

No. 629,262.

Patented July 18, 1899.

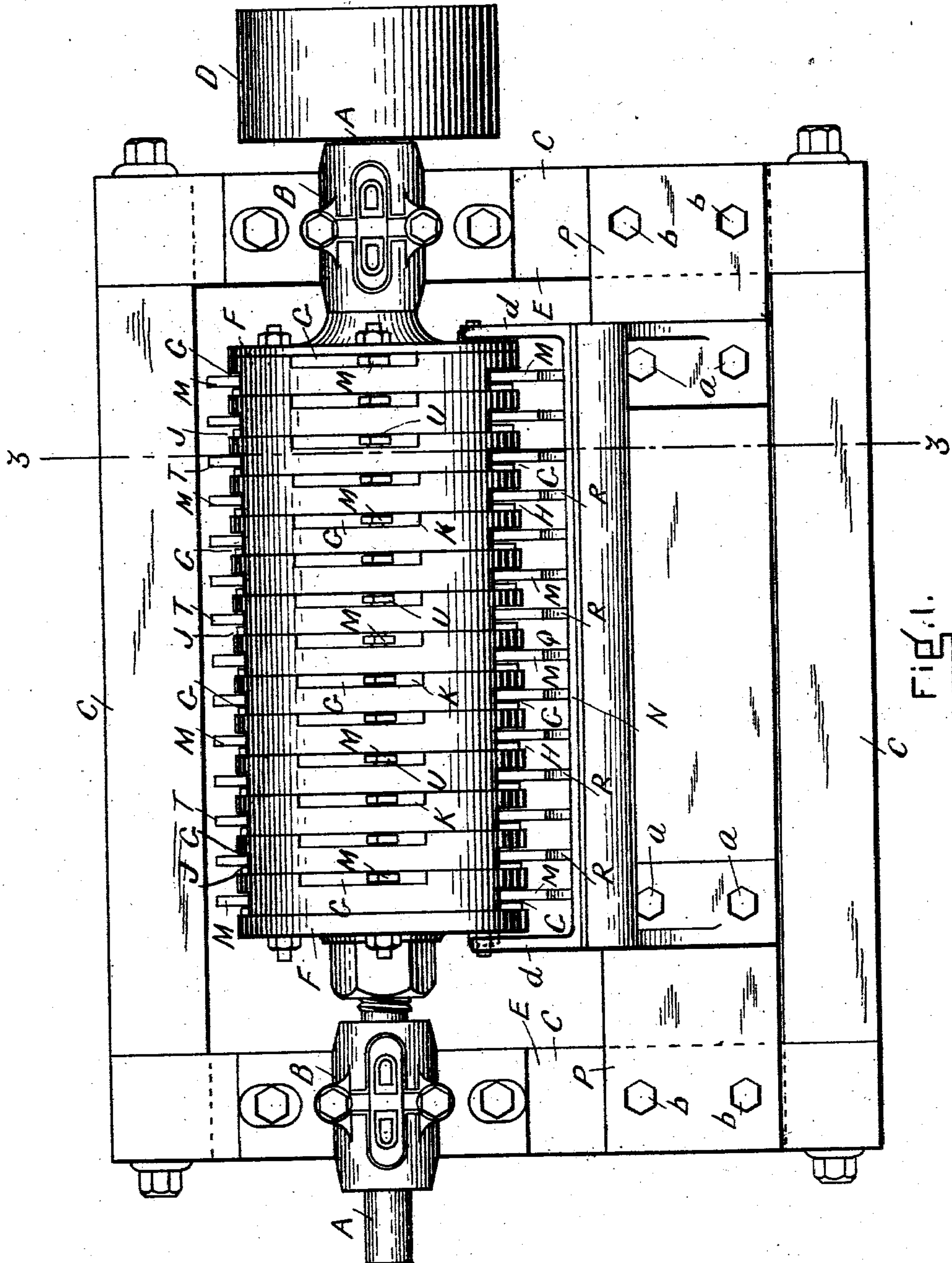
A. O. LOMBARD.

CHIP BREAKING MACHINE FOR WOOD PULP.

(Application filed Apr. 27, 1898.)

2 Sheets—Sheet 1.

(No Model.)



