April 7, 1925. 1,532,188

J. KRAKES

LITHOGRAPHIC PRINTING PLATE AND PROCESS OF PREPARING THE SAME

Filed Dec. 1, 1922

Fig 1

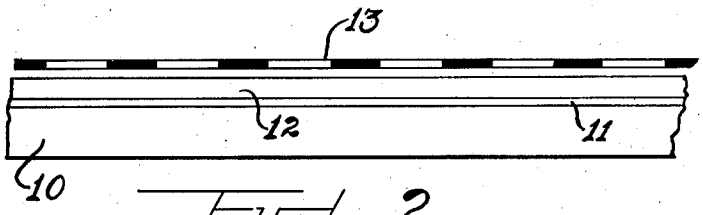


Fig 2

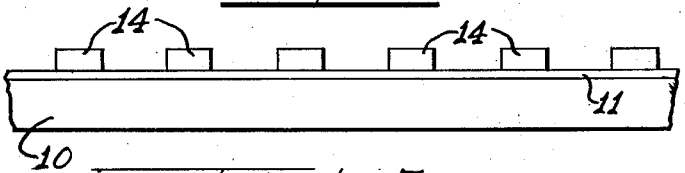


Fig 3

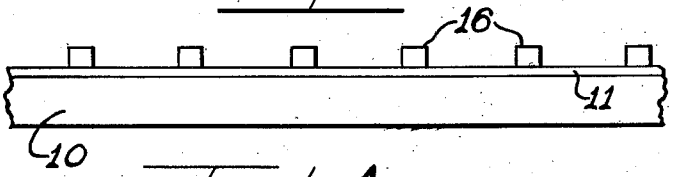


Fig 4

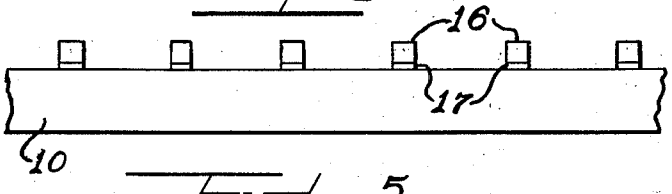


Fig 5

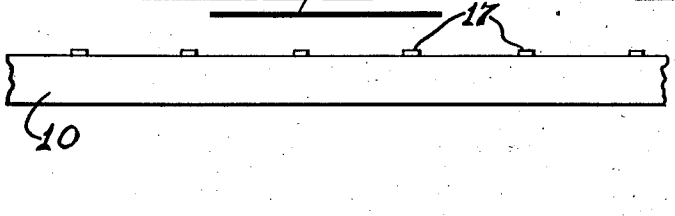


Fig 6

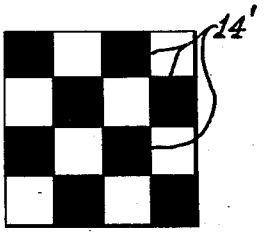
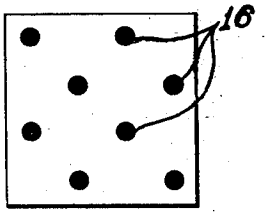


Fig 7



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES KRAKES, OF CHICAGO, ILLINOIS.

LITHOGRAPHIC PRINTING PLATE AND PROCESS OF PREPARING THE SAME.

Application filed December 1, 1922. Serial No. 604,214.

To all whom it may concern:

Be it known that I, JAMES KRAKES, a citizen of the Republic of Czechoslovakia, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Lithographic Printing Plate and Process of Preparing the Same; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

Heretofore when lithographic printing plates have been made by means of a covering of asphalt on stone or metal, the retouched portions of the plates have produced an undesirable grayish color in the prints which is due to an irregularity in the outline of the dots.

It is an object of the present invention to prepare a photolithographic plate which may be retouched by the usual washing chemical and yet will leave the dots in the retouched portions of a uniform shape and with sharp clean-cut edges.

It is a further object of this invention to prepare a photolithographic plate in which the asphalt is separated from the stone or metal by a layer of material which will prevent the asphalt from soaking into the stone or spreading along the surface of the metal.

It is a further object of this invention to provide a method for reducing the portions in a photolithographic plate which print too dark by a treatment of the plate that will avoid the undesirable grayish color that has heretofore been produced by such retouched portions.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a diagram illustrating the photolithographic plate with a negative superposed thereon.

Figure 2 is a similar diagram illustrating the condition of the plate after it has been developed.

Figure 3 is a similar diagrammatic representation of the condition of the plate after it has been treated with the retouching solution.

Figure 4 is a similar diagram showing the condition of the plate after etching.

Figure 5 is a similar diagram illustrating the final condition of the plate, ready for printing.

Figure 6 is a diagrammatic surface view illustrating the arrangement of dots upon a plate before retouching.

Figure 7 is a diagrammatic view showing the results of the retouching according to the present invention.

As shown on the drawings:

The printing plate consists of a base 10 of lithographic stone, zinc or other metal ordinarily used for printing plates. In the preparation of a lithographic plate according to my invention, a layer 11 of protective material is first spread upon the stone. Preferably this is a material that is at first rather soft but hardens upon exposure to light. Any of the usual gums or gum-like substances that harden upon exposure or drying may be used. For example, a preparation of gelatin, albumen-water (white of egg), and ammonia, together with potassium dichromate, may be spread upon the stone and then exposed to light either before or during the drying. This exposure to light may be made during the preparation of the plate as just indicated, or the exposure through the negative when copying the photograph may be made to serve. If the exposure is made during the preparation of the plate and before the use of a negative, the better practice is to give the stone a second coat of the protective material in order to be sure that an abundance of material capable of being acted upon by the light is present.

