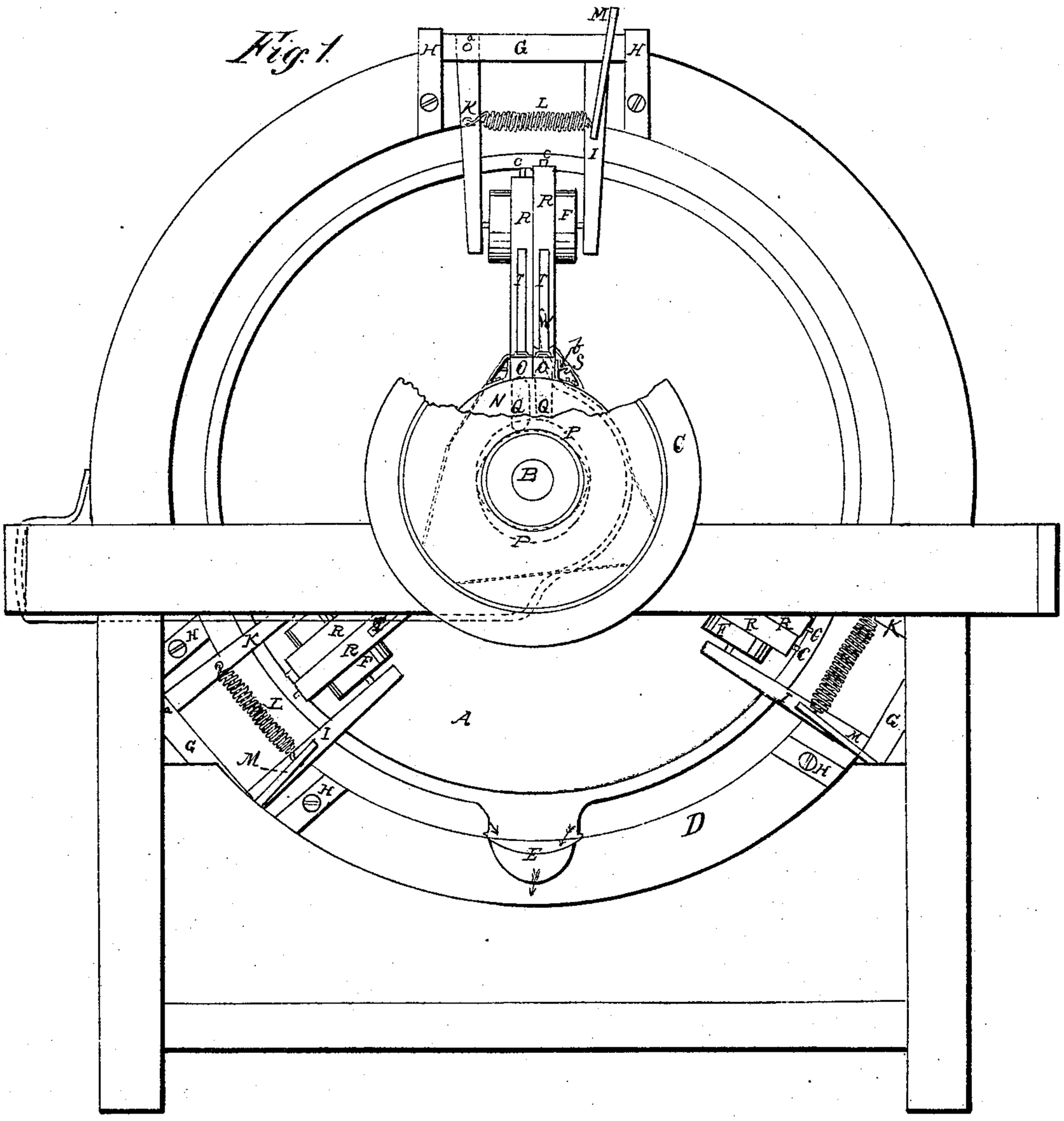
Sheet 1, 2 Sheets.

M. D. Whipple.

Grinding Paper Pulp

No. 12,978. Patented May 29, 1855.

Fig. 1.



Sheet 2, 2 Sheets.