WITNESSES

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INVENTOR

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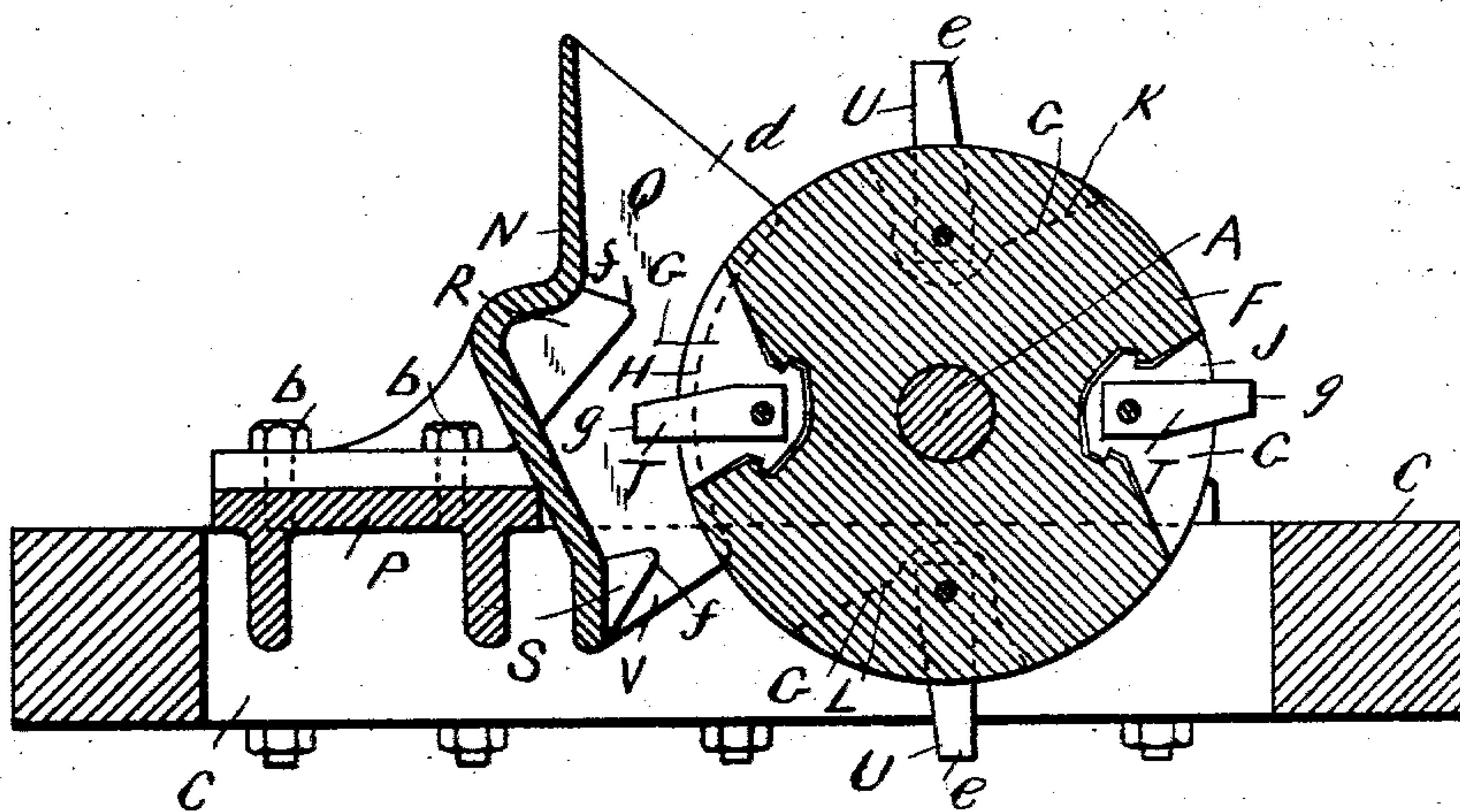
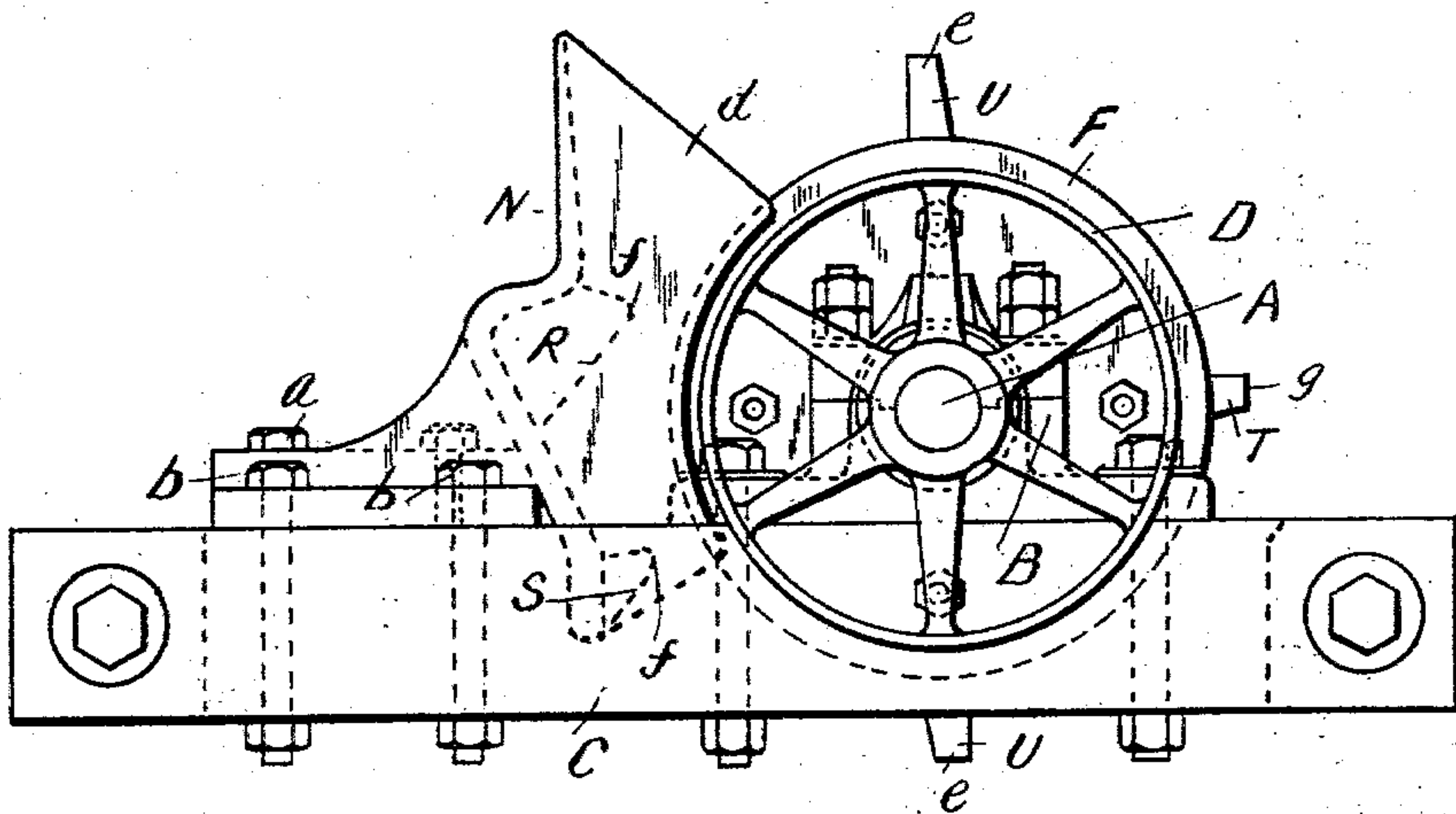
**A. O. LOMBARD.**

