C. W. SAALBURG.

PROCESS OF MAKING PICTURES.

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923,799. Patented June 1, 1909.

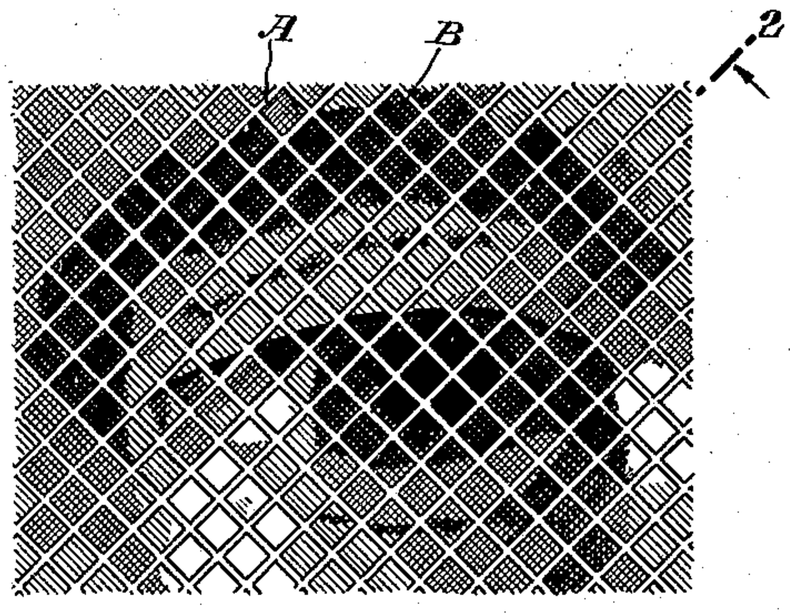

Fig: 1

Fig: 2

Witnesses:
A. Newcomb
M. Meikle

Inventor
Charles W. Saalburg,
By his Attorneys
Prindle and Wright.

UNITED STATES PATENT OFFICE.

CHARLES W. SAALBURG, OF EAST ORANGE, NEW JERSEY.

PROCESS OF MAKING PICTURES.

No. 923,799. Specification of Letters Patent. Patented June 1, 1909.

Application filed November 16, 1908. Serial No. 463,155.

To all whom it may concern:

Be it known that I, CHARLES W. SAALBURG, of East Orange, in the county of Essex and in the State of New Jersey, have invented a certain new and useful Improvement in Processes of Making Pictures, and do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention has been to produce a picture which shall be especially adapted to be manufactured by printing, and especially such a picture having a high degree of artistic merit; and to such ends my invention consists in the process of making the same hereinafter described.

As my picture will be best understood by describing one process of making the same, I shall first describe such a process.

In the accompanying drawing Figure 1 is a plan view of a plate adapted for printing my said picture according to my said process; and Fig. 2 is a section taken on the line 2—2 of Fig. 1.

The said process is capable of embodiment in a number of forms, and in selecting a specific example, it is only to be regarded as an illustration of the inventive idea.

The said picture may be either a monochrome or a polychrome. As both the highest form of the picture and of the process are illustrated in the polychrome, I shall describe such a picture and the process of making it, but it is to be understood that my invention also includes the process of making a picture in monochrome.

In the making of a picture by my said process, I first make a negative or negatives direct from the picture to be reproduced. In color work, I ordinarily make one negative of the blacks and whites, and the three usual primary color negatives, the color negatives being made through color screens. I next make a positive from each of the said negatives, and preferably do any necessary retouching upon the positives. So far, no printing screens or other devices for breaking up the surface into printing divisions have been used. Next, ordinary commercial carbon paper is sensitized and squeegeed on a smooth surface, such as a glass plate. The carbon paper is manufactured in a roll, and I preferably cut a single sheet of carbon paper large enough to cover all four positives at the same time. I also preferably cut the paper so that the length of the paper in the strip runs the long way of the positives. This single sheet of paper is sensitized, and all operations performed on it at the same time, so as to keep the stretch and shrinkage the same throughout. This working upon the four prints as a single print insures that the conditions under which each print is sensitized, developed, etc. shall be identically the same, so that the stretch and shrinkage (which are large enough to prevent perfect register of the superposed color impressions if they are not properly cared for) shall be the same on each print, and thus do no harm.

