

S. M. ALLEN.
Manufacture of Paper-Pulp from Wood.
No. 218,912. Patented Aug. 26, 1879.

Fig. 1.

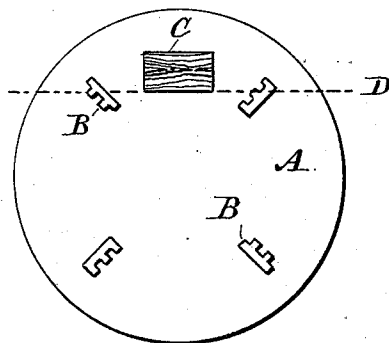


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

STEPHEN M. ALLEN, OF DUXBURY, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE OF PAPER-PULP FROM WOOD.

Specification forming part of Letters Patent No. **218,912**, dated August 26, 1879; application filed May 21, 1879.

To all whom it may concern:

Be it known that I, STEPHEN M. ALLEN, of Duxbury, in the State of Massachusetts, have invented a new and useful Improvement in the Manufacture of Paper-Pulp from Wood, which improvement is fully set forth in the following specification.

In order to separate the fibers from the block of wood many methods have been and are now employed, such as grinding by millstones, rubbing, crushing between rollers, or cutting or crushing them off in thin shavings by suitable knives and chisels. In this invention the fibers are separated in thin shavings or strips, which are or may be of considerable length. The fibers extend diagonally across the strip and terminate at the edges thereof, their length being determined by the width of the strip and the angle at which the fibers cross the same, so that long fibers are found in comparatively narrow strips. This result is accomplished by knives, chisels, or other devices adapted to cut or tear out strips of definite width, which move over the side of the block of wood, the path of the knives forming an angle with the length of the fiber of, preferably, forty-five degrees and under, and in a plane parallel, or practically parallel, with that in which the fibers on the side presented to the cutters lie.

The invention consists, therefore, first, in cutting, stripping, crushing, or tearing off the fibers from a block of wood diagonally to the longitudinal grain or rift thereof, and at the same time determining the length of the filaments, so as to obtain more or less of the effect of upsetting the fiber, as set forth in Letters Patent granted to me March 4, 1879, and at the same time secure a more uniform length to the ultimate fibrils.

It also consists in preparing paper-pulp from such fiber by crushing and beating, with or without chemical treatment; and, thirdly, in the diagonally-stripped wood or fiber in which the filaments lie in substantially the same plane as the strips, but run diagonally across them.

Not only by my method of stripping do I obtain the fibers in definite lengths, as above stated, but the beating, crushing, or grinding process is facilitated by preventing the cutting off of the bundles of filaments all in one spot

under the action of the beater-knives, and the absorption of bleaching-liquors is assisted also, as hereinafter more fully set forth.

It is evident that fibers cut from the wood in strips or in oblong or square pieces by knives moving at right angles across the rift or grain of the wood can never exceed in length the width of the strips or pieces, and, moreover, in converting the stripped wood into pulp the beater-knives or crushers act upon the entire length of the filaments at the same time.

The following description will enable those skilled in the art to make and use my invention.

The stripping, crushing, cutting, or tearing off the wood on a slight angle running across the longitudinal plane, grain, or rift of the wood may be accomplished in many ways, as by revolving, cutting, or tearing chisels or knives working against the face of the wood so as to produce the necessary result, the wood being stripped off in such a manner as to be frequently cut across the longitudinal plane of the fiber, and to be divided into thin strips, of which the laminae are crushed.

In Figure 1 is a diagram illustrating the relative position of the wood to be made into fiber and the cutters. A represents a disk, in which the knives or chisels B are secured, projecting on the face; C, the position of the wood, and D a supporting-plate for the wood.

Instead of making the knives independent, I have shown several formed in one piece by notching or serrating the edge of a cutter of suitable width. The knives should break joints with each other, so that the wood left by one series of cutters will be removed by those which follow.

In Fig. 2 is represented one of the strips thus cut out, the diagonal position of the fibers being shown by the cross-lines.

It is preferred, however, to use an apparatus which I have shown and more fully described in a separate application for Letters Patent, filed July 10, 1879. It consists of a revolving disk, either running horizontally or perpendicularly, through the plate of which the cutters are introduced, similar to those set in a common carpenter's plane, which are preceded by a line of sharp points or spurs. These spurs crease the wood supported on the shelves and pressed against

the face of the revolving plate, while the cutters following tear out the strips upon a circle of the desired radius.

The log of wood, cut of the proper length, is usually slabbed off or cut into planks, which are fed against the face of the revolving disk and cutters, either perpendicularly to the face of the disk or at such an angle as that the top and bottom of the stick shall not run out at the same time, so that when one stick follows another by a proper feed-motion there is less interruption to the work than if both edges of the stick were stripped off at the same moment. I usually employ a disk or plate holding the cutters and spurs that is about five feet in diameter, and in such case cut the blocks about twelve inches long. The wood is stripped on a circle of aforesaid diameter, at any depth or width of cut desired. The woody fibrils may be cut and torn out in any other manner to produce the desired result, leaving the fiber, when cut, from one-quarter inch to one-half inch in length. The fiber thus cut can be made of an almost exact uniformity when subsequently crushed, ground, or beaten. The stripped wood when thus cut or crushed off from the block or log is made into paper-pulp by crushing, beating, or grinding machines now known and used. The fiber may be treated with water, bleaching-liquors, or other chemicals before or at the time of the disintegrating operations.

It is not necessary to describe here the chemical compounds employed. They may be those now employed in making paper-pulp from wood, or others which are deemed suitable. The particular compounds used form no part of this invention. The fiber is very susceptible to the absorption of the bleaching-liquors, as the ends terminate at the sides of the strip.

In grinding, crushing, or beating the strips the disintegration is more perfect for a short and uniform fiber, from the fact that the beating-knife or crusher separating the fibrils cannot strike across the whole longitudinal section of the filaments at the same time, as the angular cutting of the stripped filaments presents separate points at one time, one end of

the fiber being released, while that in the same filament ahead will be seized and crushed.

Instead of holding the wood stationary it may be revolved against stationary cutters, suitable knives or spurs being used to cut the fiber across the grain. It is evident also that various other mechanical means may be employed for stripping or separating the fibers at the proper angle from the block of wood, and I do not, therefore, intend to limit myself to those indicated; neither do I make any claim thereto; but I have made a separate application, referred to above, for a machine operating on the principle hereinbefore set forth.

Having thus described my said invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The method of separating fibers from wood in strips, as described, the same consisting in crushing, cutting, or tearing them off in a direction diagonal to the length of the fiber, but in substantially the same plane, and at the same time determining the length of said fibers, as set forth.

2. As a manufacture, stripped wood-fiber for paper-making, the filaments lying in substantially the same plane as the surface of said strips, or in planes parallel thereto, and extending diagonally across the same, with their ends terminating at the edges of the strips, and being of practically equal lengths, as set forth.

3. The method of preparing paper-pulp, as described, the same consisting in separating fibers from wood in strips by crushing, cutting, or tearing the same off diagonally to the line of length of said fibers, at the same time determining the length of the fibers, and in beating, grinding, or crushing said strips, with or without chemical treatment, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

STEPHEN M. ALLEN.

Witnesses:

KATE L. TOWN,
LUCY C. JONES.