

UNITED STATES PATENT OFFICE

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IMPREGNATED PENCIL LEAD

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1

This invention relates to a planographic image-forming pencil for use in forming images upon master planographic printing plates including aluminum and paper or like cellulose base master planographic printing plates.

A number of problems are encountered in the manufacture of planographic image-forming pencils which are peculiar to such pencils and which are not encountered in the manufacture of common so-called lead pencils. Among these problems are: A planographic image-forming pencil must be capable of forming an inscription or image which will produce a satisfactory number of copies from the master plate upon which the image is written; it must be capable of making uniform lines, that is to say, lines which are of substantially uniform width throughout their entire length upon the master plate; the writing instrument, that is to say, the cylindrical rod or so-called lead which is embodied in such a planographic pencil must be neither too soft so that the inscription or image formed thereby will wash off the plate readily or so that it will produce lines which will vary in width as the pencil moves across a master aluminum or paper or like planographic plate on which it is being used to write an image, and it must not be sufficiently hard to scratch such a master planographic printing plate; and it must have good ink-receptive and ink-retentive properties so that it will be receptive to and will retain the lithographic inks used in making reproductions from the master plate.

Accordingly, an object of the present invention is to provide a new and improved image-forming planographic pencil embodying a writing instrument or so-called lead which has good image-forming properties and which will produce images having good ink-receptive and ink-retentive properties for planographic or lithographic inks; which is sufficiently hard to enable it to make lines of uniform width upon a paper or other planographic printing plate and to prevent the image made thereby from washing off the plate; and which is otherwise a satisfactory image-forming planographic pencil.

An additional object of the invention is to provide a novel impregnant for impregnating the cylindrical writing rods or so-called leads of the new planographic pencil so as to impart thereto good image-forming properties and so as to enable it to form images which have good ink-receptive and ink-retentive characteristics.

Another object of the invention is to provide a novel method for making the cylindrical writ-

2

ing rods or so-called leads of the new planographic pencil.

Other and further objects of the present invention will be apparent from the following description and claims which describe preferred embodiments of the invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the practice of the present invention the base of the cylindrical writing instrument or rod or so-called lead which is embodied in the new planographic pencil may be any one of various compositions employed in making conventional hard or so-called 8H lead pencils. Such compositions are illustrated, for example, in U. S. Patent No. 1,937,105 and in The Chemical Formulary, vol. 2, page 268. Thus a typical formula which may be employed in preparing the base of or so-called lead for the cylindrical rod or writing instrument which is embodied in the new planographic pencil may be that which is shown in the following example:

Example No. 1

	Parts by weight
Clay (binder).....	5 to 8
Amorphous or so-called Mexican graphite.....	3
Carbon black.....	1

In the manufacture of the new planographic pencil the base of the writing instrument or cylindrical rod which is embodied therein, and which may be prepared according to the formula set forth in the foregoing Example No. 1, or according to any other suitable formula, is mixed with water to form a plastic mass or dough which is then extruded in rod form and dried and baked or ignited in a graphite crucible in an oven at a temperature of approximately 1000° C. for approximately an hour.

The cylindrical rods or so-called leads thus prepared are then impregnated with a novel impregnant of the present invention, and for a suitable length of time, such as two hours, so as to impart image-forming and ink-receptive properties to the rods or so-called leads. This is accomplished by heating the rods for approximately four hours in a kettle or other suitable container with one of the impregnants which may be used in the practice of the present invention and which im-

pregnant is preferably the varnish having the composition set forth in the following example:

Example No. 2

	Parts by weight
China-wood oil.....	50
Rosin	50
	100

In the practice of the present invention it has been found that the China-wood oil provides an excellent image-forming material and has good ink-receptive properties for lithographic inks, and that the rosin component of the impregnant, while being itself a good image-forming material, also congeals or bodies and solidifies the China-wood oil component of the impregnant and overcomes the tendency of the China-wood oil if used alone to bleed to the surface of the pencil.

During the operation of impregnating the rods or so-called oil-rosin mixture set forth in the foregoing Example No. 2 the temperature of the impregnating solvent was maintained at about 200° C., care being exercised to keep the temperature of the impregnating mixture below the temperature at which the China-wood oil will polymerize and which is about 275° C. During this operation the rosin dissolves in the China-wood oil to form an impregnating solution of rosin dissolved in China-wood oil.

After the cylindrical writing rods or so-called leads were thus heated for about four hours in the China-wood oil-rosin impregnating mixture they were removed from the kettle and allowed to cool to atmospheric temperature. The thus impregnated leads or rods were then encased or enclosed in grooved wooden pencil casings in a conventional manner. This operation, as is well understood in the art, includes inserting the rods or so-called leads into a groove formed in one of two complementary sections of a wood or like pencil casing, adhesively securing the two complementary halves or sections of the pencil casing together with the rod or so-called lead therebetween; suitably shaping the outer surface of the pencil casing as by forming hexagonal faces thereon; and then suitably finishing the pencil casing as by sanding and painting the same.

In place of the preferred China-wood oil-rosin impregnant set forth in the foregoing Example No. 1 we may use, with less satisfactory results, certain other greasy planographic image-forming materials as the impregnant and among these are the following: (a) China-wood oil alone; (b) rosin alone; (c) a mixture of about equal parts of China-wood oil and Carnauba wax, by weight; and (d) a mixture composed of about equal parts by weight of China-wood or tung oil and a heat-reactive phenol-formaldehyde resin.

Likewise, in place of a selected one of the greasy planographic image-forming materials referred to above, we may employ as the impregnant selected non-greasy image-forming materials such, for example, as certain of those disclosed in United States Patent No. 2,342,713, granted February 29, 1944, and including a mixture of one part of Nigrosine base black and three parts of tricresyl phosphate, by weight.

It has been found that the new planographic pencil prepared according to the present inven-

tion has good image-forming properties, and that images formed thereby have good ink-receptive properties for lithographic inks, which are imparted thereto by the novel impregnating solution hereinbefore described; that the writing instrument or so-called lead embodied in the new lithographic pencil is sufficiently hard to enable it to form good images, including lines of uniform width, on paper and like planographic printing plates; that it will provide images which will not readily wash off such plates; and that it provides images which will enable satisfactory editions or numbers of copies to be reproduced from a master paper or like planographic printing plate when the latter is employed in making reproductions in a rotary offset duplicating or planographic printing press or the like.

It will thus be seen from the foregoing description that the present invention provides a new and improved planographic pencil, and a novel method of making the same, and that the new lithographic pencil has the desirable advantages and characteristics, and accomplishes its intended objects, including those hereinbefore pointed out and others which are inherent in the invention.

We claim:

1. A pencil lead impregnated with a mixture of China-wood oil and rosin.
2. A pencil lead impregnated with a mixture of China-wood oil and rosin in about equal parts, by weight.
3. A pencil lead comprised of amorphous graphite bonded with clay and impregnated with a mixture of China-wood oil and rosin.
4. A pencil lead comprised of a mixture of amorphous graphite and carbon black bonded with clay and impregnated with a varnish composed of China-wood oil and rosin.
5. A pencil lead comprised of a mixture of amorphous graphite and carbon black bonded with clay and impregnated with a varnish composed of about equal parts, by weight, of China-wood oil and rosin.

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