After the carbon paper is sensitized, it is exposed under a line screen, preferably one-quarter of the time which it will require under the positives. The screens referred to are the usual glass screens ruled with parallel lines. After the paper has been exposed under the screens with the lines running in one direction, the screens are turned at right angles to print lines running in a corresponding direction, and the paper again exposed for about one-quarter the exposure to be given under the positives. After the screen lines have been printed on the paper, as above indicated, the paper is exposed under all four positives at a single time, thus making all four negatives. The longest way of each positive is in the direction which was the length of the strip from which the carbon paper was cut. Before placing the positives on the paper, lines are carefully drawn at a given distance from the margin of each positive, which lines are afterward to be used in positioning the paper on the cylinders later referred to. The exposed carbon paper is then squeegeed on a carefully cleaned copper roller, the aforesaid lines being used to position the paper on the roller, so that the horizontal axis of the picture shall be exactly parallel to the axis of the cylinder. Blotters are pressed around the cylinder by inclosing them in a cover in the form of the sheet and drawing the cover up around the cylinder as by straps and buckles, the cover being substantially like an ordinary shawl strap in practice. After the film has had time to take a good hold of the cylinder, the cover is removed, and very hot water is applied to the cylinder to loosen the paper, and the paper is stripped off leaving the gelatin film of the carbon paper adhering to the cylinder. The exposed portions of the carbon film have had their bichromate of potash rendered insoluble by the action of the light, while the remaining portions of the gelatin are soluble.

By the application of hot water, the soluble gelatin is washed off, leaving the negative of the picture on the cylinder in gelatin. The cylinder is now ready for etching, except that the portions of the cylinder which it is desired to protect from the etching fluid are to be covered with asphaltum. The cylinder is now etched in the usual manner in which photogravure plates are etched, and the positive of the picture is thus sunk into the cylinder, but is by the screen lines divided up into rectangular cells. These cells are of varying depths, according as they are under the high lights, or shadows, or intermediate tones of the picture. The action of the light on the bichromatized gelatin, followed by the washing with hot water, leaves a film on the surface to be etched, which is of varying degrees of permeability, being less permeable over the screen lines and the high lights of the picture than over the darker portions. The etching agent thus striking through the film more quickly at the darker portions of the picture, eats away the metal before the agent can penetrate through the less permeable portions of the film over the screen lines and the high lights. No "resist", however, is used, and if the etching action were permitted to continue long enough, the etching agent would strike through and etch the screen lines and the high lights. It is by stopping the etching action at the right point to preserve the screen lines and high lights, while giving time enough to etch the darker portions, that the proper effect is obtained. The film is not hardened to produce a "resist". The cells preferably cover a much larger portion of the area of the cylinder than do the screen lines. The gelatin is then removed from the cylinder, and the cylinder is ready for printing.

The cylinder is placed in a rotary printing press, such, for instance, as that illustrated in the application of Charles Van Middlesworth, Serial No. 464,096, filed November 23, 1908. In printing the picture, ink is mechanically applied to the cylinder in a sufficient quantity to fill all the cells between the screen lines. The ink is then scraped off by the revolution of the cylinder against a preferably sharp steel blade, which fits closely against the cylinder, and which is preferably moved back and forth across the face of the cylinder in a direction parallel to the axis of the cylinder, the length of the blade running parallel to the said axis.

An ink which I find very effective for my purpose is one which is the subject of an application for patent executed by me the 7th day of November, 1908, Serial No. 464,192, filed Nov. 23, 1908 to which reference is made. The scraper or "doctor" removes the ink from the cylindrical surface of the cylinder wherever such surface remains, namely, from all the screen lines and from all the blank portions of the cylinder which are to represent white in the picture, and the white margin around the cylinder, and this operation leaves the cells or pockets between the screen lines completely filled with ink.

In the accompanying drawings, the formation of the printing surface is illustrated as applied to a plate. The metal which was protected by the screen lines is not eaten away and forms a series of rectilinear walls A, which, crossing each other form inclosed wells B. The wells B are of varying depths, according to the depth of color to be reproduced, although in the illustrated embodiment they are of uniform area. It is not essential that the area of the ink wells be uniform, but only that they be sufficiently large so that the walls between them may be of sufficient thickness to prevent their being eaten away and undercut by the etching fluid. In other words, the walls between the wells must be of sufficient thickness so that the wells can be etched deep enough to hold a sufficient quantity of ink to make the desired result, especially when this ink is thin enought so as not to be dragged out of the wells in scraping the plate.

