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PLANOGRAPHIC PRINTING PLATE

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Fig. 1

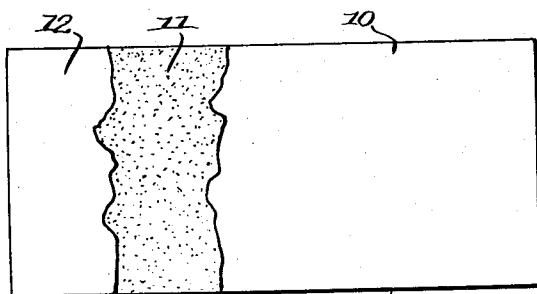
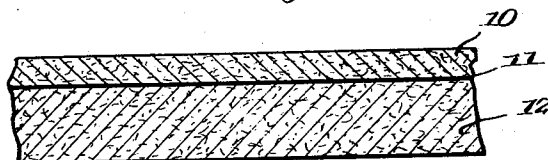


Fig. 2



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UNITED STATES PATENT OFFICE

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PLANOGRAPHIC PRINTING PLATE

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Application September 1, 1937, Serial No. 161,970

5 Claims. (Cl. 41—41.5)

This invention relates to an improvement in planographic printing, and more particularly to a cellulosic planographic printing plate and to a method of preparing the same for printing, said planographic printing plate being characterized by a printing face of dense amyloid parchment, a coextensive backing of kraft or the like tough paper and a bonding layer of a waterproof thermoplastic cellulosic cement therebetween; said printing face, backing and bonding layer being coextensive and preferably translucent, and said plate preferably bearing thereon indicia applied either to the printing face or to the inside face of the backing and being legibly visible at the printing face by incident light. When applied to the printing face the indicia are formed either by an ink which will not retain lithographic printing ink under printing conditions or by a water-soluble ink that is removed by water and during the dampening operation and hence will not be reproduced. This application is a continuation-in-part of my copending application Serial No. 72,597, filed April 3, 1936.

The art of planographic printing depends, as does the older art of lithographic printing, upon the immiscibility of oil and water. Heretofore only such surfaces as were or as could be rendered preferentially wettable by and retentive of grease and, only such surfaces as, subsequent to the delineation of a greasy image thereon, could be rendered preferentially wettable by water, were considered adapted to this process.

The older lithographic process makes use of a dressed surface of absorbent stone and the younger related planographic process has heretofore made use of variously treated metal surfaces. In these prior processes the retention of a directly delineated image depends upon a reaction between the metal of the substance of the surface and a fatty acid in the image-forming material.

It is an object of the present invention to provide a planographic printing plate having a printing face of dense amyloid parchment which I have discovered to be particularly adapted to the reception and retention of a grease-receptive printing image directly impressed thereon, as by typewriting for instance, or delineated thereon, as by free hand drawing or otherwise. It is another object to provide a highly flexible planographic printing plate having a dense amyloid parchment printing face adapted to be directly typewritten upon and upon which erasures and corrections can be made in the manner commonly employed by typists.

Another object is to provide a planographic printing plate having a printing face of dense translucent amyloid parchment, a coextensive backing of tough kraft or the like paper and an intervening waterproof layer of transparent thermoplastic cellulosic adhesive.

A further object of this invention is to provide a composite planographic printing plate of the character described wherein swelling of the printing face due to the absorption of water therein is substantially confined to a direction normal to said face and wherein lateral distortion of said printing plate and of a printing image carried thereon is substantially avoided thereby.

A still further object of this invention is to provide a composite planographic printing plate of the character described, which is sufficiently translucent to readily admit of tracing there-through by transmitted light though not necessarily by incident light.

Another object is to provide a planographic printing plate of the character described and further characterized by non-printing indicia such as those designed to serve as guides for the location of margins, spacings or other orientation of printing images upon the printing face thereof, such indicia being either upon the printing face or upon the inside face of the backing and being legibly visible at the printing face, by incident light, and, when upon the printing face being formed either by an ink which will not retain lithographic printing ink under printing conditions or by a water-soluble ink that may be removed by water or is removed by and during the dampening operation and hence will not be reproduced.

