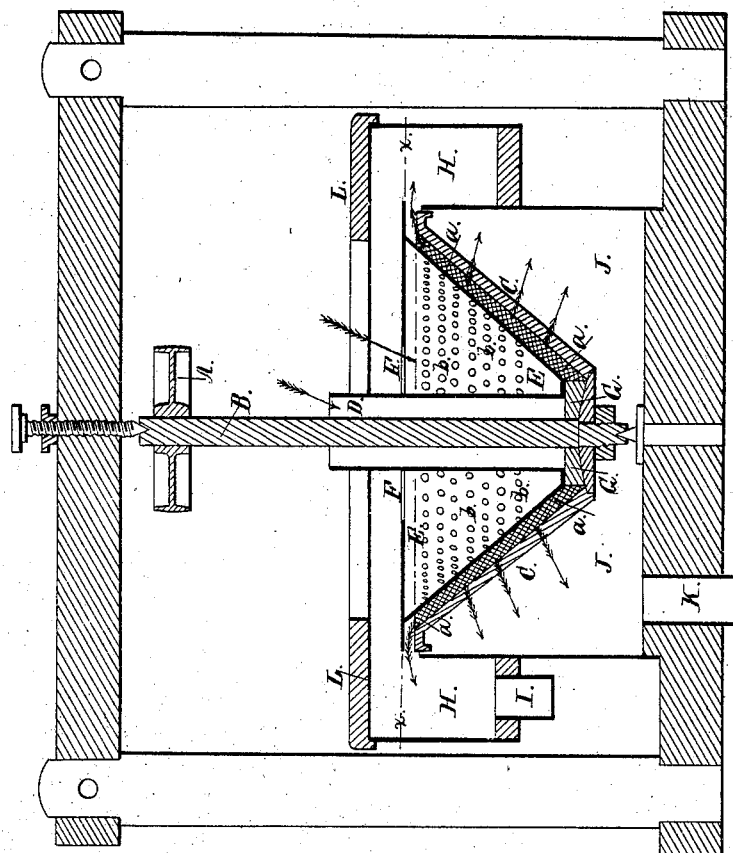


G. E. Sellers. Sheet 1 of 2 Sheets.
Pulp Washer.
N^o 46,030. Patented Jan. 24, 1865.

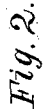
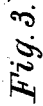
Fig. 1.



Witnesses.
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A. S. Dennis

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No 46,030. Patented Jan. 24, 1865.



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UNITED STATES PATENT OFFICE.

GEORGE ESCOL SELLERS, OF SELLER'S LANDING, ILLINOIS.

IMPROVED PULP-WASHER FOR PAPER-STOCK.

Specification forming part of Letters Patent No. **46,030**, dated January 24, 1865.

To all whom it may concern:

Be it known that I, GEORGE ESCOL SELLERS, of Seller's Landing, Hardin county, in the State of Illinois, have invented certain Improvements in the Mode of Washing Pulp or Fiber for Paper-Stock, of which the following is a specification.

The object of my invention is to wash from fiber or pulp any non-fibrous matter that may be mixed with or attached to the fiber or pulp in a cheaper and more thorough manner than has heretofore been done.

The nature of my invention consists in passing the pulp or fiber diluted or mixed with water into a centrifugal draining-machine, so constructed that the water containing the non-fibrous matter is passed through the meshes of the wire-cloth, and a continuous supply of fresh water is furnished, the washed fiber being delivered from the machine while it is in motion.

To enable others skilled in the art to use my invention, I will describe the mode in which I employ it, referring to the annexed drawings, making part of this specification, in which—

Figure 1 is a sectional elevation; Fig. 2, a section through the line *x x*. Fig. 3 is a plan view of the drainer-cone with the inner or water cone raised out of place to show the construction of both cones, similar letters having reference to similar parts.

A is a driving-pulley on shaft B, on which is hung an inverted conical centrifugal drainer composed of ribs C C, lined within with perforated metal plates or fine wire-cloth *a a a*.

D is a tube through which the pulp or stuff is fed into the conical drainer. This tube passes through and is attached to an inner metallic cone, E E, which is perforated, as shown at *b b b*. This inner cone lies above and within the wire-cloth cone above described, and is partially closed at the top, leaving the space F F around the outside of the tube D open for the supply of fresh water to pass into this inner cone.

G G are wings or fans that throw the stuff as received through the tube D against the wire-cloth on the drainer.

H is a circular trough that surrounds the washer and receives the washed stuff as it is projected over the upper rim or edge of the

drainer, and from which trough it is delivered through the pipe I.

