4 is then exposed to light passed through a photographic negative to provide photographically exposed portions 5, as has been diagrammatically illustrated in Fig. 3. In effecting photographic exposure of the coating, any suitable source of light, such as that commonly employed with photographic film, may be employed.

The exposed silver emulsion coating 4 is next treated with an agent which is adapted to dissolve away the exposed portions 5 and which does not, at this point, dissolve away the remaining unexposed portions of the coating. Removing the exposed portions 5 may be carried out by washing the coated base element in a bath of the agent hereinafter referred to.

As illustrative of a suitable agent for dissolving the exposed portions 5 of the silver emulsion coating, and at the same time leaving the unexposed portions 4 of the silver emulsion at this point in an undissolved state, there may be cited

a mixture made up of potassium peroxide, copper sulphate and bromine.

Other methods of employing the dissolving agent may be resorted to, as for example by flowing the dissolving agent over the surface of the plate and allowing it to stand for a short period of time and then lightly rubbing over the surface of the plate with a pledget of cotton, or other soft material.

Fig. 4 diagrammatically illustrates the step of washing away the portions 5 of the photosensitive emulsion, and it will be observed that there result separated portions of the unexposed photosensitive emulsion 4, leaving uncovered surfaces of the polyvinyl alcohol layer 3.

The separated unexposed portions 4, together with uncovered surfaces of the polyvinyl alcohol and clay coating 3 are lightly covered over with a thin film 6 of a grease-receptive material, as has been diagrammatically illustrated in Fig. 5. It should be noted that the grease-receptive material overlies the unexposed portions and also partly fills in the spaces between the unexposed portions 4. One example of a suitable grease-receptive material for this purpose is shellac. Other materials of a grease-receptive character may be employed, as for example "Dubar," spar varnish and other lacquers.

Thereafter a greasy inking material, such as greasy developing ink or printing ink, is applied over the surface of the plate, with the greasy ink becoming filled in around the unexposed portions 4 as well as lightly overlying the portions 4.

The plate is then developed to form grease-receptive printing portions 7, occurring on the shellac-covered surface at points corresponding to those areas of the polyvinyl alcohol and clay coating 3 from which exposed portions 5 have been washed away.

In carrying out the developing operation, the plate is immersed in warm water, which strikes through the shellac and greasy ink to penetrate into and wash away unexposed portions 4 of the silver and gelatin. In being thus washed away from the plate, the unexposed portions 4, carrying with them directly overlying parts of the shellac film 6 and corresponding ink portions, while leaving other parts of the shellac film and ink portions fixed to the polyvinyl alcohol and clay coating 3. These remaining parts of the shellac film and corresponding ink portions serve to provide an anchoring medium for holding greasy ink and thereby form greasy printing portions. The surface of the polyvinyl alcohol and clay coating 3, at those points from which unexposed portions 4 of the silver emulsion have been washed away, is then rendered water-receptive to provide the grease-repellent non-printing portions of the plate. A completed plate, finished in accordance with the method of the invention, has been diagrammatically illustrated in Figure 6 of the drawing.

An important aspect of the invention is the step of washing away photographically exposed portions of the silver gelatin emulsion while at the same time temporarily preserving the unexposed portions of the silver coating and then washing away the unexposed portions during a development operation.

It is pointed out that the unexposed portions of the silver coating, while covered with shellac and greasy ink, by remaining in a water-soluble state provide for selective formation of printing areas in much the same way as occurs in the de-

velopment of lithographic printing plates in accordance with the albumin process. The unexposed gelatin and silver becomes washed away, even though covered by the shellac and greasy developing ink, in much the same manner as occurs when unexposed portions of an albumin coating are dissolved and washed away while also covered with greasy developing materials. The process of the invention especially takes advantage of this operation of washing out unexposed portions first by filling in with greasy ink the spaces occurring between the unexposed portions resulting from washing out exposed portions. The greasy material thus filled in between the unexposed portions, together with the underlying shellac becomes strongly attached to the polyvinyl alcohol and clay surface, and thus affords a satisfactory medium upon which greasy printing ink may be applied and thereafter transferred in the manner common to lithographic printing plates.

It is pointed out that the method of the invention is simple, cheap, efficient and adapted to effect material savings in connection with the preparation of planographic printing plates generally. As noted above, the use of actinic light, coating mixtures including chromium compounds, and all the apparatus and operations now resorted to in applying such coatings, are eliminated, with very great savings in time, labor and equipment. By the method described, very rapid preparation of printing plates can be carried out, and such operations may take place outside of laboratories or other establishments in which exposure and development of lithographic plates have heretofore been carried out.

It is intended that the invention may be varied in several respects and may be utilized for forming various other types of printing members, as for example photographic negatives, etched plates, relief plates and other operations. In this connection, the step of washing out photographically exposed portions of a silver emulsion coating is thought to be especially important and adaptable for other applications in the field of printing generally.