Another object is to provide an imperforate planographic printing plate of the character described and further characterized by a transverse scoring adjacent and parallel to each end thereof, said scoring being convex on the facing side of said plate and concave on the reverse side thereof, whereby end-portions of the plate may be readily folded over to engage tensioning means on or attachable to the impression cylinder of a planographic printing press.

One advantage of plates embodying this invention is that by reason of their translucency tracings may be made thereon from underlying originals. Another advantage is that the guiding indicia will not interfere with the use of the plate as by curtailing the working area and the objections to impressed guiding indicia on thin sheet metal or metal foil-faced plates are thus

avoided. Another advantage is that plates of this invention are made up of commercially obtainable products by a mere assembly thereof and hence are inexpensive to manufacture. Other objects and advantages will become apparent as the description proceeds.

The expression "planographic printing" is used herein to denote that printing process in which the surface of the printing element is substantially plane and in which the printing image is substantially in the plane of the printing surface. That is to say, the printing image is neither raised appreciably above nor sunk below the plane of the printing surface as in printing from type or from a deep etched plate on the one hand or from an engraved or intaglio plate on the other.

The expression "substantially plane" is used to denote a surface which is macroscopically though not necessarily microscopically smooth and one in which variations from the mean are microscopically small.

The term "amyloid parchment" is used to denote the product of the well-known process of treating water-leaf paper in sulfuric acid, washing, neutralizing, drying and sometimes but not always or necessarily calendering the same.

Not all amyloid parchment is suitable for the purposes of this invention but any amyloid parchment which fulfills the criteria hereinafter catalogued is suitable for said purposes. The general criteria of suitability for the purposes of this invention are:

(1) The parchment must be of such character as to be highly resistant to distintegration by water, i. e., it must have and retain a high cohesion when saturated with water;

(2) The parchment should consist preferably only of cellulose and its amyloid derivative and must not comprise any water-soluble sizing or any size or other component or contaminant which is preferentially grease receptive and repellent of water;

(3) The parchment must be readily wet by and absorptive of water;

(4) The parchment must be substantially plane and of substantially uniform high density and corresponding translucency;

(5) The parchment when substantially dry must be readily wettable by grease and, when integrated therewith, must be retentive thereof against the displacing effect of water or acidic dampening solutions, and the parchment when already wet by water must be repellent to grease. In other words, grease integrated with the dry parchment should not be readily displaced by water later applied, but grease contracted with parchment previously dampened by water but without other preparatory treatment should be readily displaced by water later applied.

As the art of parchmentizing water-leaf paper is well known and forms no part of this invention, no further description thereof is deemed necessary. Because not all amyloid parchments are suitable for the purposes of this invention and because it is not feasible to distinguish wholly in terms of chemical composition, mode of manufacture, or physical characteristics those useful from those which are not suitable, it is thought expedient to provide simple tests by which those amyloid parchments which are useful for the said purposes may be readily distinguished from those which are not.

The specific tests to determine the suitability of amyloid parchment for the printing surface of

the plates of this invention in accordance with the general criteria set forth above are as follows:

(1) The resistance of the amyloid parchment to distintegration by water may be tested by immersing a sample of the material in question in water at room temperature for one hour and then spreading the sample on a smooth hard surface, as a sheet of glass for instance, removing the superficial water with absorbent material, as blotting paper, and then rubbing the surface with the ball of the thumb under heavy pressure. If the sample withstands five passes of the thumb under these conditions without observable attrition of the surface, it is suitable in this respect.

(2) The capability of the parchment to be readily wet by and absorptive of water is ascertained by following the usual method of determining the moisture content of papers. If the difference between the paper in the dry state, i. e., in equilibrium with the atmosphere, and the paper in the dampened state shows an increment of weight of two per centum or more, the product is suitable in this respect.

(3) The grease retentivity of wet parchment for grease integrated therewith when dry has been found to vary approximately as the density thereof or inversely as the opacity thereof, and the preferred parchment is one which has a substantially uniform density corresponding to an opacity of between 0.45 and 0.55 as determined for a thickness of 0.004 of an inch in a Bausch & Lomb opacimeter, such parchment being also satisfactory as to its translucency.