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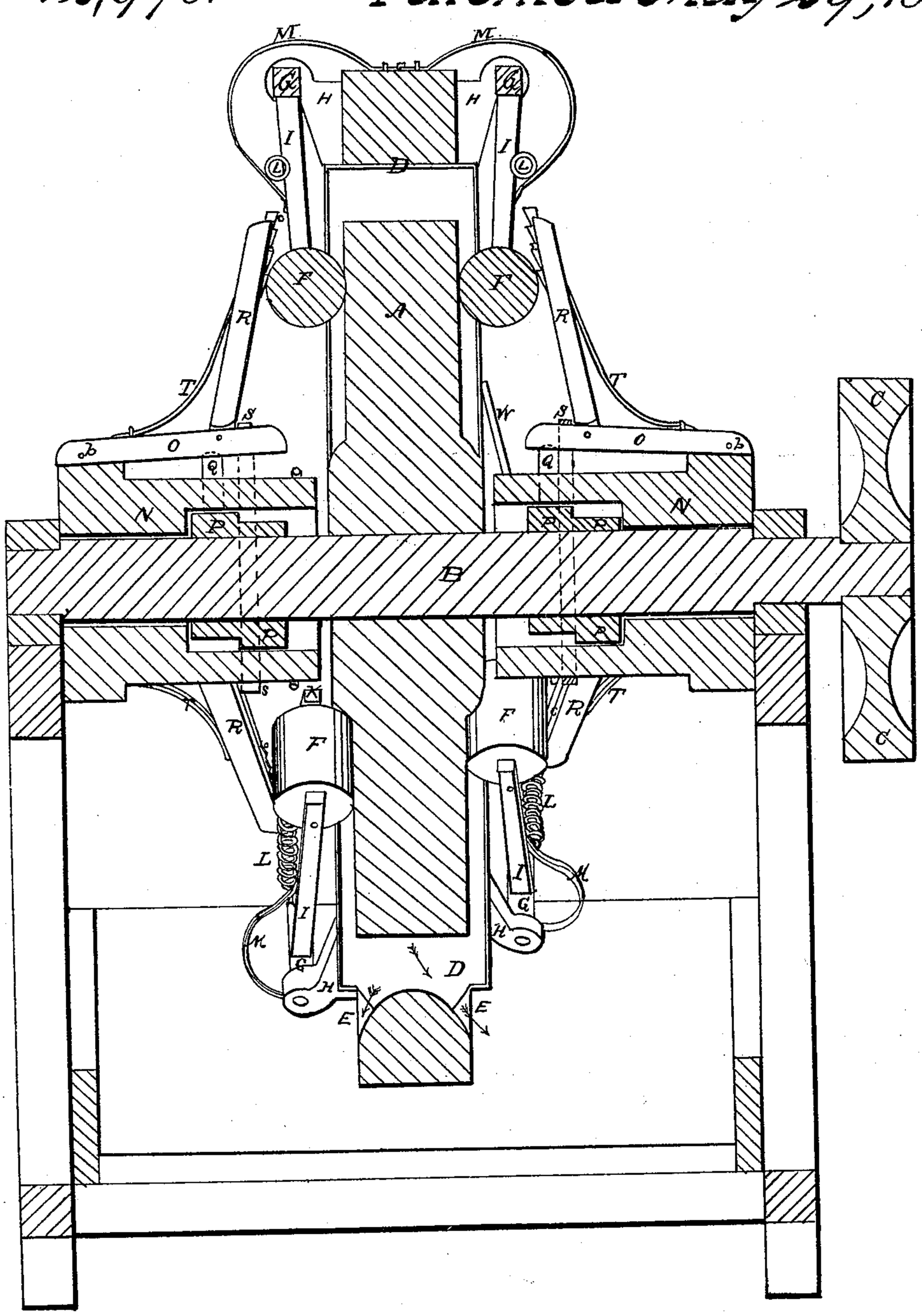

UNITED STATES PATENT OFFICE.

MILTON D. WHIPPLE, OF CHARLESTOWN, MASSACHUSETTS.

IMPROVEMENT IN PREPARING WOOD FOR PAPER-PULP.

Specification forming part of Letters Patent No. **12,978**, dated May 29, 1855.

To all whom it may concern:

Be it known that I, MILTON D. WHIPPLE, of Charlestown, in the county of Middlesex and State of Massachusetts, have invented a new and useful Method of Preparing Paper-Pulp from Wood, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a side view of the machine which I employ in carrying out my invention; Fig. 2, a vertical section through the center of the same.

