

UNITED STATES PATENT OFFICE.

MARIUS LE NORMANT DES VARANNES AND ANTOINE REGNOUF DE VAINS,
OF ST. VINCENT DE BLANZAT, NEAR CÉBAZAT, FRANCE.

MANUFACTURE OF PAPER-PULP.

No. 818,206.

Specification of Letters Patent.

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Application filed January 21, 1905. Serial No. 242,197.

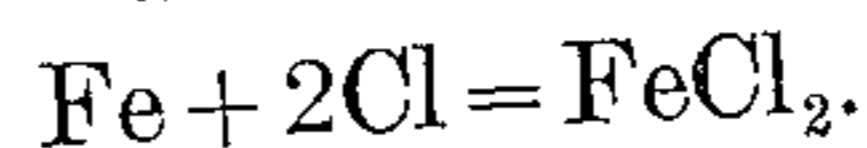
To all whom it may concern:

Be it known that we, MARIUS LE NORMANT DES VARANNES and ANTOINE REGNOUF DE VAINS, engineers, citizens of the Republic of France, residing at the Paper Mill, St. Vincent de Blanzat, by Cébazat, Puy de Dome, in the Republic of France, have invented certain new and useful Improvements in the Manufacture of Paper-Pulp, of which the following is a specification.

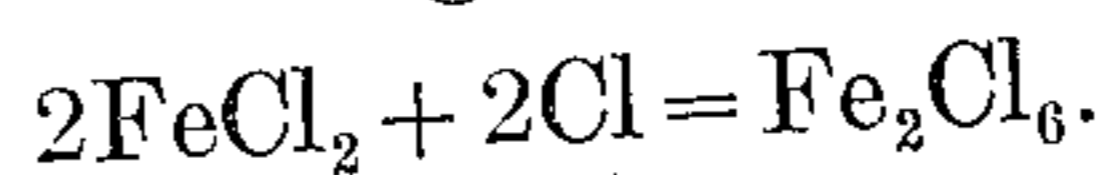
Pulps intended for the manufacture of photographic and other papers undergo in the practical execution of our process the ordinary treatment up to the refining operation. It should, however, be understood that all possible precautions should be taken in order to diminish the number of metallic particles introduced accidentally into the pulp—that is to say, the breaking-cylinder should be provided with blades of very good hard steel and a plate of the same metal, while the trough should not be of metal. These precautions are not absolutely indispensable; but they increase the rapidity of the succeeding operations and decrease the amount of waste. The torn rags are then placed in a stuff-engine, which is likewise provided with steel blades. Bronze should also be eliminated, as blades of bronze present the defect in the operation in question of making the pulp too fat, and this is always effected abundantly by the succeeding operations. The pulp is completely refined without sizing and is then conducted into a vat. From this latter it first of all passes over a long sand-trap serving to stop all the heavy particles, the reactions of which might not be rapid, and then into a half-stuff machine similar to the head of a paper-engine—that is to say, a making-table with siphons, a wet press, and in addition a strong couching-press. The paper thus obtained is thick and retains a small quantity of water in its pulp. It is rolled in the same manner as pulp intended to be bleached with gaseous chlorin. The rolled paper is then introduced into hermetically-closed chests, in which it is submitted to a simple slight bleaching with gaseous chlorin. This operation presents the double advantage of bleaching the pulp and of attacking the metallic particles, converting them into soluble substances readily eliminated merely by washing.

At the ordinary temperature chlorin, in

fact, vigorously attacks all metals in order to form the corresponding chlorids. In the case of iron, for example, we have the reaction:

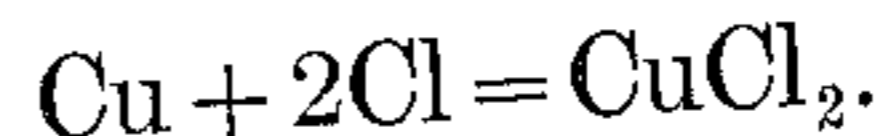


This protochlorid of iron again reacts upon the chlorin, so as to give the perchlorid

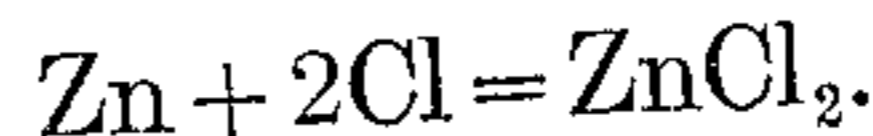


In fact, a mixture of protochlorid and of perchlorid of iron results.

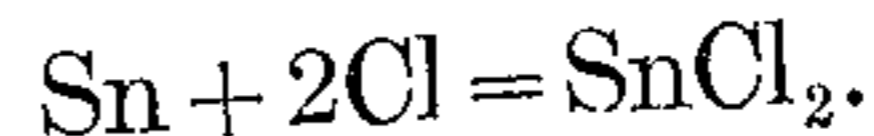
The reaction for copper is the same:



For zinc:



For tin:



and then



In the passage through the half-stuff machine care should be taken that the pressure is sufficient to insure that the paper obtained presents the appearance of moist blotting-paper, which is, however, still capable of absorbing a little moisture in such a manner that the soluble compound may be sucked up, because the chlorin does not act completely upon the metallic particles except when the composition formed is completely absorbed, and the metal always presents to it faces not impregnated with the substances that are formed.

The treatment with gaseous chlorin cannot be replaced by treatment with liquid chlorin, which is far more simple, but which gives unsatisfactory results. Similarly, in all the other reactions attempted in the liquid pulp the metallic particles at the beginning of the reaction become surrounded by a bubble of gas and are no longer attacked.

The employment of gaseous chlorin presents the double advantage of producing complete elimination of the metallic particles and of bleaching the pulp. This latter may remain in contact with the chlorin as long as the bleaching appears to require without, however, prolonging this contact to such a point as to injure the quality of the pulp. In any case after a stay of an hour's duration in the bleaching-chest all the metallic reactions are completed. The pulp then passes into a washing and diluting apparatus of stone,

where it is washed until all traces of chlorin have disappeared. The metallic particles are then entirely eliminated.

As the washing of a refined pulp presents some difficulties and takes place slowly the stuff-engine in order to hasten operations is provided with several washing-drums. In order to decrease the amount of waste, the washing-waters are caused to pass through a series of pulp-retainers or save-alls.

When the washing effected is judged to be sufficient, it is stopped and sizing is carried out in the engine itself. Then before being sent to the paper-machine the pulp, the dilution of which is not absolutely perfect, passes into a stone beating-engine, (similar to the Thode refining apparatus,) which renders it absolutely homogeneous and removes the few knots or lumps which may have escaped the refining. The paper is then manufactured by the machine, and its quality will be so much the better in view of the fact that all desirable precautions have been taken for obviating the introduction of fresh metallic par-

ticles during this last operation. To this end the plates of the siphons should be of ebonite, all the rollers supporting the apron should be covered with ebonite, the presses should be of stone, and the metal doctors should be omitted.

What we claim, and desire to secure by Letters Patent of the United States, is—

The process of eliminating metallic particles from paper-pulp which consists in subjecting the same, after it has been completely finished, or refined, and before sizing, to the action of gaseous chlorin to convert the metallic particles into soluble chlorids and then removing said chlorids by washing.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses this 6th day of January, 1905.

MARIUS LE NORMANT DES VARANNES.
ANTOINE REGNOUF DE VAINS.

Witnesses:

PAUL COULOMB,
ARCHIBALD R. BAKER.