

# UNITED STATES PATENT OFFICE.

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PROCESS OF SIZING PAPER, CLOTH, AND OTHER FIBROUS SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 251,062, dated December 20, 1881.

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*To all whom it may concern:*

Be it known that I, PETER E. MINOR, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in the Process of Sizing Paper, Cloth, and other Fibrous Substances, of which the following is a specification.

Heretofore paper has been sized substantially in two ways, viz: first, by what is known to the trade as "rosin sizing," which consists of rosin and soda or soda-ash, and when used in the engine is precipitated with a solution of alum on the fiber of the pulp and dried on the machine; second, by animal sizing, which consists of glue or similar material and a solution of alum. In this process the paper is first made, and when nearly dry is run through the sizing, and is afterward dried by atmospheric air at the ordinary temperature. The disadvantages of these processes are, first, in the use of rosin sizing little or no strength is added to the material or product; second, in the use of animal sizing the substance of the paper is not penetrated thoroughly, only the outside receiving the advantages of the sizing, and consequently the strength of the paper is but little increased. If an additional coating of sizing is used for the purpose of increasing the strength of the paper, the sizing is liable to crack, and the paper becomes less flexible and more liable to break. This sizing, as heretofore used, cannot be precipitated by alum in the engine and incorporated in the body of the pulp, for the reason that its solubility in water causes it to be wasted during the process of manufacture. Hence this sizing, not being susceptible of incorporation with the body of the pulp or paper, adds comparatively little strength to the manufactured paper. Again, inasmuch as this sizing cannot be successfully dried by artificial heat, and requires the slow process of natural evaporation in air at the natural temperature, the amount of room required for drying purposes is largely increased, and the cost, both in time and labor, is consequently greatly enhanced.

The object of my invention is to provide a substance which, when used alone or in combination with either or both of the above-named sizings, will in all cases greatly increase the strength, flexibility, and toughness of the paper manufactured, and when animal sizing is

used enables me to precipitate the same on the fiber of the pulp in the engine, and thus thoroughly incorporate the sizing with the body of the paper, and at the same time renders the animal sizing insoluble in water and prevents its loss during the process of manufacturing the paper.

To this end my invention consists in the use of the mucilage extracted from Irish moss.

To carry my invention into effect I proceed as follows: For the manufacture of one ton of paper by the use of rosin sizing, after the usual quantity of rosin sizing is put into the engine, I add the mucilage extracted from five pounds of Irish moss, the solution being about a barrel in quantity. This should be put in either at the time or immediately after the rosin sizing is put in. The usual quantity of a saturated solution of alum is then added to the mixture. The whole is then thoroughly beaten in the engine with the pulp, the alum serving the purpose of precipitating the sizing on the fiber of the pulp. These proportions may be varied. Double the quantity of the moss extract may, for instance, be used and less of the rosin, the greater quantity of the moss merely serving the purpose of increasing the strength, flexibility, and finish of the paper.

In the manufacture of paper by the use of animal sizing, I may use to one pound of glue in solution the mucilage from one pound of Irish moss; or these proportions may be varied to a certain extent. This compound may then be precipitated on the fiber of the pulp by the use of alum solution in the quantity usual in rosin sizing.

By the use of my invention, as above, animal sizing may be used in the engine, and thus incorporated with the pulp, the same as rosin sizing, and precipitated on the fiber of the pulp. This also renders the animal sizing insoluble in water, thus enabling the fiber to take up and retain all the sizing precipitated upon it. Again, the paper made by this process may be dried on the machine by artificial heat, thus saving in time and drying room, as hereinbefore stated. The paper thus made is sized all the way through its substance, instead of only on the surface, as by the old process of animal sizing. The paper is also greatly increased in strength and flexibility, and by the use of a fibrous wood pulp as good or nearly as good a quality of paper

may be produced by my process as can be made from rag stock by the old process. The paper is practically insoluble in water, and therefore retains its strength to a much greater degree than other paper when subjected to dampness.

The Irish-moss mucilage may also be used with both animal and rosin sizing, the proportions being about equal parts of the three sizings. These proportions may be varied, however, a greater proportion of the moss solution always adding strength and flexibility to the product, besides giving it a better finish. This sizing may also be precipitated in the engine, and the product may be dried on the machine.

I may also use Irish-moss mucilage alone as a sizing, and use caustic soda to precipitate it in the engine, instead of using alum solution, as in the other processes. This makes a very strong, flexible paper, and is especially adapted for the manufacture of tissue-paper and the like.

By the employment of this process the saving in the cost of manufacturing animal-sized paper is from twenty-five to thirty-three per cent.

In the manufacture of manila or other paper where color is not an element of value or excellence, I may use a solution of sulphate of iron, in the proportion of four ounces of the sulphate to one gallon of water, or even stronger, as a precipitate, instead of the solution of alum.

The above sizings may also be used to make an insoluble waterproofing for cloth, hat-bodies, &c., and for a dressing for leather; but as these subjects form the basis of other applications for Letters Patent which I propose to make it is unnecessary to particularize in this.

Having thus fully described my invention, and the best methods known to me of carrying it into effect, what I claim is—

1. The process hereinbefore described of sizing paper and paper-stock by the use of the mucilage extracted from Irish moss, in combination with rosin sizing, the whole being pre-

cipitated on the fiber of the pulp by a saturated solution of alum, as and for the purpose herein set forth.

2. The process herein set forth of sizing paper and paper-stock by the use of the mucilage extracted from Irish moss, in combination with animal sizing, the whole being precipitated on the fiber of the pulp in the engine by means of a saturated solution of alum, as and for the purpose described.

3. The process hereinbefore described of sizing paper and paper-stock by the use of the mucilage extracted from Irish moss, in combination with rosin sizing and animal sizing, the whole being precipitated on the fiber of the pulp in the engine by means of a saturated solution of alum, as and for the purpose herein set forth.

4. The process herein described of sizing paper and paper-stock by the use of the mucilage extracted from Irish moss, in combination with other ingredients, the whole being precipitated on the fiber of the pulp by a saturated solution of alum, as and for the purpose herein set forth.

5. The process herein described of sizing paper or paper-stock by the use of the mucilage extracted from Irish moss and precipitated on the fiber of the pulp by means of a saturated solution of alum, as described.

6. The process herein set forth of sizing paper or paper-stock by the use of the mucilage extracted from Irish moss, in combination with caustic soda, as hereinbefore set forth.

7. The process herein described of sizing paper or paper-stock by the use of the mucilage extracted from Irish moss.

PETER E. MINOR.

In presence of—

EMMETT O'NEILL,  
WM. F. GIBSON.