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PLASTIC OFFSET PRESS PRINTING PLATE
AND METHOD OF MAKING SAMEThomas R. Caton, Valley Stream,
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8 Claims. (Cl. 41—41.5)

The present invention deals with printing and specifically is directed to an offset press printing plate employed in connection with rotary cylinders or presses of printing duplicating machines. Hitherto and in so far as I am aware metal printing plates have been utilized. As is well known metal printing plates are subject to oxidation, thus requiring counteretching or a suitable acid for cleaning the metal plate to remove the oxide films. In many instances the employment of a counteretch renders the metal plate so sensitive that a desensitizing etching is needed to be applied to the application of the photosensitive coating. Generally the metal printing plates referred to are of aluminum or zinc and these in actual practice must receive a desensitizing etch after development. In the case of an aluminum or zinc printing plate, these must also receive a protective film of gum arabic to prevent the metal from oxidizing prior to its use in the rotary printing press. Where storage of aluminum or zinc plates is required, the inked image must be washed off to prevent crystallization of the ink and the destruction of the image and to preclude the uninked image from crystallizing and thus becoming useless, a film or coating of what is commonly known as asphaltum solution is applied to the inked image and rubbed down to an even dry film.

With the present invention, a plastic sheeting is employed as the printing plate and the object thereof is to provide a novel and improved printing plate of cellulose acetate or nitrocellulose providing a non-metallic plastic and pliable and resilient sheeting conveniently adapted for offset press printing and adapted to be desirably and readily processed for application to the printing cylinders of the duplicating apparatus. The invention has as a further object the provision of a novel and simplified method or process of making a non-metallic flexible and pliable printing sheeting requiring no counteretching, desensitizing etch, nor a protecting film of gum arabic, thus saving appreciable time and materials. As another object and according to the herein process, the use of asphaltum solution is eliminated since a plastic sheeting is employed and thus no oxidation takes place. Further and other important objects and advantages of the invention will appear from the following detailed specification.

Thus in accordance with the herein simplified method of making the improved non-metallic printing plate, the latter as hitherto pointed out is of a flexible, resilient and pliable sheeting and

of moldable plastic material such as cellulose acetate, or nitrocellulose material which may be opaque, transparent or translucent. One surface thereof is roughened or uniformly dry grained, that is, this surface is brazed adequately by either sand blasting or by subjecting this surface on a supporting oscillating table employing sand and marbles as abrasives. It follows that a uniformly grained surface is obtained. The purpose of such grained surface is to provide microscopic protuberances for adequately retaining moisture and the sensitizing solution which steps follow subsequently in the process herein. The irregular or uniformly grained surface of the plastic sheet is subsequently processed and such sheet with its grained surface may be desirably immersed in a solution or bath of approximately 3% caustic soda and 97% H₂O by volume for initially softening the microscopic protuberances for a period of, to wit, one minute and said bath is maintained substantially at 90 degrees F. at approximately atmospheric pressure and suitably agitated. Thereafter the plastic plate and particularly the grained surface thereof is flushed with lukewarm water to remove the caustic layer. Subsequently the plastic plate is immersed in a bath of approximately 3% H₂SO₄ and 97% water by volume and maintained substantially at 90° F. for approximately one minute at atmospheric pressure and agitated for hardening the grained surface, giving such surface a retained affinity to moisture so that when this surface is in contact with the dampening rollers of an offset printing press, the hardened grained surface of the plate receives an even film of repellent or fountain solution commonly used in the lithographic industry and for the purpose of rendering said hardened surface selective to moisture and ink as required.

Having grained one side of the plastic plate or sheet, softened and hardened the protuberances thereof and cooled, the plate is ready to receive the sensitizing solution. However preparatory to the application of such solution, the roughened or grained side is initially dampened with water to expedite the flow of the sensitizing solution which is thereafter applied. This sensitizing solution is of a type well known in the art, and is evenly distributed over the dampened grained surface by centrifugal force, that is the coated plate is placed on a revolving support and the coating is uniformly spread by centrifugal force. Following this step the sensitized coating is appropriately dried and is awaiting to receive the image of a photographic negative,

that is, the sensitized plastic plate and a photographic negative are appropriately arranged in contact in a vacuum controlled frame and adequately exposed to light. Thus the image of the negative is impressed on the plastic plate.

Subsequently ink known in the art as developing ink is applied to the exposed surface of the plastic plate and rubbed down to a smooth even dry film. This inked plate is immersed in a bath of water to dissolve the unexposed sensitized surface of the plate, leaving only the exposed inked image which is subsequently fixed and dried. At this time, the treated plastic plate may be stored for future use or applied to the duplicating machine.

The plastic plate with the developed image thereon if applied to the duplicating machine is mounted on the revolvable cylinder thereof which carries the usual fountain solution applied to the plate by dampening rollers just in advance of the ink rollers thereof. The portion of the exposed grained surface where no image appears accepts moisture making that portion of the plate repellent to ink but the image portion of the surface being greasy accepts the ink and rejects moisture. As this cylinder revolves, the inked image of the plastic plate is transferred to a rubber blanket of another cylinder as the blanket accepts the image from the plastic plate and the image on the blanket is transferred to copy paper carried by another cylinder as is well understood in the art.