As it is exceedingly difficult to perfectly clean the surface of the cylinder outside of the picture where it is desired to have the paper in its natural condition, and without having any ink on it, I have invented the expedient of covering the impression cylinder with paper, and then making the press revolve the cylinder once so that the picture is printed on the said paper covering. I then cut away all the covering outside of the picture where it is desired to leave the paper clean upon which the picture is to be printed, thus leaving a relief or raised surface on the impression cylinder exactly corresponding to the picture, but not extending beyond it, and in fact, depressing or removing the remaining portions of the impression cylinder surface. In this manner, when the printing takes place, the paper on which the picture is to be printed is not pressed against the portions of the surface of the printing cylinder which are not engraved, and thus any slight film of ink which may remain there is not transferred to the paper. In order that the impression and printing cylinders may not come in contact where they are not held apart by the portion of the covering of the impression cylinder corresponding to the picture, I preferably leave or form a ring on each end of the impression cylinder, which is of substantially the same height as the said paper covering, so that the said rings will sustain the printing cylinder when it is passing over portions of the impression cylinder not having the height of the said retained portion of the paper covering. The impression cylinder is twice the diameter of the printing cylinder, so that the printing cylin-

der can have the two said revolutions between each printing operation. By the use of the said arrangement of cylinders and the said ink, I find that a single color can be printed upon a dry sheet of paper of dull or matte surface at a high rate of speed, so that many hundreds of such impressions can be made in a single day. It is not necessary to dampen the paper, nor to heat the cylinder, and it is not necessary to rub the cylinder off by hand or with a cloth as heretofore. The "doctor" does not injure the surface of the cylinder, and the cylinder thus has a very long life. In printing a polychrome picture, the several impressions, all made preferably from etched cylinders as above described, are superimposed one upon another in the usual order of such printing. Of course, it is obvious that the same effect could be produced by etching a plate instead of a cylinder, and that the said plate could be wiped off instead of scraped clean.

The nature of my picture can now be understood. Each cell in the etched cylinder deposits its ink upon the paper like an inverted cup, so that the ink is piled up in relief upon the paper. It is entirely different from printing where the plate is etched away around the points which are to print upon the paper, for in the latter case a film of ink is deposited upon a plane surface, and that surface crushes the ink into the paper, and often forms a depression in the paper where the imprint is made. With my picture, however, the paper is not depressed where the ink is deposited, but the ink is deposited on the surface of the paper and piled up thereon (where the color is heavy), and the impression of the printing surface on the paper tends to increase rather than decrease such relief, for the screen lines which in my printing surface are in relief and do not carry any ink, tend to depress the paper around the portions which receive the ink. The entire surface of my picture is covered with ink, except only that the surface is crossed by the screen lines. Every portion of the imprint of my picture, except the pure whites, is covered by complete rectangles of ink. The differences in shade are not obtained by making the rectangles larger or smaller, or more or less complete, but they are obtained by the differences in depths of the cells, and consequently the differences in thickness of the deposit of ink. It is in precisely the same way that differences in color are produced in a pastel. In a pastel, the color is put on in varying thicknesses, according to the depth of color desired. On the contrary, with a half tone engraving, the different degrees of color are obtained by making the dots of color which are printed larger or smaller, and often of different shapes. In my picture, the entire paper is fully covered with ink, except for the screen lines, but the ink is of varying degrees of thickness. In a half tone, on the other hand, the ink is of uniform thickness wherever it appears, but the natural surface of the paper is left uncovered where it is desired to produce a lighter effect. This, as before stated, is owing to making the dots of color of larger or smaller area. In other words, the engraving in the surface of my cylinder is a cast of the picture to be produced, while with half tones, the engraving is never filled with ink, the ink being applied only to the portions of the original surface which still remain, so that the engraving represents the white portions of the picture. In my picture, the picture is made up by ink running from transparency to opacity, while with all other printed pictures, the picture is made up by dots or isolated specks of ink of different sizes. In my picture the effect is produced in an ideal way of varying the densities of the ink as an artist would do by hand. With my picture, the effect of the lighter tones is produced by the white of the paper showing through the ink, something in the same way as the light shows through a stained glass window. This is a highly artistic effect. My picture can be printed on soft paper, while a half tone must be printed on paper having a hard surface, to prevent the ink from sinking in and separating and covering the little white interstices between the specks of ink. This piling up of the ink in effect produces the rich velvety appearance so much prized in etchings or in intaglio engravings. The reproduction of pastels by my process produces a picture remarkably like the pastel in appearance. As my colors are printed in varying degrees of thickness, the lower colors shine through the upper colors, and thus combine the colors, because they are transparent, while the usual colors do not combine in this way.

