

UNITED STATES PATENT OFFICE.

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METHOD OF PRODUCING PAPER-PULP FROM OLD PAPER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL KURTZ HÄHNLE, a subject of the King of Wurttemberg, residing at Reutlingen, in the Kingdom of Wurttemberg, Empire of Germany, have invented a new and useful Method of Producing Paper-Pulp from Old Paper, of which the following is a specification.

My invention relates to improvements in the process of producing paper pulp from printed or written papers and cleaning the pulp by means of alkaline solutions, and has for its object to render the process more advantageous and to obtain a saving in chemicals.

According to known methods the old paper is first carefully cut up, then treated with the lye and afterward washed out by means of sprinklers, until it is clean. With these methods, however, it is not possible to recover the lye, whereby the expenses of the production are rendered high. Furthermore a method has been made known, in which in place of a mechanical disintegration of the mass to be treated an exclusively chemical disintegration is effected by means of a comparatively concentrated solution of alkali. With this method, however, it was impossible to recover the lye as was intended, since the spongy material completely absorbed the lye and hardly released a considerable quantity of the lye voluntarily. Therefore with this process the maximum quantity of the alkali employed was lost. Besides this the fact is to be taken into account, that the chemical disintegration has a most unfavorable influence upon the fibers treated.

The present invention avoids the drawbacks of the old methods and consists in a process, in which an economical cleaning of the old paper is rendered possible. This effect can, however, be attained only in case the method is carried out exactly as is hereinafter explained and the following points of view are considered. First of all the connection between color or ink and paper must be so much loosened, as to render possible a complete washing out of the impurities in the subsequent process. In order to cheapen as much as possible the whole process the diluted solution of alkali employed requires to be recovered after its use and to be repeatedly used over and over again in the following operations, so that always only the quantity of alkali lost or

consumed in the previous process need be compensated for. It is for this reason, that at the moment that the alkali is about to be recovered, the paper requires to have essentially maintained its structure, in other words it should at this moment not yet have been turned into a pulpy mass, since otherwise the recovery of the alkali would be practically impossible. The old paper so preliminarily treated then requires to undergo a most extensive mechanical disintegration, whereupon the washing of the finely divided material on sieves by means of sprinklers is effected. A further essential feature of the new method consists in that during the disintegration subsequent to the treatment with alkali every objectionable pressing effect is avoided. Therefore the new method is as follows: The old raw materials are first soaked with a diluted lye, until the connection between the paper and the color or ink is sufficiently loosened, then subjected to a light pressure for squeezing out the liquid. This is best effected by means of an endless sieve, which receives the material and conveys it between several consecutive pairs of lightly loaded squeezing rolls, whereby the exceeding quantity of lye is squeezed out. The liquid flowing off is returned to a reservoir, in order to be afterward restored to its initial state. The transmission of the material and the removal of the lye may, however, also be effected by means of a tapering conveyer or any similar device. The material thus preliminarily treated is then put in a vessel and a convenient quantity of water is introduced whereupon the material is reduced to fibers by means of twirls or agitators, so that the printers' ink and similar inks gradually separate from the fibers. Care should be taken to protect the mass from pressing effects. Agitating apparatus of any improved construction may be employed, which are capable of finely dividing the material by means of rotary agitators or twirls. The known apparatus called in German "*Glockenzersäuser*" are particularly suitable for this purpose. In order to free the fibrous mass from the loosened impurities, it is now placed on an endless belt of fine wire-gauze and passed therewith beneath sprinklers, so that the sprays can carry off the impurities. At the delivery end of the sieve the completely cleaned fibrous mass can be taken off.

The process can be carried out continuously, even for the largest quantities, and requires but small quantities of chemicals and small outlays for wages and driving power, so that it can be employed most advantageously for all sorts of old papers, also for papers of the lowest quality.

Instead of the alkaline solutions mentioned above, also other chemical agents, which produce a similar effect, may be employed. For the selection of the chemical agents it is always essential, that the chemicals be capable of producing a sufficient effect upon the paper to be cleaned or upon the impurities to be removed without altering the paper mass to a degree which exceeds the absolute necessity.

I claim:

A process for cleaning paper from printing and writing thereon by the use of alkaline liquids which may be afterward recovered which consists in first soaking the paper with a diluted alkaline solution, then subjected to a light pressure for squeezing out the liquid, then mixing the mass with water and reducing the same to fibers without pressure, and finally sprinkling said fibrous mass with water for carrying off the impurities.

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Witnesses:

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