United States Patent Office.

ROBERT W. RUSSELL, OF NEW YORK, N. Y.

Letters Patent No. 88,515, *dated March* 30, 1869.

IMPROVED PAPER-STOCK, BOX-BOARD, ROOFING-PAPER, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, ROBERT W. RUSSELL, of New York, in the county of New York, and State of New York, have invented certain new and useful Processes for the Manufacture of Paper-Box Board, Paper-Stock, Roofing-Paper, and other kinds of paper and fibrous articles, from cane, or reeds, and similar vegetable fibrous substances, disintegrated by the explosive force of steam; and I hereby declare the following to be a full, clear, and exact description of the same.

I take the cane, or reeds of the cane-brakes of the Carolinas, and other southern States, sometimes used for fishing-poles, or other similar fibrous material, and after the same has been disintegrated by the explosive force of steam, by the process for which a patent was granted, by the United States, to A. S. Lyman, August 3, 1858, it is subjected to treatment, as follows:

The said fibre is cleansed, by passing it over an apron to and between rollers, running in a water-trough, and set nearly close together, whereby the fibre is charged with water, and squeezed, or bruised, and the gum, resin, silex, and other extraneous matter, are washed away from the fibre.

The water is supplied freely to the trough, so as to overflow and carry off the light, pithy, and other worthless floating matter.

The water supplied to the trough also escapes through apertures in its sides and bottom, so as to carry off the dirt and coloring-matter.

The fibre is passed from the washing and squeezing-rollers, out of the trough, to and between rollers, to squeeze out the water, and the fibre is then passed, in sheet-form, over the cylinder driers, (such as are used for drying thick paper,) and wholly or partially dried thereon. The sheets are cut into suitable lengths, and the drying may be then completed upon a single cylinder, or in any other suitable manner.

The fibre, thus treated, is divested of acid, and a considerable quantity of soluble and worthless matter, and being dried, compressed into cakes, or blocks of suitable size, and baled, is in a fit condition for exportation..

From this paper-stock, various kinds of good paper are made, conveniently and economically.

A great weight of the fibre, thus cleansed and compressed, can be got into a boiler, and the acid of the fibre being washed away, a small quantity of alkali, applied to the cleansed fibre, is sufficient to complete the disintegration of the fibre, and remove the intercellular tissue and coloring-matter, and cause the pulp to felt well.

The feeding of the fibre to the washing-rollers will be facilitated by previously picking open the fibre.

The fibre, disintegrated as aforesaid, picked open, cleansed, dusted, separated, and shortened, is in a proper condition to be baled, and is a new and useful kind of paper-stock.

The washing will be facilitated if the fibre be blown from the guns into water, or if water be poured upon or otherwise applied to the blown fibre, directly after the discharge from the guns, and the washing will be rendered more efficient by a previous soaking or boiling of the blown fibre in water, either with or without alkali.

Two or more of the said sheets may be run together, interposing rosin, size, or a compound of tar and rosin, or gum, glue, or other adhesive matter, and also, when required, applied with pulverized soapstone, limestone, cement, plaster of Paris, or other substance. The compound sheet is then pressed between rollers, and cut into lengths of the required size.

Instead of washing the steam-blown fibre, it may be picked open, and two or more sheets of it may be run together, interposing the size, or composition as aforesaid. The material, thus prepared, is available as the basis of fibrous-composition slabs and panels to be coated with bituminous, silicate, or other composition, or otherwise treated, to finish them according to the uses to which they are to be applied.

The adhesive and other substances may be applied, as aforesaid, to the fibre, either by pouring the liquid matter, and strewing the pulverized substances upon one of the sheets, on its passage to the press-rolls, or the liquid matter may be applied by rollers to the sheet, or the liquid matter and pulverized substances may be mixed and applied in the same way. The size, or composition, may also be applied as aforesaid, between sheets of felt, or thick paper, made from the said fibre.

The said cane-fibre, not subjected to chemical treatment, is very soft, and requires an admixture of other substances to stiffen and harden the material, when binders' board paper-box board, and some other kinds of paper are to be made.

Straw is too harsh and brittle for many purposes, when used alone, but when mixed with the said cane-fibre in proper proportions, the compound is neither too soft nor too hard.

The cane-fibre may also be rendered sufficiently hard and stiff for box-board, and binders' board, and similar articles, by boiling or soaking the fibre in a solution of lime. Rosin-size will also act well upon the said fibre for the same purpose. So glue, gum, paste, or other adhesive substance, will harden and stiffen the cane-fibre sufficiently for that purpose.

Clay, plaster of Paris, cement, soapstone, or other earthy or mineral substance, mixed with the adhesive matter, serves to give the board stiffness and hardness, and at the same time make it cheaper.

A new and improved method of combining the fibre with the adhesive and other matter, as aforesaid, is as follows:

The steam-blown cane-fibre, being ground up and run off on a wet roll in the usual way, gum, glue, tar, and rosin-compounds, or other matter, in a liquid form, may be applied by a brush or roller, or by other suitable means, to the sheet, as it is passing around the wet roll, or may be poured or sprinkled upon the same.

And pulverized soapstone, limestone, slate, plaster of Paris, cement, or clay or other substances, to give the sheet the proper hardness and consistency, and desired character and quality, are scattered, or strewn upon the sheet, as it is passing around the wet roll. Or a composition of adhesive matter and the pulverized soapstone, or other matter, as aforesaid, may be applied, by a roller or other suitable method, to the sheet while it is passing around the wet roll. The sheets are then dried upon drying-cylinders, or otherwise, as aforesaid, and may then be pressed under hot calender-rolls.

Several useful kinds of paper, for example, wall, curtain, and wrapping-paper, can be made by mixing the steam-blown cane-fibre with straw, which new compound, by blending the soft quality of the cane-fibre with the hard quality of the straw, is found to be of great value. The mixture should be in about equal proportions of straw and cane-fibre, or with a larger proportion of cane-fibre. A similar mixture of the soft cane-fibre with what is called hard stock, or with rag pulp, yields a new and useful kind of paper.

The cane-fibre, disintegrated as aforesaid, and not treated with any chemical, is very soft and spongy, and will absorb tar freely. In consequence of this peculiar quality of the fibre as it comes from the steam-gun, coupled with its tenacity and its cheapness, it is available for roofing-paper, commonly made of pulp chiefly from woollen rags, which roofing-paper is saturated with tar, and then covered with fine gravel or sand.

The roofing-paper may be made of the blown cane-fibre, in combination with woollen-rag pulp, in the proportion of about thirty-three to seventy-five per cent. of the cane-fibre and the balance wool-rag pulp.

What I claim as my invention and discovery, and desire to secure by Letters Patent, is—

1. The above described methods, or processes of making paper-stock, paper-box board, roofing-paper, and other kinds of paper and fibrous articles, as aforesaid, made from cane, or reeds, or similar fibrous vegetable substances, disintegrated by the explosive force of steam.

2. The above-described manufactures, the products of the said processes.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

R. W. RUSSELL.

Witnesses:

E. R. REED,

EDM. F. BROWN.