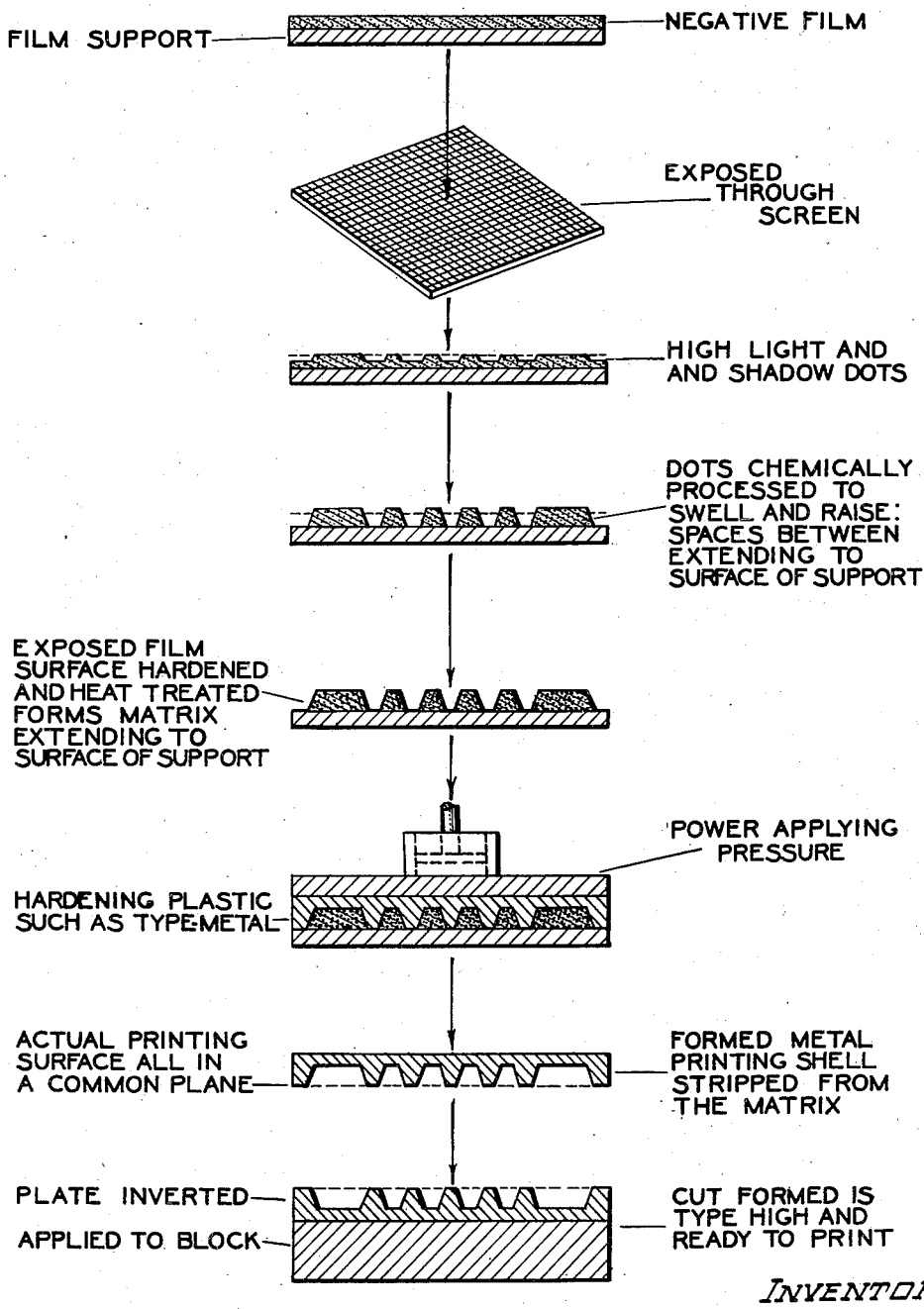
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PROCESS OF MOLDING PRINTING CUTS FROM PHOTOGRAPHIC PLATES

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PROCESS OF MOLDING PRINTING CUTS FROM PHOTOGRAPHIC PLATES

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This invention relates in general to the process of making a mold photographically in a camera from which printing cuts may be made directly by electroplating and other methods, and may be more particularly described as a process of making a negative and a matrix in one operation.

