UNITED STATES PATENT OFFICE.

HENRY LOWE, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PREPARING PAPER-PULP FROM REEDS.

Specification forming part of Letters Patent No. **20,355**, dated May 25, 1858.

To all whom it may concern:

Be it known that I, HENRY LOWE, of the city and county of Baltimore, in the State of Maryland, have invented a new mode by which I am enabled to make a great economy in the production of paper, of which the following is a specification.

The invention is particularly adapted to the production of paper from reeds, (*Arundinaria macrosperma* of Michaux,) and perhaps some other substances also.

In the manufacture of paper from reeds it has heretofore been thought necessary to reduce the reeds to half-stuff by the use of the old engine; but by repeated experiment I have found that reeds may be disintegrated in the revolving boiler, so as to be directly reduced to pulp, thus saving much expense in the manufacture of paper.

My invention consists of an improved process of making paper-pulp from reeds by first disintegrating the reeds by boiling them in a solution of caustic soda, accompanied by agitation, and then reducing directly to pulp without the use of the old engine to reduce the reeds to half-stuff.

Paper from reeds.—Having cut the reeds into convenient lengths—say two or three inches, more or less—the stock is then boiled in a tub with a weak solution of muriatic or sulphuric acid—say of the strength of four degrees of Baumé's hydrometer, or thereabout—for, say, six hours, (it will answer by cold infusion, but requires the liquor to be much stronger or to be much longer subjected to its action,) until, when the pieces of reed are bended backward and forward, it will not crack like the dry reed. See that the joints are also acted on by the acid liquor, so as to be in the same condition. Now draw off the liquor into another tub or vessel and reserve it for future use. Water is now freely run through the stuff to wash out the acid, and the reeds are furnished into the revolving boiler and ten pounds, or thereabout, of caustic soda or its equivalent is added for every hundred pounds of dry reeds. As much water is added in the boiler as is usually put with other stocks, the boiler closed up, the hot steam let on, and it is then put in motion and kept boiling for about eight hours, which I have found by my experience to be the best length of time. During the revolution of the boiler the stuff falls to pieces. (It may perhaps be facilitated by putting into the boiler some cannon-balls; but this I have not yet tried and do not deem important, as I effect the desired result without.) The boiler is now opened and the stuff is let down, combined with the hot liquor, at once into the vat of the Kingsland engine. (I prefer to have the said vat concave at bottom, as the stuff is more readily agitated and kept uniform in its consistency. I also prefer to have steam introduced into the vat, so as to keep up the temperature.) I prefer to have the vat lower than the boiler, so that by affixing a shoot the contents of the boiler will be at once discharged into the vat. If there is not enough liquor with the boiled reeds to make it thin enough to be lifted up by the means used to furnish it into the Kingsland engine, water may be added. From the vat it is furnished into the Kingsland engine as other kinds of stock and "pulped." I prefer "pulping" the stock while it is hot, and also in its own liquor, as by that I save labor, power, and time, the fiber grinds quicker and better. If intended to be made into wrapping or unbleached paper, as the "pulp" flows from the Kingsland engine I mix a solution of alum with it. This has the effect to strike the gummy matter from the liquor, and it acts as a sizing to the paper and lessens the waste. Enough alum is added to neutralize the soda or other alkali used in the boiling, and if not so used when the alkaline liquor went on the felts it would have a tendency to destroy them. If the alum is added before the stock is pulped, it has the effect of hardening the fiber and making it difficult to be raised into the Kingsland engine.

If the intention is to make white or bleached paper, instead of at once grinding it to pulp in the Kingsland engine I reduce it by that engine to a kind of "half-stuff," merely opening out the fiber and letting the stuff flow into a tank, where the liquor is drained off, and it is washed and bleached by the action of chloride of lime, sulphuric and muriatic acid, and carbonate of soda, nearly as is done in bleaching woven cotton fabrics. When bleached it is furnished into the vat of the Kingsland engine, again mixed with water, agitated, and furnished into the engine to be pulped—power used, say, ten horses for eight hours. The

power required to drive the Kingsland engine to pulp reed-stock after being prepared as aforesaid in the revolving boiler is computed not to exceed ten horses. I will say fifteen. The amount of wrapping-paper pulp produced in an hour is more than can be made from rag-stock—say it is the same—equal to two hundred and forty pounds of dry paper. If the reed-stock were boiled in a tub, it would have then to be furnished into the old grinding-engine, and I have found by my experience that the time required to grind it into half-stuff would be even more than on other stocks, and of course the power used would be more. My object in using the revolving boiler is that it breaks up the fiber, so that its effect on this stock is equivalent to the use of the old grinding-engine, upon which so great an amount of time and power is expended. All the other advantages of the boiler I can get by the use of the tub. The paper-manufacturers do not use the revolving boiler for the same purpose that I do.

It will be observed that after the reeds are furnished into the revolving boiler there is no more labor on the stock until it is made into pulp, if intended for unbleached paper; but if white or printing paper, by having properly-contrived mechanical arrangements for bleaching, that part of the operation can be attended to by one man.

The engine-tenders are entirely dispensed with, as the Kingsland engine may be put under the control of the paper-machine "tender," it requiring only to be set to the required gage.

For the preparation of white pulp it is preferable to employ two separate vats and two engines.

It is obvious that some variations may be made in both the chemical and the mechanical details of my process without departing from my invention. For instance, the said treatment may be omitted and the duration of the alkaline treatment prolonged.

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

The above-described process of making paper-pulp from reeds by first disintegrating the reeds by boiling in a solution of caustic soda, accompanied by agitation, and then reducing them directly to pulp without reducing to half-stuff by the machine technically called the "old rag-engine."

HENRY LOWE. [L. S.]

Witnesses:
R. S. HUCK,
THOS. LEIDY.