UNITED STATES PATENT OFFICE.

JOHN MANNING, OF WINDSOR, NOVA SCOTIA, CANADA.

IMPROVEMENT IN PROCESSES OF APPLYING GYPSUM IN THE MANUFACTURE OF PAPER.

Specification forming part of Letters Patent No. **219,407**, dated September 9, 1879; application filed February 7, 1879.

To all whom it may concern:

Be it known that I, JOHN MANNING, of Windsor, in the county of Hants, in the Province of Nova Scotia, Dominion of Canada, have invented a new and useful Improvement in the Manufacture of Paper, of which the following is a specification.

This invention relates to the combination of gypsum or any of the various forms of sulphate of lime with paper-pulp in the manufacture of paper, substantially as hereinafter fully described.

In carrying out this invention, I take gypsum or any of the various forms of sulphate of lime—such as crystallized selenite, alabaster, &c.—and in a suitable machine crush and reduce it to a condition proper to refine, bleach, and grind. I then refine and bleach it, as may be required, by the use of muriatic or sulphuric acids, in the usual manner of refining and bleaching with such acids. The material is then washed, floated, and dried, and then ground in a suitable grinding-mill to a very fine powder and bolted, and then this powdered gypsum is made anhydrous in the usual manner. It is now in proper condition to be combined with paper-pulp, which is accomplished in the following manner:

Into paper-pulp which is being reduced in a paper-pulp engine to a fine condition I slowly sift or riddle some of this anhydrous gypsum, to the amount desired to be combined with the paper-pulp, at a point in the paper-engine tank as near to the beater as possible—that is, at that side of the beater where the pulp in its movements to be beaten passes under or through it. As this anhydrous gypsum passes under or through the beater with the pulp the particles of gypsum are separated by and intermixed with the fibers of the pulp, which fibers, in their separation of the particles of gypsum, interpose and prevent contact of the same with each other, thereby preventing the setting or hardening of the gypsum into lumps. In about an hour, or thereabout, the water in the pulp will have thoroughly penetrated and combined with the particles of gypsum, which are held from contact with each other by the fibers of the pulp, and the gypsum will then be completely disintegrated and an impalpable powder produced.

It is best to add this anhydrous gypsum to the pulp when it (the pulp) is about half beaten, although it can be introduced at any time desired, the fibers of the pulp being then sufficiently fine for good results, as by the time the pulp is fully beaten and prepared for use in the making of it into paper the water of the pulp will have had time to combine with the anhydrous gypsum, and have accomplished its disintegration.

By sifting the gypsum into the pulp close to the beater, as described, the particles of gypsum will not have time to set and harden or lump before they pass under or through the beater, where they are separated by and intermixed with the fibers of the pulp, and disintegration accomplished, substantially as described.

It has been found by practical experiments that once passing of the gypsum through or under the beater is sufficient to effectually prevent any setting or hardening of the gypsum.

It is best to put only a small quantity of the gypsum into the pulp at one time—say about ten to twelve per cent. of the gypsum to the amount of pulp—allowing it to become combined with the water and disintegrated first, when a little more can be added, and so on until the full amount required is combined with the pulp.

In making paper of an inferior quality, or when it is not desired to be very white, the refining and bleaching process need not be carried to its full extent, as is obvious; also, in lieu of introducing the anhydrous gypsum into the pulp while it is being beaten in the engine, it can be added at any time desired; but as above described is preferable, and the best practical results are obtained at a saving of time, labor, and expense.

Using anhydrous gypsum, substantially as above described, in the manufacture of paper, a larger proportion of it adheres to the pulp—say eighty or ninety per cent.—than heretofore in the use of such substances for similar purpose, and by this mode of combining the two—that is, the anhydrous gypsum with the paper-pulp—the cost of the manufacture of paper is greatly reduced, dispensing with expensive and cumbersome machinery, as at present employed in preparing gypsum for

such use, much labor and time are saved, and the quality of the paper improved, as it is whiter, harder, and firmer, and, when calendered, will have a beautiful enamel finish.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The improved process in the manufacture of paper, substantially as described, the same consisting in sifting powdered anhydrous gypsum into the paper-pulp while the pulp is being beaten in a paper-pulp-beating engine.

JOHN MANNING.

Witnesses:

EDWIN W. BROWN,

GEO. H. EARL.