(4) The relative grease retentivity of wet parchment for grease integrated therewith when dry and the grease repellency of wet parchment may be tested by applying greasy lithographic printing ink to a limited area of the parchment when substantially dry, (i. e., when the parchment is in moisture equilibrium with the atmosphere at ordinary relative humidities) and integrating it therewith by heating to 100° F. for ten minutes and then wetting the non-inked areas with water and, after the parchment in these areas has become thoroughly saturated, removing the superficial water with blotting paper or the like, and then immediately rolling up the wetted area with the printing ink. If the surface has been insufficiently freed of water, it may refuse ink, and if so, further contact with dry clean blotting or other bibulous paper should be made. When and as soon as the area to be tested accepts ink, the inking brayer should be repeatedly rolled across it in several directions, preferably at right angles to each other, until such area is rolled up solid or completely covered with ink. A pool of the etching solution described in my United States Patent No. 2,003,268, dated May 28, 1935, which comprises ammonium dihydrogen phosphate, nickel or cobalt nitrate, glycerine and water is then poured upon the inked area and allowed to stand and undisturbed for ten minutes or so. If the parchment under test is suitable in respect of its ability to retain grease applied thereto and integrated therewith when dry, it will be found at the completion of the above test that the ink on the originally inked area has remained substantially unchanged and has not been appreciably disturbed by the etching solution. If the parchment under test is suitable in respect of its ability of repel ink when wet, i. e., free from any component or contaminant which is preferentially grease receptive, it will

then be found to be free or substantially free from ink in those portions of the areas covered by the pool of etch which were not inked while dry.

5 As the plates of this invention are particularly useful for the reception of direct typewriting, it is desirable that they be highly flexible; and to this end plates of between five and ten thousandths of an inch in thickness are preferred.
 10 A sheet of dense amyloid parchment of about 60 lbs. ream weight [24 x 36 500 sheets] and approximately 0.004 inch in thickness in adherent combination with a sheet of Kraft or the like paper of about 45 lbs. weight and approximately 0.004 of an inch in thickness by means
 15 of an intervening layer of an adhesive of approximately 0.0005 of an inch in thickness, yields a plate of satisfactory thickness (circa 0.0085 inch). The intervening layer is a water-insoluble, thermoplastic, transparent, cellulose
 20 derivative, such as cellulose acetate or nitrate plasticized with resin having an adhesion to the parchment facing when the facing is saturated with water of at least five ounces per linear
 25 inch. In making the plate the adhesive is first applied to the parchment in solution, the solvent evaporated, and the facing and backing laminated by heat and pressure. Under such
 30 conditions, and after saturation with water, an adhesion of from nine to ten ounces per linear inch has been obtained.

The backing is protected by the intermediate layer from the effect of the dampening solution applied to the printing face in the usual way
 35 during the printing operation and hence, although the parchment printing face does swell due to the absorption of the dampening solution, such swelling is confined to a direction normal to the face. Any tendency to substantial lateral
 40 distortion of the plate is accordingly prevented and the lateral dimensions of the printing image are maintained substantially constant.

The plate is provided with indicia, such as guide marks applied to the inner face of the
 45 backing and covered by the parchment and thermoplastic layer. When, as is preferable, the parchment is translucent and the said layer is transparent, the indicia are readily visible there-through by incident light and obviously do not
 50 print because of the coverage afforded by the parchment. When desired, however, the indicia may be printed directly upon the face of the parchment with a known ink which is either
 55 non-printing, i. e., not receptive to lithographic printing ink, or is water-soluble and readily removed by the dampening solution and not transferred with the image when the plate is used
 for printing. The indicia may be in the form of marks to assist in the proper location of typing
 60 or other images upon the printing face or in the form of advertising or trade-marks. The essence of this feature is that the indicia take no part in the use of the plate for printing.

The plate may be and preferably is substantially translucent so that designs may be traced
 65 upon the printing face in suitable ink-receiving image material under the guidance of originals which are rendered visible at the printing face by light transmitted through the plate, though
 70 not necessarily visible by incident light. The translucency of the backing may be enhanced as desired in well known ways as by impregnation with waxy or resinous materials.