In the attempts that have heretofore been made to employ the fiber of wood as a material in the manufacture of paper various plans have been adopted for the purpose of disintegrating the wood, none of which have proved entirely successful. To accomplish this end without deteriorating the quality of the fiber is the object of my present invention, the first part of which consists in submitting the wood in blocks to the action of a grindstone, by which means it is reduced to pulp of a very uniform quality, the fibers being finely divided longitudinally, while they are preserved of a sufficient length to insure the greatest strength.

The second part of my invention consists in so applying the block to the grinding-surface that the motion of the latter shall be in the direction of the fibers, or very nearly so, which position of the block is found to be essential to the preservation of the fibers, any other position of the blocks with respect to the stone being found to be destructive to them and to the quality of the pulp obtained therefrom. I have also discovered that it is absolutely essential to the proper performance of the operation that the block be kept constantly rotating so as to present a very limited surface of the block to the stone, and this rotation of the block of wood while it is being abraded by the stone constitutes the third part of my invention.

To enable others skilled in the art to understand my invention and to put the same into practical operation, I will proceed to describe the manner in which I have carried it out.

In the accompanying drawings, A represents a grindstone secured to the shaft B and driven by power suitably applied to the driving-pulley C.

D is a stationary trough which entirely surrounds the stone and collects and delivers through the spouts E the fibers of the wood as they are ground off.

The wood to be ground is divested of its bark and sawed into short cylinders F. These cylinders are suspended so as to revolve upon their axes in contact with the stone in frames constructed as follows:

G is a bar or shaft pivoted in the stationary bearings H, attached to the trough D.

I is an arm mortised into the bar G or otherwise secured thereto, and K is a similar arm pivoted at *a* and drawn toward the arm I by the spring L. Between these two arms the block to be ground is pivoted, and it is kept uniformly pressed down upon the stone A by means of the springs M.

The blocks are constantly rotated, while the grinding proceeds in the following manner:

N are stationary sleeves which surround the driving-shaft B, but without touching it, and are secure to the frame-work of the machine.

P are eccentrics secured to the shaft B, and seen in blue in the drawings, upon which rest the short posts Q, dotted in red. These posts bear upon the under side of the levers O, pivoted at *b* to the sleeves N. To these levers are again pivoted other levers R, having inclined teeth *c* upon their inner surfaces, which bear against the blocks or cylinders F.

S are bands of india-rubber, (seen in brown in the drawings,) which encircle the levers O and draw them constantly toward the sleeves N, keeping the posts Q down upon the surface of the cams P.

T are springs which keep the levers R pressed up against the blocks F. Any other suitable form of spring may be employed for the performance of either of these duties.

The cams P are so arranged upon the shaft B that as one of the levers R moves out the other moves in. As they move out, the corners of the teeth *c* catch in the block and revolve it. On returning they slip over the surface of the block and impart no motion thereto. The blocks are thus kept constantly in motion, as required.

A stream of water is made to pour from the pipe W upon the stone at the point where the block touches it to insure its even and efficient action upon the fibers of the wood.

One of these pipes is seen in the drawings, represented in blue. A similar pipe is required for each block.

It is found to be essential to the success of the operation that the block be so placed upon the stone that the fibers shall lie in the direction of its motion, or very nearly so. When this correspondence is exact, pulp with the longest fiber is produced. When the blocks are slightly canted, so that the fibers form an angle with the direction of motion of the stone, the fiber is shorter, and if this angle be considerable the fibers of the pulp are very short; and when the direction of motion of the stone is allowed to make an angle of ninety degrees with the fibers of the block the latter are cut up so short as to be worthless.

In the machine above represented and described three blocks of wood are shown upon each side of the stone. It is my intention, however, to apply as many of them upon each side as can be accommodated around the periphery of the stone, and I do not therefore limit myself to any particular number of blocks. Neither do I limit myself to the employment of the machinery herein described, but intend to vary it as circumstances may require or as may be found most desirable.

What I claim as my invention, and desire to secure by Letters Patent in the process of preparing paper-pulp from wood, is—

1. Grinding the block upon the surface of a revolving stone or its equivalent, for the purpose set forth.

2. Maintaining the block in such position with respect to the stone that the fibers of the wood shall lie in the direction of motion of the stone, or very nearly so, for the purpose set forth.

3. Rotating the block during the operation of grinding, for the purpose herein set forth.

MILTON D. WHIPPLE.

Witnesses:

SAM. COOPER,

JOHN S. CLOW.