J is a chamber surrounding the drainer to receive the wash-water after it has passed through and from the stuff that is being washed, and is conducted off through the pipe K.

L L is a cover to prevent the washed stuff from splashing over the trough H.

Having above described an apparatus such as I use, I will now proceed to describe the manner I operate with it on the disintegrated fiber of cane, (*Arundinaria macrosperma*), the same being applicable to any other fiber or pulp.

After the fiber has been thoroughly disintegrated, but still contains the non-fibrous matter in the mass, I dilute it with water in an ordinary stuff-chest provided with agitators, by which it is thoroughly mixed and kept in suspension. After causing the conical drainer, together with its inner perforated water-cone, to revolve with great velocity, I open a stop cock or valve and allow the diluted stuff to run in a continuous stream from the stuff-chest into the feeding-tube D, through which it passes into the fans, and is driven upward and outward by centrifugal force against the conical wire-covered drainer. At the same time I run a stream of clean water through the opening F into the inner cone, from which it is distributed by jets with great force through the perforations, affording a fresh supply of clean wash-water to the pulp or stuff as it rises on the wire-cloth lining of the drainer, which, by its conical form and increasing diameter, causes the stuff to be spread thinner and thinner as it rises to the top rim, over which it is delivered into the trough H. The water in which the stuff is held in suspension in the stuff-chest passes with great velocity through the meshes of the wire-cloth lining of the drainer, carrying with it large portions of the non-fibrous matter. As this water is passed off, fresh supplies are furnished through the perforations of the inner cone with accelerated velocity as the diameter of the conical drainer increases. The water passing through the stuff that is spreading on and ascending the cone carries with it such non-fibrous matter as requires more force to detach and remove it from the fiber than the force applied where the di-

luted stuff first strikes the wire-cloth, and the clean washed stuff is projected continuously over the rim into the receiving-trough, from which it is conducted, ready to be formed into paper. That the stuff may be delivered into the receiving trough sufficiently diluted to flow from it, I make a row of perforations so high in the inner cone, E, that the water passing through them goes over with the stuff instead of through the wire cloth.

When the arundine (non-fibrous portion of cane) is to be saved for use, this process of washing is very important, as it carries off larger quantities of arundine in proportion to the water, from which it has afterward to be separated, than any other mode of washing heretofore practiced.

My mode of washing pulp differs essentially from the modes usually practiced by paper-makers, which are continuous dilutions of the wash-water, never entirely passing it off from the pulp, and requiring much greater quantities of water and longer time than my process without as effectually accomplishing the washing.

Every experienced paper-maker knows the importance of washing rags when in the state called "half-stock" before being reduced to pulp, and the difficulty and almost impossibility of thoroughly washing pulp after killing printer's ink by boiling old printed paper in alkali. It takes from six to ten hours to wash out the ink in the ordinary heating and washing engine, owing to the pulp forming a filter that keeps back the non-fibrous matter.

I experienced great difficulty in washing the arundine from disintegrated cane fiber until I adopted this process, the theory of which is diluting with water the pulp to be washed, keeping it and the material to be washed from it in suspension by thorough agitation until the water with such portions as can be passed with it through the meshes of the wire-cloth is drained off with great velocity, then passing with increased force continuous

streams of water through the pulp, spread so as to present the least possible filtering action to the material to be removed.

A very little experience teaches the amount of water in which the stuff should be suspended, the quantities of suspended stuff to admit into the drainer, the amount of wash-water to be passed into the inner cone, and the velocity with which the drainer should be revolved, this latter being somewhat dependent on the steepness of the cone. I find that a drainer of twenty-six inches in diameter at its upper rim, with the cone at an angle of about forty-five degrees, run at a velocity of one thousand revolutions per minute, will wash as much pulp as four ordinary beating-engines will prepare from rags.

I am not aware that the principle of centrifugal draining has ever been used for paper-pulp, nor that the conical form has been used to thin out the material to be drained by spreading it over an increasing surface, and by the increasing centrifugal force causing the material to rise and be continuously delivered over the top rim; nor that any device has been used to furnish a fresh supply of wash-water as the foul water has been drained off, thus applying the principle of the centrifugal drainer to an effective washing-machine.

Having fully described my process as to its object, nature, and theory of operation, what I claim as my invention, and desire to secure by Letters Patent, is—

Washing pulp or fiber for paper-stock by submitting it to the action of a centrifugal drainer, so arranged as to permit the stuff to pass over the draining-surface in a gradually thinning sheet, and to be washed by a continuous stream of water passing through it, substantially in the manner and for the purpose specified.

GEO. ESCOL SELLERS.

Witnesses:

LOUIS T. DENNIS,
F. C. DENNIS.