The plate may be secured to the impression
 75 element of the machine by means of an adhesive

layer or preferably by suitable clamping means which grasp the ends of the plate. Creases across each end of the plate are provided to insure the even location of the clamping means; such creases being convex on the facing side
 5 of the plate and concave on the reverse side thereof, whereby the ends of the plate may be readily folded over.

In the accompanying drawing, Figure 1 is a plan view and Figure 2 is a sectional view.
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Referring to the drawing, I have shown a plate embodying this invention. The reference numeral 10 designates the printing face to which is adhered by the adhesive layer 11 the backing
 12.

I claim:

1. A composite planographic printing plate comprising a facing of amyloid parchment readily wet by and absorptive of water and highly resistant to disintegration thereby which parchment when substantially dry is readily wettable
 20 by grease and, when integrated with grease is retentive thereof against the displacing effect of water or acidic dampening solutions and, when wet by water is repellant to grease, such parchment being of substantially uniform high density and corresponding translucency and adapted
 25 to receive the printing image thereon, a backing for said parchment and a waterproof intervening layer by which the parchment is secured to the backing, said layer being substantially transparent whereby indicia on the inner face
 30 of the backing can be read by incident light through the facing and intervening layer.

2. A composite planographic printing plate comprising a facing of amyloid parchment readily wet by and absorptive of water and highly resistant to disintegration thereby which parchment when substantially dry is readily wettable
 35 by grease and, when integrated with grease, is retentive thereof against the displacing effect of water or acidic dampening solutions and, when wet by water is repellant to grease, such parchment being of substantially uniform high density and corresponding translucency and adapted
 40 to receive the printing image thereon, a backing for said parchment, a water proof intervening layer by which the parchment is secured to the backing, and having indicia upon the facing in ink which is water soluble and readily removed
 45 by the dampening solution employed in the printing operation.

3. A composite planographic printing plate comprising a facing of amyloid parchment readily wet by and absorptive of water and highly resistant to disintegration thereby which parchment when substantially dry is readily wettable
 55 by grease and, when integrated with grease, is retentive thereof against the displacing effect of water or acidic dampening solutions and, when wet by water, is repellant to grease, such parchment being of substantially uniform high density and corresponding translucency and adapted
 60 to receive the printing image thereon, a backing for said parchment, a waterproof intervening layer by which the parchment is secured to the backing, said backing being of cellulose material and said intervening layer and backing being sufficiently translucent so that images may be visually
 65 perceived through the plate by light transmitted therethrough and tracings thereof made upon the facing.

4. A composite planographic printing plate comprising a facing of amyloid parchment adapted to receive the printing image thereon,
 75

a backing for said facing and a waterproof intervening layer which the facing is secured to the backing, said facing, backing and intervening layer being coextensive and the parchment forming said facing being readily wet by and absorptive of water and highly resistant to disintegration thereby, which parchment, when substantially dry, is readily wettable by grease and, when integrated with grease, is retentive thereof against the displacing effect of water or acidic dampening solutions and, when wet by water, is repellant to grease such parchment possessing a substantially uniform density corresponding to an opacity of between 0.45 and 0.55 as determined for a thickness of 0.004 of an inch in a Bausch and Lomb opacimeter.

5. A composite planographic printing plate comprising a facing of amyloid parchment adapted to receive the printing image thereon, a sub-

stantially translucent backing for said facing and a substantially translucent waterproof intervening layer by which the facing is secured to the backing, said facing, backing and intervening layer be coextensive and the parchment forming said facing being readily wet by and absorptive of water and highly resistant to disintegration thereby, which parchment, when substantially dry, is readily wettable by grease and, when integrated with grease, is retentive thereof against the displacing effect of water or acidic dampening solutions and, when wet by water, is repellant to grease such parchment possessing a substantially uniform density corresponding to an opacity of between 0.45 and 0.55 as determined for a thickness of 0.004 of an inch in a Bausch and Lomb opacimeter.

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