UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING LITHOGRAPHS.

1,128,436. Specification of Letters Patent. Patented Feb. 16, 1915.

No Drawing. Application filed March 27, 1911. Serial No. 617,088.

To all whom it may concern:

Be it known that I, JAMES S. FREER, a citizen of the United States, and a resident of the town of Rutherford, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in the Process of Making Lithographs, of which the following is a specification.

This invention relates to a process for making half-tone lithographs and has for its object the production of a printed surface in which the various light effects are produced and regulated by varying the size of the small dots which make up such lithographs. Before, half-tone lithographs have ordinarily been produced by photographing the object to be reproduced through a screen. This produced a negative divided into very fine dots of practically uniform size. A print from this negative was then transferred upon a sensitized master plate, from which as required by the lithographer, it was transferred to stone or appropriate metal. The printed picture ultimately obtained, like the original negative, was composed of a multitude of practically uniform dots, which, appearing upon the high light portions as well as upon the darker portions of the picture, produced a generally dull or flat effect. In order to overcome this difficulty, there has been invented in more recent times, a process known as the high light process, in which the high lights of the original picture are reproduced in the finished lithographic print without having any dots, so as to leave very clear high lights. The intermediate tones, however, have the same flat or dull effect of the older process. To produce a lithograph by the high light process, the inventor photographed through the screen, not the original picture intended to be produced, but a photographic negative of the original picture, whereby all of the white parts of the original picture being changed to black on the negative, would not show any screen lines or dots on the final negative. This final negative was then printed upon a sensitized plate and the lithographic process proceeded as before.

According to the present invention, the picture to be reproduced is first photographed through a screen, as in the old lithographic process. The negative is then either directly or through an intermediate negative print, transferred upon a sensitized copper plate, or an equivalent plate, which after receiving the photographic imprint, is treated with acid. The effect of this acid treatment is to produce a metal plate in which the various small printing dots are modified in size in accordance with the tones of the original picture, that is, the dots showing on the high lights of the picture are very materially reduced in size, although they are rarely allowed to be removed entirely. The intermediate tones are similarly affected. From time to time, test prints are taken from this plate, and as these prints show that certain further modifications of tone effects may be desired, the etching process is continued. This metal plate being under the control of the operator can be altered and modified until a substantially perfect tone is arrived at for every shade of the picture. When the copper plate is in perfect condition, a print of it is made upon a proper metal plate, such as a zinc or aluminum plate, known as the master plate, and this master plate is used by the lithographer or printer to produce a series of transfers therefrom upon stone or metal, from which the ultimate lithographic printing is then made. The finally printed pictures will be almost perfect reproductions of the original as to tone effect. The essence of this invention resides consequently in providing an intermediate stage in the process in which the tones of the picture are capable of being modified and regulated. In all of the known photographic processes, there is no possibility of modification since the negatives and prints therefrom were always identical and incapable of modification or amendment. In the older processes, the tone effect of the final printed picture was necessarily identical with the tone effect of the first screen negative. The processes were incapable of any adjustment as to tone between the stage of the screen negative and the stage of the final print. According to the present process, which is of particular value in connection with presses known as offset presses, the screen negative is considered merely as a rough suggestion of the ultimately desired picture and the final picture is never the same as the picture shown on the screen negative. Between these two stages, there is an intermediate step wherein the picture undergoes modifications as to tone by reason of being transferred to a metal plate, which

can be etched and changed according to the wish of the engraver.

It will not be necessary to describe in detail the plates or etching processes, as these are well known to engravers at the present time, nor will it be necessary to go into detail about the preparation of the master plate, since lithographers are familiar with such devices. This process is, however, the first to produce a half-tone lithograph having the full rounded effect of the original picture and it is the first lithographic process in which an intermediate reprint or reproduction from the screen negative is either capable of or is actually made the subject of modification as to tone.

Where in the claims I refer to the preliminary step as one which produces a photo-engraving, I do not intend to limit the invention to a plate produced by the aid of photography, but I intend to refer generically to a relief printing plate which may be either a photo-engraving, an electrotype or a similar relief plate produced by any suitable agency.

What is claimed is:

1. A lithographic process which consists in producing a photoengraving of the subject, modifying the engraving by intensifying or obliterating parts thereof, inking said modified engraving and transferring the inked image to a prepared flat metal master plate by direct contact, causing the image thus produced to become permanently set upon the master plate, then applying ink to the master plate and transferring such ink from said master plate to the lithographic surface of a lithographic press.

2. A lithographic process which consists in producing a photoengraving of the subject, modifying the engraving by intensifying or obliterating parts thereof, inking said modified engraving and transferring the inked image to a prepared metal master plate by direct contact, causing the image thus produced to become permanently set upon the master plate, then applying ink to the master plate and transferring such ink from said master plate to the lithographic surface of a lithographic press.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES S. FREER.

Witnesses:
EDWARD ABERLE,
JOHN A. KEHLENBECK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."