In actual practice the plastic printing plate or sheeting has proved just as satisfactory as either a zinc or aluminum metal printing plate of the kind well known in the art, and offers economy in that it requires less steps in processing for ultimate use in the press concomitantly cutting down the number of chemicals as there is no need for counter etch, plate etch, or the use of gum arabic or asphaltum. The plastic printing plate can also be stored away for future use without the numerous process steps required to preserve an aluminum or zinc printing plate in that the plastic printing plate does not oxidize. Of course the preserving process steps may be applied but experience with the herein described plastic plate teaches that such preserving steps are not necessary. The herein described plastic printing plate can be used in connection with all types of offset printing presses, namely, the Harris, Hoe, Webb and Dorfer, Rutherford, Davidson and Multilith.

By the present invention a plastic sheet or plate for photo offset printing has been provided and grained in the manner herein specified and subsequently such grained surface has been treated by chemical baths above alluded to to make such surface deliberately and selectively acceptable to moisture and ink. Without such treatment the plastic plate could not carry an even film of moisture at the offset printing press and if not treated in this way would result in the entire surface of the plate accepting ink instead of the photographic image only accepting the ink. Hence selectivity by the processed grained surface is possible only by the hardened protuberances thereof.

Various changes may be made in the details of construction and arrangement of parts and the steps in the herein described method without departing from the spirit of the invention or sacrificing any of the advantages thereof inherent therein.

I claim:

1. The herein described method of preparing a photo offset printing plate of a hardened plastic material selected from the group consisting of cellulose acetate and nitrocellulose, which comprises, dry graining one surface of said plate to provide a plurality of microscopic protuberances, subjecting said surface to a relatively weak solution of caustic soda for softening said protuberances, removing the caustic layer provided by said bath from said surface, and subjecting said grained surface to a weak solution of sulphuric acid for hardening said protuberances.

2. The herein described method of preparing a photo offset printing plate of a hardened plastic material selected from the group consisting of cellulose acetate and nitrocellulose, which comprises, graining one surface of said plate to provide a plurality of microscopic protuberances, subjecting said surface to a weak solution of caustic soda for softening said protuberances, removing the caustic layer provided by said bath from said surface, and subjecting said grained surface to a weak solution of sulphuric acid for hardening said protuberances.

3. The herein described method of preparing a photo offset printing plate of a hardened plastic material selected from the group consisting of cellulose acetate and nitrocellulose, which comprises, graining one surface of said plate to provide a plurality of microscopic protuberances, subjecting said surface to a bath of approximately three percent of caustic soda and ninety seven percent water by volume for softening said protuberances, removing the caustic layer provided by said bath from said surface, and subjecting said grained surface to a weak solution of approximately three percent sulphuric acid and ninety seven percent water by volume for hardening said protuberances, and drying said surface.

4. The herein described method of preparing a photo offset printing plate of a hardened plastic material selected from the group consisting of cellulose acetate and nitrocellulose, which comprises, graining one surface of said plate to provide a plurality of microscopic protuberances, subjecting said surface to a bath of approximately three percent of caustic soda and ninety seven percent water by volume for softening said protuberances, removing the caustic layer provided by said bath from said surface, and subjecting said grained surface to a weak solution of sulphuric acid for hardening said protuberances.

5. As a new article of manufacture for photo offset printing, a flexible and resilient printing plate adapted to be mounted on a printing press and of a material chosen from the group consisting of cellulose acetate and nitrocellulose and having a grained surface first treated with a relatively weak solution of caustic soda and thereafter treated with a relatively weak solution of sulphuric acid, whereby said surface is adapted to carry a photographically impressed and developed inked image and selectively accepting moisture and grease.

6. As a new article of manufacture for photo offset printing, a flexible and resilient printing plate adapted to be removably mounted on a printing press and of a material chosen from the group consisting of cellulose acetate and nitrocellulose and having one surface provided with closely disposed relatively minute protuberances first treated with a relatively weak solution of caustic soda, and thereafter treated with a rela-

tively weak solution of sulphuric acid, whereby said surface is adapted to retain a sensitized coating to receive a photographically impressed image and to retain a coating of ink and selectively accepting moisture and grease.

7. As a new article of manufacture, a relatively elongated flexible and resilient and relatively thin printing plate adapted to be secured curvilinearly to one cylinder of a printing press and of a material chosen from the group consisting of cellulose acetate and nitrocellulose, said plate having on one surface thereof a plurality of relatively microscopic protuberances first treated with a relatively weak solution of caustic soda and thereafter treated with a relatively weak solution of sulphuric acid whereby said surface is adapted to carry a photographically impressed

and inked image, and selectively accepting moisture and grease.

8. As a new article of manufacture, a relatively elongated flexible and resilient and relatively thin printing plate adapted to be secured curvilinearly to one cylinder of a printing press and of a material chosen from the group consisting of cellulose acetate and nitrocellulose, said plate having on one surface thereof a plurality of closely arranged relatively microscopic protuberances first treated with a relatively weak solution of caustic soda, and thereafter treated with a relatively weak solution of sulphuric acid, whereby said surface is adapted to carry a photographically impressed and inked image, and selectively accepting moisture and grease.

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