

UNITED STATES PATENT OFFICE.

PETER SCHUMACHER, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR
TO THE FIRM OF KLIMSCH & CO., OF FRANKFORT-ON-THE-MAIN, GER-
MANY.

PROCESS OF TREATING PHOTOGRAPHIC PRINTS.

No. 846,954.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed December 27, 1905. Serial No. 293,532.

To all whom it may concern:

Be it known that I, PETER SCHUMACHER, doctor of philosophy, chemist, a subject of the German Emperor, and a resident of No. 129 Grüneburgweg, Frankfort-on-the-Main; Kingdom of Prussia, German Empire, have invented new and useful Improvements in the Process of Treating Photographic Prints, of which the following is a specification.

The operation of decomposing a photographic copy into a system of grains or dots in the art of reproduction generally is made either optically by placing before the sensitized plate a lined or grained screen or mechanically by printing on grained surfaces. To obtain a grain chemically has hitherto only been possible in collotype or collotype transfer, in which process the grain is formed by the exposed coating itself. In the new invention the exposed coating takes also part in the formation of the grain, the new process being due to the discovery that by volatilizing a solution of resins, balsams, oils, greases, and so on upon an exposed sensitized plate a precipitation of the resin and so on into single points or dots takes place, which correspond in size and disposition to the tints and the design of the picture. If, for instance, a half-tone negative is copied upon a coating of chromatic alum, volatilizing upon a plate a solution of powdered resin of two to three per cent. in absolute alcohol, the resin will be found precipitated as a system of dots sticking firmly on the plate and forming a perfect decomposition of the tints of the picture, with all its peculiarities and fineness. In order to obtain an especially uniform secretion of the grain, the flooding of the plate and the volatilizing of the resinous solution can be made on a whirler the quickness of which can be regulated. The arrangement of the dots differs from that produced by the processes hitherto known by the fact that the dots do not cover the surface equally without reference to the design, but that they attach themselves along the lines of the design and have an arrangement correspondent to the lines in the direction of their grouping.

The chief conditions for carrying out the process are as follows: constant temperature of the copied plate, of the resinous solution, and the room wherein the secretion of the grain is made, besides a constant degree

of dampness of the latter. All these conditions must be attended to very closely in order to obtain a complete breaking up of the picture and constant results. It is of the utmost importance to keep up a fixed degree of dampness, and in order to obtain this with all certitude in the face of the ever-oscillating atmospheric dampness the secretion of the grain must be carried out in a box separated from the atmosphere, the capacity of dampness of which is maintained constant by passing through it a current of air dried or damped before or by other proper mediums. As it is very difficult, however, even with the expedients mentioned above, to obtain a fixed degree of dampness, owing to the variation of the dampness of the air, the only especially practical medium left is working in a room completely or nearly completely saturated with dampness. This condition can be filled very easily and with absolute certitude by suspending wet clothes, by sprinkling water inside the box, by introducing a current of air which has been saturated before with water by passing through some washing-tubs filled with water, provided that the temperature of the box be kept at a fixed height, the absolute and relative degree of dampness will remain perfectly constant, and there have been created the uniform main conditions which are absolutely necessary without being dependent upon the atmosphere.

As a matter of course there cannot be produced a proper grain under ordinary circumstances in so high a dampness, and it is necessary, therefore, to heat the plate before, and perhaps also its bed, so that the temperature of same may exceed that of the room in which the secretion of the grain is made. In this case it is advisable to heat also the resinous solution before in order to avoid a cooling of the plate when the plate is flooded.

The measurements of the box must be taken rather large; otherwise the vapors emanating from the resinous solution when evaporating would have a bad influence on the formation of the grain. The production of the grain when volatilizing the solution on the sensitized plate is dependent upon a series of conditions—such as, for instance, the degree of exposure, the quality and quantity of the resin, the quickness of the evapora-

tion, and so on. It is obvious that this changes the character and the arrangements of the dots, so that it is of utmost importance to keep up always the same conditions.

5 The resin eliminated sticks firmly to the plate, which then can be etched and prepared for any of the different methods of printing. To sensitize the plates, there can be used, besides the chromic albumen, still
10 other organic sensitively-prepared substances, such as gelatin, glue, fish-glue, gun, and so on.

The coating that produces the grain may be composed not only of common resin, but
15 also of mastic, elemi, sandarak, amber, gumdammar, gum-copal, asphaltum, dragon's blood, shellac, fir-resin, and sundry balsams and with or without greases, oils, and so on.

These substances according to the circumstances can be used pure or mixed. As dissolving mediums can be used according to
20 circumstances the different liquids which are suitable to the above-mentioned substances.

Instead of the merely alcoholic solution of
25 the resin there can be used successfully also a mixture of petrolic ether and alcohol; yet it is advisable to subject the former to the fractionate distillation and use always the same fractions. It may be mentioned that nearly
30 all the ingredients added to the sensitized coating or to the resinous solution have a certain influence on the formation, even then if the added bodies can be considered as neutral ones or of little effect. It is impossible,
35 therefore, to enumerate here all the ingredients which may be added and what may be the effect they call forth on the sensitized plate. Special attention is called only to the following points: Calcium chlorid added to
40 the resinous solution produces a round shape and large number of the eliminated dots in the light parts. Turpentine calls forth according to the quantity a close shading in the formation of the grain and a round grain
45 in the light parts.

Alkalies, especially ammoniac, cause a better adaptation of the grain to the tints of the copy. An increase of the concentration of the resinous solution gives a coarser grain,
50 which can be obtained also by reducing the rapidity of the whirler upon which the plate is placed during the evaporation of the resinous solution. It is obvious, therefore, that by means of varying the concentration of the
55 solution of the ingredients and the rapidity the operator is in a position of obtaining

every fineness of grain desired. The process is appropriate for every method of printing and of special advantage to color-printing, owing to the fact that the grain is not arranged according to a certain system of lines and every production of "Moiré" is entirely excluded.

Now what I claim, and desire to secure by Letters Patent, is the following:

1. The process for decomposing photographic pictures into a system of grains by evaporating on a sensitized plate a resinous solution in suitable solvents.

2. The process for decomposing photographic pictures into a system of grains by evaporating on a sensitized plate a resinous solution in suitable solvents, characterized by the fact that the evaporation is carried out under the same conditions of heating and dampness of the plate, of the resinous solution and the laboratory respectively.

3. The process for decomposing photographic pictures into a system of grains by evaporating on a sensitized plate a resinous solution in suitable solvents characterized by the addition of ingredients such as other resinoids or calcium chlorid, turpentine or alkalies for producing the modification of the grain by variation of the concentration of the solution.

4. The process for decomposing photographic pictures into a system of grains by evaporating on a sensitized plate a resinous solution in suitable solvents in which the production of the grain is effected in a room separated from the atmosphere the dampness of which is maintained constant by appropriate mediums.

5. The process for decomposing photographic pictures into a system of grains by evaporating on a sensitized plate a resinous solution in suitable solvents in which the production of the grain is effected in a room nearly or completely saturated with dampness, the plate and its bed being previously heated and in which calcium chlorid and turpentine are added to the resinous solution.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 13th day of December, 1905.

PETER SCHUMACHER.

Witnesses:

EVA SATTLER,

OSKAR STANDHARDT.