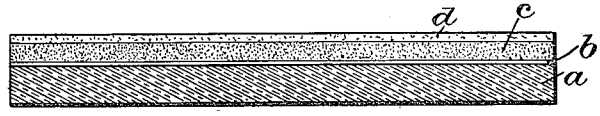
(No Model.)

O. DUBOIS.

PHOTO MECHANICAL PRINTING PLATE.

No. 428,472. Patented May 20, 1890.



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OTTO DUBOIS, OF FALL RIVER, MASSACHUSETTS.

PHOTO-MECHANICAL PRINTING-PLATE.

SPECIFICATION forming part of Letters Patent No. 428,472, dated May 20, 1890.

Application filed March 16, 1887. Serial No. 231,109. (No model.)

To all whom it may concern:

Be it known that I, OTTO DUBOIS, of the city of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Photo-Mechanical Printing-Plates, (or Gelatine Plates for Photo-Mechanical Printing;) and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

So far as my knowledge extends all gelatinous photo-mechanical printing-plates heretofore known have been of comparatively short life, even when very thoroughly washed and used but little; and one object of my invention is to produce a plate which will not deteriorate through exposure to light and air, but which will be capable of intermittent use, regardless of lapse of time and exposure, until the plate is actually worn out.

Another object sought by me is to produce a gelatine plate capable of affording a far greater number of perfect impressions than any prior gelatinous plate known to me.

Another object sought by me is in the process of printing to reduce the applications of water or other moistening-liquid to the plate to a minimum. I also seek to enable comparatively unskilled labor to perform the mechanical printing operation without either endangering the plate or any undue waste of paper and other materials which is incident to imperfect impressions, and, further, to obtain such well-known advantages as might accrue from the use of a thick gelatinous plate were it not for the well-known disadvantages heretofore encountered in the use of thick plates, in that, unless all prior plates be very thin, a well-known coarse-grained effect is necessarily developed therein, which detracts from the character of the impressions taken therefrom, the said grain being clearly discernible on the prints.

Each and all of these several ends are practically attainable by reason of my invention. One salient characteristic of a gelatine plate embodying my invention is that the gelatinous matter is rendered opaque by means of the presence of non-actinic color, instead of being transparent, as usually heretofore, although it has been heretofore proposed to mix white pigment with the gelatine for enabling the progress of the printing operation to be better observed when ebonite or other black backing was employed for supporting the gelatinous film. White gelatine compounds are, however, specially actinic, and hence they are wholly outside of my invention. This non-actinic opacity of my plate prevents the undue penetration of light while exposed under a negative, and hence a plate much thicker than is practicable when transparent can be properly acted upon by the light without developing any objectionable grain in the gelatine.

One advantage of an unusually-thick gelatinous plate consists in its capacity for absorbing more water than a thin plate, (all other conditions being equal,) and hence wetting operations can be reduced to a minimum. Another advantage is that a thick plate on the usual rigid backing is more elastic or resilient than the thin plate, and hence less pressure need be involved in inking and in printing, accompanied by a corresponding decrease in destructive wear of the printing-surface and a corresponding increased printing capacity. All of these several valuable results will and do accrue from the use of my improved photo-mechanical printing-plates, because for the first time I employ therein a yellow gelatinous opaque compound, and hence said plates are light in color and non-actinic.

As with prior gelatinous plates, I can employ with mine a backing of any of the many kinds heretofore known and used, and my plate will as readily directly adhere to ordinary backing or support as any of the prior gelatinous preparations or solutions; but with a glass backing, as is generally preferred, mine, like others, requires some specially-interposed medium for securing a reliable union of the gelatinous plate with the glass backing, and in this connection I have sought to obtain, with less cost and trouble, a more reliable union than can be effected with the silicate of soda or the egg albumen and a chromic-acid salt, heretofore employed.

For producing my gelatinous photo-mechanical printing-plates in their best form, I proceed as follows: I dissolve forty-five (45) grams of gelatine in twelve (12) ounces of water at a

well-known favorable temperature. To this I add six (6) grams of bichromate of potash (or any other chromic-acid salt) dissolved in water. After a thorough admixture I then add fifteen (15) grams of acetate of lead, dissolved in, say, six (6) ounces of water, and meantime stir continually. The lead will unite with the chromic acid from the salt and develop chromate of lead well and evenly distributed in the gelatine, and make the mass of a fine light-yellow color and opaque. The acetic acid from the acetate of lead will unite with the base of the chromic-acid salt, thus developing an acetate. The mass, having been all this while properly warmed, is then allowed to cool to a coagulum, which is then thinly sliced and washed freely in cold water until the acetate has been eliminated, whereupon, after draining the water therefrom, the sliced coagulum is ready for further procedure.