As printing cuts are now made it is necessary to utilize the engraving art for a complicated system combining photographic and etching processes, all of which are more or less laborious, expensive, and take a great amount of time.

The present invention relates to a simplified process for producing a negative mold photographically from which plates may be made directly by casting, by depositing metal thereon electrolytically or by applying a metal in a plastic condition under considerable pressure, all of which is much simpler and requires only a fraction of the time which is ordinarily taken up in the production of printing plates of this kind. A much finer photographic reproduction is also made by this process due to the fact that no etching is required.

In carrying out my invention for an improved process for making printing cuts directly from photographic plates, it is unnecessary to give in detail the photographic formulae which may be involved in developing the plates as they are subject to great variation depending upon the type of plate desired, and anyone skilled in or reasonably familiar with photographic processes can develop the plates photographically in accordance with the invention.

In making printing cuts photographically it is customary either to make line cuts without a screen or to expose the photographic negatives through a halftone screen which produces the halftone dot formation, but no particular type of camera or screen is necessary, and the process is applicable in general to any type of printing cuts.

The steps in carrying out my improved process, diagrammatically illustrated in the accompanying drawing, are as follows:

(1) Expose a photographic film through a halftone screen to produce a negative having the ordinary halftone dot form; this negative preferably comprises a plate of glass, metal, paper or Celluloid, but may be any suitable plate coated with a light-sensitive emulsion, preferably one having a heavier coating of gelatin than ordinarily used.

(2) Process this negative plate to swell, harden and raise the exposed dots, thus forming a negative mold in which openings extend between the dots to the uniform surface of the backing glass or plate, thus producing a matrix for the formation of the dots for printing.

(3) After the matrix negative has thus been prepared it may be placed in a bath of formaldehyde or treated with heat forming a hard resisting surface.

(4) Using a resinous or plastic hardening material, such as condensite, Bakelite, and the like, or preferably a plastic metal such as lead or type metal in a plastic state, take an impression from the matrix plate. Instead of making a mold or casting, the place produced as the result of the above step may be treated electrolytically as follows:

(5) Put the matrix plate thus developed in a bath to produce a coating of silver nitrate on the film by soaking it from five to ten minutes, then develop out with an iron sulfate or other developer, after which it is dried and polished with a soft brush.

(6) The plate thus produced is placed with the emulsion side out and backed in a wax mold which is then prepared in the regular electroplating way for depositing metal thereon.

(7) The plate backed with wax is then placed in an electrolytic bath and copper or other metal is deposited directly upon the plate, depending upon the thickness of the shell desired.

The plate thus formed either cast or molded on the matrix, or as a metallic deposit, or a stereotype plate, may then be backed and secured to a printing block and used in the ordinary way.

In processing every silver emulsion plate the highlight halftone dots are always higher than the shadow dots due to the fact that the highlight dots are isolated and therefore they swell more than the adjacent or connected shadow dots, thereby producing a printing plate which it is difficult to print without too heavy an impression causing smearing and heavy highlight dots.

In the present case the positive printing dots which are deposited, cast, or molded upon the matrix negative, all start from the supporting surface of the glass, or other plate, which backs the photographic emulsion, so that the outer surface of the printing plate which is formed on the matrix film is smooth and uniform, the dots being all of the same level. There will also be deep shadow dots on the negative due to the fact that the shadow dot is isolated and swells to great

depth. This insures clean printing of the plate formed.

The advantage of the present system is that a fine dot in the highlight may be formed as an exact reproduction of the copy obtained due to the fact that there is no etching or undercutting of the dots and no re-etching to get fine dots as in the method heretofore employed of producing copper halftones. In this system there is less loss of tone reproduction, due to the fact that no negative is made which in the ordinary process is placed against a material to produce a positive, thereby eliminating poor contact and a weak dot formation.

In this process the negative is processed in such a way as to become an original matrix exposed in the camera and developed, from which a printing plate is rapidly produced therefrom by one of the methods above described.

In processing any silver emulsion there is great danger of dust holes and blisters. If these should occur on the matrix plate of this invention it will make only negative holes which therefore will produce black spots upon the printing plate formed and these black spots are easily noticed and easily tooled out, whereas in the previous type of making gelatin process halftone plates the plate is defective and must be thrown away.