With half tone work, great care has to be taken to place the screen lines of the successive colors at angles where they will not produce objectionable patterns, such as a tesselated floor, or a plaid effect, and much difficulty and expense are involved in producing this kind of work to avoid this objectionable effect. I find that with my process I need pay no attention to the angle of the screen lines, but can print the screen lines of the successive pictures all in substantially the same direction, and without care, as no pattern effect is produced under any circumstances. I suppose this to be due to the fact that the screen lines are but a small portion of the entire area of my picture, while with the half tones, they form a considerable portion of the lighter portions of the picture.

I preferably print upon sheets of paper instead of upon paper in a roll, and position the sheet for each of the superimposed impres-

sions by placing it against gages. Paper in a roll will stretch so as to prevent perfect registry of one impression upon another, as its length changes under different conditions of humidity, tension, electricity, pressure, etc. By the use of sheets, all of these objections are eliminated and I obtain perfect registry.

The picture which I have described herein is not claimed in the present application, but is the subject of another application for patent, Serial No. 488,405, filed Apr. 7, 1909.

I claim:

1. The process of producing an intaglio printing plate, which consists in subjecting a surface having a light sensitive coating to the action of light through a line screen, printing from a positive on the said surface, developing the image produced without hardening the light sensitive coating, and then etching the surface so treated, thereby producing relatively large color receiving cavities of uniform area and varying depth, according to the depth of color desired.

2. The process of printing pictures, comprising forming a carbon tissue negative of the picture to be reproduced, which negative is crossed by screen lines, transferring said tissue to a plate and etching said plate, developing the image produced without hardening the light sensitive coating, the depth of the various portions varying according to the depth of color desired, and then filling the cavities thus formed with ink, removing the ink from the screen lines and high portions of the plate, and printing the picture.

3. The process of printing pictures, consisting in forming an intaglio positive in a printing surface, said positive being divided into small cavities of substantially equal area by walls corresponding to the screen lines, the depths of said cavities varying, according to the depth of color desired, filling said cavities with ink, removing the ink from said walls, and printing.

4. The process of printing multicolor pictures, comprising etching intaglio positives, one for each color to be printed, said positives being broken up into cells of uniform area by screen lines, the depth of said cells varying, according to the depth of color desired, filling each of said positives with its respective color, removing the ink from said screen lines and the high portions of the printing surface, leaving said cells filled with ink, and printing, first one color and then another, the colors being superimposed upon each other.

5. The process of printing pictures, which comprises forming an intaglio printing surface for each of the several colors to be printed, said intaglio surface being broken up into ink-receiving wells of considerable area and of depth varying according to the depth of color desired, filling said printing surfaces with thin ink of the proper color, scraping the surplus ink from the surfaces of said plates, and superimposing said colors upon a sheet of paper.

6. The process of printing a picture, comprising forming an intaglio printing surface divided into cells of uniform area, the depths of said cells varying according to the depth of color desired, applying ink to said surface, removing the ink from the unetched portions of said printing surface while leaving the ink in said cells, and impressing said printing surface upon dry paper.

7. The process of printing pictures, comprising forming an intaglio printing surface having large ink-receiving wells separated by continuous walls, said wells being of varying depth, according to the depth of color required, filling said intaglio with thin ink, removing the excess, and printing from said surface while cold.

8. The process of printing pictures upon dry paper, comprising forming an intaglio printing surface, said surface consisting of relatively large ink-receiving wells separated by continuous walls, said wells varying in depth, according to the depth of color desired, filling said intaglio with ink, removing the excess, and printing from said surface while cold, said impression being made upon dry paper.

In testimony that I claim the foregoing I have hereunto set my hand.

CHARLES W. SAALBURG.

Witnesses:

ARTHUR WRIGHT,

A. NEWCOMB.