While I have shown a preferred embodiment of my invention, it should be understood that various changes and modifications may be resorted to without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. Process for preparing a planographic printing plate which comprises providing a photosensitive silver emulsion coating supported on a planographic base, exposing the coating to form photographically exposed portions and unexposed portions, treating the plate with an agent for removing from the base said photographically hardened portions only, coating the plate with a grease-receptive material, applying a greasy ink over the said grease-receptive material and washing the plate in water to remove unexposed portions of the silver emulsion together with overlying parts of the grease-receptive material and greasy ink.

2. Process for preparing a planographic printing plate which comprises applying a photosensitive silver emulsion on a planographic base, subjecting the plate to light passed through a photographic negative to form photographically hardened portions and unexposed portions, washing out the photographically hardened portions, coating with shellac, applying greasy ink over the

shellac and developing in water to wash away unexposed portions of the silver emulsion together with shellac and greasy ink.

3. Process for preparing a planographic printing plate which comprises providing a photosensitive silver emulsion coating supported on a water-receptive planographic base, exposing the photosensitive emulsion to form photographically exposed and unexposed portions, treating the plate with an agent which is adapted to dissolve the photographically exposed portions only, applying a second coating over the surface of the plate from which the photographically exposed portions have been removed, covering the second coating with a greasy inking material, and then washing the plate in water to remove unexposed portions of the silver emulsion coating together with directly overlying portions of the said second coating and the greasy ink and to leave greasy printing portions anchored to the water-receptive planographic base.

4. Process for preparing a planographic printing plate which comprises providing a photosensitive silver emulsion coating supported on a planographic base, exposing the photosensitive emulsion to form photographically exposed and unexposed portions, treating the plate with an agent for removing said photographically exposed portions only from the planographic base, said agent including a mixture of hydrogen peroxide, copper sulphate and bromine, applying a second coating over the surface of the plate, covering the second coating with a greasy ink, then removing from the planographic base the unexposed portions of the silver emulsion thereby to leave greasy printing portions anchored to the planographic base.

5. Process for preparing a planographic printing plate which comprises providing a photosensitive silver emulsion coating supported on a planographic printing plate base, exposing the coating to form photographically exposed portions and unexposed portions, treating the plate with an agent for removing from the base said photographically exposed portions only, coating the plate with a resinous material which becomes attached to the printing plate base at those points from which photographically exposed portions have been removed, applying greasy ink and washing in water to dissolve away unexposed portions of the silver emulsion coating together with overlying parts of the resinous material.

6. Process for preparing a printing member which comprises providing a photosensitive silver emulsion coating on a water-receptive base element, exposing the coating to form photographically exposed portions and unexposed portions, removing said photographically exposed portions from the base element, applying on the base element in the spaces left by removal of the exposed portions an anchoring medium of grease-receptive character, covering the base element with greasy

ink thereby to attach the ink to the anchoring medium, and washing in water to remove unexposed portions of the photosensitive coating together with overlying portions of the anchoring medium and ink.

7. Process for preparing a planographic printing plate which comprises applying a photosensitive silver emulsion coating on a water-receptive base element, exposing the coating to form photographically exposed portions and unexposed portions, treating with an agent for removing from the base said photographically hardened portions only, said agent comprising a mixture which includes hydrogen peroxide, applying a second coating over the unexposed portions of the silver emulsion coating and over portions of the water-receptive base from which exposed portions of the silver emulsion coating have been removed, covering the second coating with a greasy ink, washing away unexposed portions of the silver emulsion coating together with directly overlying parts of the second coating and the greasy ink, thereby to form grease-receptive printing portions anchored to the water-receptive base by means of the remaining portions of the said second coating.

8. Process for preparing a planographic printing plate which comprises applying a photosensitive silver emulsion on a planographic base, subjecting the plate to light passed through a photographic negative to form photographically hardened portions and unexposed portions, washing out the photographically hardened portions with a mixture of hydrogen peroxide, cupric sulphate, hydrochloric acid and water, coating with shellac, applying greasy ink over the shellac and developing in water to wash away unexposed portions of the silver emulsion together with shellac and greasy ink overlying said unexposed portions.

9. Process for preparing a planographic printing plate which comprises applying a photosensitive silver emulsion on a planographic base, subjecting the plate to light passed through a photographic negative to form photographically hardened portions and unexposed portions, washing out the photographically hardened portions with a mixture of hydrogen peroxide, cupric sulphate, bromine and water, coating with shellac, applying greasy ink over the shellac and developing in water to wash away unexposed portions of the silver emulsion together with shellac and greasy ink overlying said unexposed portions.

10. That improved process which comprises applying a photosensitive silver emulsion on a base, exposing the emulsion to form photographically exposed portions and unexposed portions, removing the exposed portions only, then filling in around the unexposed portions a second coating material, covering with a greasy ink and washing in water to remove the unexposed portions of the silver emulsion coating.

ELLIS BASSIST.