

UNITED STATES PATENT OFFICE.

WILHELM SCHRÖTER, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR
TO FABRIK TECHNISCHER PAPIERE ARNDT UND TROOST, OF SAME
PLACE.

PHOTOGRAPHIC-PRINTING PAPER.

SPECIFICATION forming part of Letters Patent No. 585,452, dated June 29, 1897.

Application filed January 3, 1895. Serial No. 533,734. (Specimens.)

To all whom it may concern:

Be it known that I, WILHELM SCHRÖTER, merchant, of Frankfort-on-the-Main, Prussia, Germany, have invented new and useful Improvements in the Manufacture of Photographic-Printing Papers, of which the following is a specification.

This invention relates to the manufacture of photographic-printing paper.

At the present time there is no heliographic process with silver paper which operates without a special developing or fixing bath. Only iron prints have heretofore been developed in pure cold water by a single washing operation. Besides the well-known compounds of silver the improved paper contains also an iron compound which in this combination performs a double function. In the first place the compound of an iron salt and a silver salt appears to be much more permanent than that of silver salts alone, and in the second place the iron salt, owing to its being reduced in the light, serves to precipitate silver from the silver salt, and thus produces the picture.

The primary material employed in the production of this improved paper is a paper which contains no chlorin. Use is preferably made of pure rag paper and also fabric for this purpose. The absence of wood is very desirable. These materials are soaked with a solution which consists of silver nitrate, iron ammonium citrate, tartaric acid, and preferably, also, gelatin. It has been found that the tartaric acid or the citric acid may be dispensed with without giving rise to a very great difference. The same is the case with the gelatin. The quantity of the iron salt used determines the darkness in tone of the copies obtained. The proportions in which these materials have heretofore been used and have given favorable results are one thousand cubic centimeters of distilled water, eighty to one hundred grams of iron ammonium citrate, twelve to twenty grams of silver nitrate, fifteen to twenty grams of tartaric acid, and ten to fifteen grams of gelatin. The paper soaked with this solution keeps unchanged for several months in the unexposed state. Exposed to the light it is five times more sensitive than the ordinary pa-

per containing potassium ferricyanid. The parts exposed to the light receive a slightly-yellowish color, which by the washing in pure water changes to deep brown.

By reason of its very great sensitiveness the improved paper may be employed in cases where such has not hitherto been possible, especially for printing on rather thick cardboard and for producing negative stencils which may be used directly with the same paper or with paper containing potassium ferricyanid for the production of positives. The copies thus obtained are quite unchangeable in the light after the washing and do not require any further fixing.

According to what is known regarding the several components of the solution two operations must take place for forming the copy. In the first place a small part of the silver nitrate in the presence of the organic substances will be directly decomposed in the light and become colored. In the second place, and this is evidently the more important operation for imparting color, the iron oxid present is reduced by the exposure to light, in consequence of which metallic silver is then precipitated from the silver nitrate. The opinion that the two operations take place in conjunction appears to be supported by the brown color of the product obtained.

Although the pictures produced with this improved paper keep very long under ordinary circumstances, it is advisable in cases where the pictures are liable to be brought into contact with acids or substances containing acids to submit them to a fixing operation.

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

1. A process for manufacturing a highly-sensitive photographic-printing sheet, which consists in soaking a paper or textile fabric free of chlorin with a solution of silver nitrate and iron ammonium citrate, to which is added free tartaric acid to redissolve the precipitated silver citrate.

2. As a new article of manufacture, a highly-sensitive photographic-printing sheet herein described and impregnated with a mixture of silver nitrate, iron ammonium citrate and free tartaric acid, substantially in the propor-

tions described, and having a light yellow tint which turns brown when exposed to the light and becomes yellow again when moistened, and becomes darker and brown when
5 dried and which when fixed by sodium hyp-sulfite takes a brown tint when dried.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

WILHELM SCHRÖTER.

Witnesses:

CARL ROTTY,
JEAN GRUND.