For blanking out white spaces it is only necessary after processing of the negative to brush in a wax coating for electrolytic deposits, or iron filings for casting or molding a plate, on the places where pure white is desired. This in turn makes a depression in the positive deposit electrolytically or cast upon the matrix negative. By this method large spaces in making line cuts may be produced, simply by brushing in a wax coating which may be twice as thick, for example, giving twice the depth to the spaces between the lines.

In processing a negative plate according to (2) above or an ordinary process film which is placed in contact with a negative and exposed to produce a positive, the plate or film may be developed with a special developer which prepares the film or plate and raising and hardening of the exposed dots as follows:

(*a*)

Sodium sulphite	oz.	1
Potassium bromide	oz.	¾
Pyro	oz.	2¼
Water	gal.	1

(*b*)

Caustic soda	oz.	1¼
Potassium hydroxide	oz.	1¼
Water	gal.	1

After the hypo bath this film is placed in wash water until the hypo has been completely washed out. The film is then placed in a hardening bath consisting of

(*c*)

Copper sulphite	oz.	12
Potassium bromide	oz.	2
Water	gal.	2

where it is allowed to remain for ten minutes.

A film is then placed in washout water at a temperature of about 90° F. and allowed to remain in this bath from five to ten minutes. This eliminates the gelatin between the dots leaving the exposed portions as a relief printing plate.

As an alternative after the hypo bath the film is placed in wash water but the tank in which it is placed is either made of aluminum or coated on the inside with aluminum and the running water is further agitated by air. This sets up an electrolytic action between the silver on the film and the aluminum and so hardens the exposed emulsion that the exposed spots will stand hot washout water and by washing out the spaces between the exposed dots a relief printing plate is provided.

A plate treated by either of the two washout processes above may be further processed by immersing it in a solution of formaldehyde, five parts of water to one part of formaldehyde. This sets and hardens the gelatin sub-layer so that on moist days the dot formation will not run or come off of the film base. This action prepares it for the next step which softens the silver and allows the dot to be puffed or intensified.

The film may then be placed in a bath which is known as an intensifier, consisting of the following formula:

(*d*)

Potassium iodide	oz.	3
Resublimed iodine	oz.	1
Water	oz.	64

The film is allowed to remain in this solution for five minutes or more after which it is washed and dried and is ready for use.

Thus it will be seen that various changes in the method and operation may be made by those skilled in the art without departing from the spirit and scope of this invention.

I claim:

1. The process of molding printing cuts directly upon a negative photographic matrix which comprises, exposing a sensitized film carried upon a supporting base through a half-tone screen, in photographically processing the sensitized film until the openings between the high-light and shadow portions formed by the screen extend to the surface of the film supporting base, in depositing a metal coating which extends to the surface of the plate through the openings in the film, in producing printing surfaces extending through the film to the base which have the same height, and in removing the metal coating in which the dots forming the printing surface are all in the same plane.

2. The method of producing metal printing cuts directly from a photographic negative which comprises exposing a sensitized photographic film through a half-tone screen, in chemically processing the film on its base until the openings between the high-light and shadow dots formed by the screen extend to the surface of the base, in casting or otherwise depositing a film of metal directly upon the film until it reaches the common surface of the base, and in stripping the metal film from the matrix to form a printing cut in which all of the printing surfaces are in a common plane as determined by the base.

3. The method of producing metal printing cuts directly from a photographic negative which comprises exposing a light sensitive film backed by a supporting plate to produce a negative halftone dot formation, in chemically processing the film so that the openings between the dots reach the surface of the supporting plate, in hardening the remainder of the film, in depositing a hardening plastic material like metal upon the surface of the film, in applying pressure to the material to force it in the openings of the film against the base to produce a common printing surface, and in removing the hardened plastic material

from the film to expose the printing surface with all printing in the same plane.

4. The method of making positive printing cuts directly from a negative photographic plate which comprises exposing a photographic film mounted on a supporting base in a camera through a half-tone screen, in chemically developing the negative until the spaces between the high-light and shadow dots extend to the surface of the supporting base, in processing the exposed surface of the remaining negative to form a hard tough surface, in applying a thin metal coating in plastic form to the negative matrix, in applying pressure to the coating to force it through the matrix openings to contact with the surface of the supporting base, in removing the hardened metal film in which the high-light and shadow surfaces are located in a common printing plane produced by the film base, and in applying this metal film to a printing block to form a printing cut in which all of the printing surfaces are in a common plane.

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