# CHIP BREAKING MACHINE FOR WOOD PULP.

(Application filed Apr. 27, 1898.)

(No Model.)

**2 Sheets—Sheet 2.**



WITNESSES

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# UNITED STATES PATENT OFFICE.

ALVIN O. LOMBARD, OF WATERVILLE, MAINE.

## CHIP-BREAKING MACHINE FOR WOOD-PULP.

SPECIFICATION forming part of Letters Patent No. 629,262, dated July 18, 1899.

Application filed April 27, 1898. Serial No. 679,014. (No model.)

*To all whom it may concern:*

Be it known that I, ALVIN O. LOMBARD, of Waterville, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Chip-Breaking Machines for Wood-Pulp, of which the following is a full, clear, and exact description.

This invention relates to a machine for breaking up small blocks of wood into chips, &c., or into a suitable condition for making wood-pulp from which to make paper; and the invention consists in combination, with a rotating drum having one or more series of radially-projecting arms pivoted thereto, of a suitable receptacle to receive the blocks of wood to be broken, provided with obstructions or projections against which the blocks of wood are forced by the arms striking them as the drum is swiftly rotated, whereby the blocks of wood are broken up into chips or small particles suitable to be put into a machine for beating the same into pulp for making paper, all substantially as hereinafter fully described, reference being had to the accompanying sheets of drawings, in which is shown a machine constructed and arranged for operation in accordance with this invention.

