

UNITED STATES PATENT OFFICE.

DOUGLAS HICKOX, OF SPRINGFIELD, ILLINOIS.

IMPROVEMENT IN PROCESSES FOR MANUFACTURING PAPER-PULP.

Specification forming part of Letters Patent No. 196,666, dated October 30, 1877; application filed August 30, 1876.

To all whom it may concern:

Be it known that I, DOUGLAS HICKOX, of Springfield, in the county of Sangamon and State of Illinois, have invented a new and useful Improvement in Processes for the Manufacture of Paper; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improvement in the process of manufacturing paper from the plant botanically known as the *Abutilon avicennæ*, locally called "Indian mallow," "stamp-weed," "rag-weed," &c., which grows largely in Missouri and Illinois.

Heretofore paper has been manufactured from this plant by the ordinary process, as used in the manufacture of paper from straw and such like material.

I have found in such manufacture that the paper produced is coarse in appearance, and has a rough and uneven surface, unfitting it for use as a fine wrapping-paper and for like purposes.

The object, therefore, I have in view is the production of paper from the *Abutilon avicennæ* which will have a smooth and even surface, and can be used for fine paper bags, and as fine wrapping-paper, and can be applied to any of the uses to which a brown or colored paper might be adapted.

The manner in which I conduct my process is as follows: I take the *Abutilon avicennæ* and first treat it in the manner heretofore employed, by cutting or breaking the plant into short pieces, then boiling from six to twelve hours in a solution of lime and soda-ash under a pressure of about eighty pounds to the square inch. After this step the plant is removed from the boiler and deposited in piles to undergo a process of fermentation. Then the plant is in a condition to be washed and reduced to pulp, suitable for making paper, which is done by grinding or breaking in a machine called a "pulping" or "rag" engine, used by all paper-makers for the reduction of stock to pulp.

During this part of the process, which lasts usually from eight to twelve hours, the plant is exposed to a constant stream of fresh, clean water, supplied at one end of the machine, the impurities and surplus water being carried off by a revolving screen at the other end of the machine.

The water washes and softens the material, and carries off all the impurities.

After the expiration of the time necessary to complete this part of the process, a sufficient quantity of bleaching material is added to give the pulp the proper color. The pulp is now in a semi-fluid state, and may be drawn off or elevated with pumps and conveyed in spouts having a slight inclination.

The pulp at this point heretofore has been manufactured directly into paper in the ordinary way.

By my improved process I take the pulp in the semi-fluid state, after it has been thoroughly ground, washed, and bleached in the ordinary pulping-engine, as above described, and pass it through a pair of millstones, such as are in general use among millers for grinding grain.

I have designed to use any of the ordinary kinds of millstones, whether the stones are vertical or horizontal, or whether the upper or lower stone is the runner.

After the pulp has passed through these millstones and has been ground it is made into paper in the ordinary manner.

The grinding of the pulp after passing from the rag or pulping engine diminishes the size of the fiber, and, without lessening the strength of the paper, gives its surface a smooth and homogeneous appearance.

I do not wish to confine my invention to the treatment of *Abutilon avicennæ*, since it can be practiced with equal advantage upon the straw of grains, or upon wood or other similar vegetable substances.

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

The process of treating *Abutilon avicennæ*, straw, or other similar vegetable substances in the manufacture of paper-pulp, consisting in first cutting or breaking the plant into small pieces, then boiling the same, then allowing it to ferment, then reducing it to pulp in a rag or pulping engine, and subjecting it to a stream of water, and finally grinding between ordinary millstones, substantially as described.

This specification signed and witnessed this 25th day of August, 1876.

DOUGLAS HICKOX.

Witnesses:

SAML. D. SCHOLES,
F. C. MATHER.