It is to be understood that chrome-yellow as a separate body may be mechanically incorporated with the gelatine; but it will be obvious that the best results must accrue by developing within the mass of gelatine the medium on which reliance is had for producing a plate having the requisite degree of opacity, and also that color which is most effective because of its non-actinic character. This opaque and specially non-actinic gelatine I believe to be broadly new in the art, and I proceed therewith as follows: I melt the colored gelatine and sensitize in the usual manner, preferably by the use of chromate of ammonium; but other chromic-acid salts may be used.

If a metal backing is to be employed, the sensitized gelatine is poured directly thereon and spread to evenness in the usual manner.

If the preferable glass backing is to be used, said backing may with fair results be previously treated as heretofore, in connection with the use of transparent sensitized gelatine—as, for instance, coated with silicate of soda or with egg albumen and a chromic-acid salt; but I obtain better results by proceeding in a novel manner devised by me, as follows: I immerse five (5) grams of gum-tragacanth in five (5) ounces of water for several days until it has been thoroughly swelled and softened, and to this is added a sufficient quantity of caustic ammonia (aqua-ammonia of high strength) to form a thin solution of the gum. This when coated upon a glass plate soon hardens by the evaporation of the ammonia and by drying, and affords a coating practically insoluble in water, and presenting a surface with which the gelatine will reliably adhere, thus securing a practically perfect union of the gelatine plate or film with the glass plate.

Whatever the intervening medium may be the opaque non-actinic gelatine can be applied in one or more thick films, or several thin ones, as may be desired in each case, each succeeding film readily uniting with the last preceding film and rendering the mass practically solid and homogeneous. The sensitized gelatine plate, however it may have been mounted on its backing, is then ready for exposure beneath a negative or a positive in the same manner as with the old transparent plates, but, unlike them, without any danger of too great exposure, because of the non-actinity of my opaque gelatine.

In exposing my plates under the negative it will be found that the blacks will only print to a certain depth and there remain until all the details in the whites are printed. After the negative exposure has been completed I proceed to remove all remaining external traces of the chromic-acid salt by first washing the plate in running water, say, ten minutes, and then immersing it for from two to five minutes in a solution composed of one quart of water, one ounce of acetate of lead, and one ounce of free acetic acid, the latter serving to counteract any undue astringent effect on the part of the lead, and then wash in water for, say, ten minutes and then dried. The lead of this acetate solution unites with the chromic-acid salt still remaining in the gelatine film and forms chrome-yellow, which, being non-sensitive to light, renders the plate unchangeable. The plate, being dried off, is then ready at any time for printing operations in the usual manner. The plate thus described possesses all of the qualities which I deem desirable, and from its use the several advantages which I have recited will accrue. I find, however, that it is sometimes desirable to make a further addition to the plate prior to exposure to a negative—that is to say, I apply to my opaque and non-actinic plate a coating of transparent sensitized gelatine, which so unites therewith as to make the whole practically homogeneous as to structure, and it can be used without in any manner impairing the results which accrue from the use of plates without this transparent surface. This transparent coating is of special value on such of my plates as may have been rendered opaque by the use of non-actinic pigments; but in any case the gelatine of the opaque sub-surface will be so wedded to the transparent surface gelatine as to secure that excessive absorptive capacity which I seek, and because of which a single wetting with water will serve for several inkings and produce as good results as with the alternate water wetting and inking, which is practically requisite in the use of all prior photo-mechanical gelatine printing-plates known to me. In my experience with glycerine solutions a transparent plate as heretofore prepared will admit of from fifteen to twenty-five impressions to each wetting operation; but with my plates I can take after each wetting with said solution from fifty to one thousand impressions, according to the hardness of the paper and its consequent capacity for absorbing moisture. It will be readily seen that the sub-surface when charged with water affords a desirable degree of elasticity

not attainable with a thin plate. Whether my plates have said transparent coating or not, they can be made of any desired thickness in one or more coatings or films without fear of developing the objectionable coarse grain well known to be liable in the use of transparent plates.

In the accompanying drawings one of my plates in its best form is illustrated in section, the glass backing being indicated at *a*, the coating of tragacanth at *b*, the main body of opaque gelatinous matter at *c*, and the outer transparent film at *d*.

As a rule, I expose the plate to light at its back for a few minutes before or after the exposure of the plate to a negative, for rendering the tragacanth coating absolutely firm in the presence of water during subsequent printing operations; but if this precaution be not taken the tragacanth will not be softened by glycerine solutions.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a photo-mechanical printing-plate, the combination of a suitable rigid backing and a printing-surface composed of a yellow opaque gelatinous film, substantially as described.

2. A photo-mechanical printing-plate having its printing-surface composed of a sheeted mass of gelatine containing chrome-yellow, substantially as and for the purposes specified.

3. A photo-mechanical printing-plate having a glass backing, a gelatinous printing-surface, and an interposed film of ammoniated gum-tragacanth, substantially as and for the purposes specified.

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