Figure 1 is a plan view. Fig. 2 is an end elevation; and Fig. 3 is a vertical cross-section on line 3 3, Fig. 1.

In the drawings, A represents a horizontal shaft-adapted to turn in bearings B, supported on a frame C, which shaft on one end has a pulley D, by which it can be connected by a belt with any suitable driving power. Secured to this shaft between the end pieces E of the frame is a drum F, to rotate with the shaft having four longitudinal series or rows of transverse grooves or recesses G in the circumference, two series H J being diametrically opposite to each other on the same transverse plane, and the other series K L being diametrically opposite to each other, but on a transverse plane at one side of or alternating with the first series. Pivoted in each groove is an arm M of a length to project beyond the circumference of the drum, the arms pivoted in the two series of grooves K L being of equal length, but longer than the other two series of arms, which are of equal length and pivoted in the two series of grooves H J,

as shown more particularly in cross-section in Fig. 3.

N is an upright board or piece in front of the drum F, secured to the plate P by bolts a, which plate is secured to the ends C of the frame by bolts b, this board being substantially vertical, but of the outline shown in cross-section in Fig. 3, and forming in connection with the drum between it and the drum and its end walls d a receptacle Q, into which the suitably-prepared blocks of wood are placed to be broken up into chip form by the arms of the drum as they are carried around with the drum. Secured at regular intervals along this front board N on its inner side are two rows of knuckle-like projections R S, extending toward the drum, one row, R, above the other row, S, and in the same transverse vertical planes, and each of a thickness corresponding to the thickness of the arms M. These projections are in the same transverse vertical planes as the shorter arms T, but are of such a length that the ends g of the shorter arms, as the drum is rotated, will freely pass by the ends f of the projections and not touch them, while the longer arms U not being in the same transverse planes as the shorter arms in the rotation of the drum their ends e will freely pass between the projections R and S.

The operation of the machine is substantially as follows: The drum F is rotated at a rapid speed, the centrifugal force causing the arms M to project radially from the drum, as shown in Fig. 2. The blocks of wood which have previously been prepared of the proper shape and length are then thrown into the receptacle between the drum and the front board and fall down upon the knuckle projections R of the upper series, when they are struck forcibly by the longer arms U of the drum as they rest on these projections. The blocks thus broken then fall down upon the lower row of projections S, against which they are forced by the arms, again striking them and broken still more when they fall down through the opening V at the bottom into a suitable receptacle for removing them to the pulp-machine. The shorter arms T also strike against the blocks or chips and still further reduce them to smaller particles by forcing them against the knuckle projec-



tions and grinding them between their respective ends.

5 This machine breaks the block very rapidly, easily, and satisfactorily into the small chips necessary for making pulp of the same.

The grooves or recesses in the drum are widened at their outer ends, as shown in Fig. 3, which allows more freedom of the arms, so that they will not be too rigid.

10 Having thus described my invention, what I claim is—

1. In a chip-breaking machine, the combination of a rotary drum, a series of arms pivotally mounted thereon with the alternate opposite arms in different vertical planes and of different length, the free ends of all of said arms projecting beyond the periphery of the drum, and rigid projections in front of the drum one set in the same vertical plane as the shorter arms and out of the plane of the other set of arms, as and for the purpose specified.

2. In a chip-breaking machine, the combination of a rotary drum, a series of arms pivotally mounted therein with alternate opposite arms of less length and in different ver-

tical planes from the other arms, the free ends of all the arms projecting beyond the periphery of the drum, and rigid projections in front of the drum with one set above the horizontal axis of the drum and out of vertical plane with the longer arms, and the other set below said axial line and in vertical plane with the shorter arms, as set forth.

3. In a chip-breaking machine, in combination, a rotating drum, a longitudinal row or series of transverse grooves or recesses in the circumference of the drum, an arm pivoted in each groove or recess their free ends projecting beyond the circumference of the drum and a series of rigid projections on a suitable support in front of the drum in the same transverse vertical planes of the arms respectively.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALVIN O. LOMBARD.

Witnesses:

HORACE PRINCETON,  
FRANK W. HASKELL.