When the layer 11 of protective material has hardened, the usual layer of asphalt, with which workers in this art are familiar, is spread on the layer 11 as shown at 12. Because of the presence of the protective layer 11, this asphalt does not soak into the stone but remains wholly above the layer 11. A negative 13 is then placed above the stone, as shown in Figure 1, and the stone with the negative is exposed to light.

The negative is then removed and the plate is treated with the usual developing solution of turpentine. Where the asphalt has been exposed to light, it does not readily dissolve in the turpentine, but under the

opaque parts of the negative the asphalt remains unaffected by light and will be dissolved in the turpentine. The result is the sort of a plate illustrated in Figure 2 where the stone or metal 10 forming the base is covered by the protective layer 11 on which the dots corresponding to the transparent parts of the negative are represented by specks or islands or patches of asphalt, as is illustrated at 14 in Figure 2.

In the most frequent application of my invention the negative will be of the type made by means of a screen, so that the specks or patches of asphalt 14 will be distributed in a more or less regular pattern over the plate. These cakes will be larger where the final picture is to be darker and will be smaller where the picture printed from the plate is to be lighter. The usual photographic practices do not give a picture which is satisfactory in all parts, and the operator must retouch by changing the size of the dots in portions of the plate in order to produce an artistically satisfactory result. This is accomplished by treating those portions of the plate which print too dark with some chemical that will dissolve away a portion of the asphalt. The usual way of doing this is by applying the chemical locally with a wad of cotton or other convenient vehicle.

The plate before retouching is represented by Fig. 6, wherein black portions 14′ stand for the patches or dots of asphalt. Retouching, as heretofore performed, has resulted in an irregular or ragged outline of the dots or patches. When the asphalt is mounted on stone, this irregularity is largely caused by the action of the asphalt in soaking into the grains of the stone, so that the chemical acting upon the asphalt is not the only agency diminishing the size of the patches, but there is a tendency to undercut the edges of each patch of asphalt by the combined action of the dissolving chemical and the absorbing or capillary action of the stone. When the asphalt is applied on metal, such as zinc, there is a tendency for the semi-dissolved asphalt to spread in a film over the metal, and this tendency has the same effect upon the edges of the patches and results in the same irregular shaped dots.

When the protective layer 11 is present, there is nothing at the base of the edge walls of the several patches 16 of asphalt illustrated in Figure 3 to cause the asphalt to be removed any faster there. The action of the chemical removes asphalt equally along the whole height of the side surface of the patch. Consequently the edges remain vertical walls and the resulting patches are of the shape shown at 16 in Fig. 7. Therefore the edges of the dots which will be formed when the print is made will be sharp and smooth and not either irregular or fringed. The above-mentioned washing, retouching, local reduction or local development (these terms are used interchangeably here) is accomplished by any of the chemicals known to workers in this art. I have employed to advantage a mixture of turpentine and benzene. Whatever chemical be employed for this purpose, the new character of the edges of the patches of asphalt and so the new character of the edges of the dots in the final print results from the protective layer 11.

After the retouching is completed, I treat the whole plate with a solution of gum arabic and nitric acid for etching. This solution acts only where the protective layer 11 is not covered by asphalt, so that there results the plate illustrated in Figure 4, in which the stone 10 is exposed except for the parts covered by the patches. At each of these dots a small piece 17 of the protective material remains covered by a patch 16 of asphalt. If this etching is carried a little further, the stone or metal 10 may be slightly etched between the dots, but this is not necessary for the carrying out of my invention.

After the etching all of the asphalt is removed by a further treatment with any of the usual solvents for asphalt-benzine, turpentine, benzene, or a mixture thereof. The result is the plate shown in Figure 5, in which the patches 17 of protective material stand up above the general surface of the stone or metal 10. When this plate is used for printing, the projecting patches 17 receive the ink and give the impression, while the stone itself acts solely as a support for the dot-forming patches.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A photolithographic plate comprising a foundation of lithographic stone, a layer of hardened gum-like material disposed upon the stone, and a layer of sensitive greasy material separated from the stone by said layer of hardened gum-like material.

2. A photolithographic plate comprising a layer of light sensitive asphalt, a foundation layer, and an intermediate layer of material impervious to asphalt.

3. A process of preparing a printing plate which comprises covering a foundation layer with a mixture of gelatin, albumen and a chemical which will cause these substances to harden when exposed to light, exposing said layer to light, covering said layer with a layer of light-sensi-

tive asphalt, exposing the asphalt to light through a negative, developing the resulting latent image in the asphalt, treating the portions of the plate which would print too dark with a reducing compound whereby the size of the patches of asphalt is reduced, etching the plate to remove the hardened layer between the patches of asphalt, and finally washing all asphalt from the plate.

4. The process of locally reducing the tone of a photolithographic printing plate which consists in preparing a printing plate consisting of patches of asphalt, one for each dot in the finished picture, separated from the foundation by a layer of material impervious to asphalt, and washing the selected portions of the plate with a material that will dissolve asphalt whereby the size of the patches of asphalt will be reduced without producing irregularities in the edges of said patches.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

JAMES KRAKES.

Witnesses:

CHARLES W. HILLS, JR.,

OSCAR HARTMANN.