

UNITED STATES PATENT OFFICE.

HENRY LOWE, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PAPER PULP OR STOCK.

Specification forming part of Letters Patent No. 33,092, dated August 20, 1861.

To all whom it may concern:

Be it known that I, HENRY LOWE, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in the Manufacture of Paper; and I do hereby declare that the following is a full and exact description thereof.

After many years' experiment in the manufacture of paper I have discovered that it is an improvement to reduce the fibrous matter of many different paper-making materials having a very short fiber much further or to a much greater subdivision than it has been customary by the old methods.

Heretofore paper-makers have been careful not to reduce the stock too far, supposing that a certain considerable length of fiber must be preserved in order to make paper. When paper-stock has by chance been reduced beyond such old standard length of fiber all manufacturers have regarded the same as "spoiled" or "killed" by the too great reduction or subdivision of the fiber; but I find that this killed stock may be revived by further reduction of the fibers, so as to make paper, and often better paper than that made from the same original stock according to the old practice of long fiber. Thus I have established a new theory of paper-making from short fiber and applied the same practically to different materials in the manufacture of different kinds of paper.

My invention is intended for paper-stock having a very short natural fiber; and it consists in reducing such materials as nearly as possible to the separation of the ultimate fibers (as deposited by nature) in order to make a stronger and better paper, and to enable manufacturers to use killed stock or materials, which, according to the old theory, have a fiber too short for paper-making.

In the practical application of my invention to different paper-stocks the details of treatment may be somewhat varied in order most readily to accomplish the same common result according to one common principle, and the details of treatment are varied only for the sake of economy and convenience. By this plan many fibrous substances hitherto regarded as worthless on account of their tendency to produce short fiber only may be worked with success, giving good and often very excellent paper.

The following general description will illustrate my invention, yet the manufacturer must

vary the same according to circumstances and agreeably to my new mode of working short fiber: Take, for instance, reeds, straw, or Manila hemp and first treat the same according to the known methods for the reduction of such substances preparatory to pulping. Then, instead of completing the process of reduction by the pulping process, as is common, (but which will not succeed at all with reeds,) take this partially-reduced stock and subject the same to further chemical and mechanical treatment until the stock is spoiled or killed, according to the old theory, because the fibers have become too short. After the short fibers have been subdivided as nearly as possible to their ultimate natural length and the foreign matter broken up and washed out, the stuff is pulped and then felted in the usual manner.

In order to separate the fibers of reeds, straw, and Manila hemp, I recommend boiling the same in a solution of caustic soda in a rotary boiler under a high pressure—say 135° Fahrenheit—the boiler being moved about five revolutions per minute. This treatment may be continued twelve hours or more, according to the effects or results. The agitation of the stock greatly facilitates the separation of the fiber and the breaking up of the insoluble foreign matter, which in the common method of long fiber prevents the fibers from coming together in the process of felting.

After the fibers have been thoroughly separated great care must be taken in washing this short fiber not to waste the same. I prefer the use of a worm-cylinder washer with wire-cloth, having meshes to suit the condition of the stock and the kind of paper to be made.

When the fiber has been thoroughly reduced I treat the same with sulphuric acid—say about one pound of acid to one hundred pounds of fiber—with a proper quantity of "bleach-water," at 1½° to 3° Baumé, the same as used in bleaching straw fiber. When the bleach is nearly exhausted the stuff may be put into the old grinding-engine (not to be "drawn out" or "linted") to be pounded, in order to make the stuff hold the water and to bring it into condition to properly felt. This last treatment may be effected by Kingsland's or Jordan's or other engine; but it is very important that the knives are dull, so as to give considerable surface, and thus pound instead of cutting the fiber.

For tissue-paper the fibers must be reduced

to extreme subdivision and great care taken in the washing in order to obtain a strong paper.

I confine my claim to the peculiar improvement above set forth, in accordance with my new theory—the shorter the fiber the better the paper—as distinguished from the common theory and practice, which required a standard length of fiber in order to felt.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

The above-described paper stock or pulp having a short fiber, as a new article of manufacture, the same being made from killed or spoiled stock or from vegetable substances having naturally a very short fiber, substantially as set forth.

HENRY LOWE.

Witnesses:

EDM. F. BROWN,
DANIEL BREED.