

(No Model.)

4 Sheets—Sheet 1.

L. A. J. NIETHAMMER & A. PFARR.
MACHINE FOR CUTTING WOOD FOR THE MANUFACTURE OF CELLULOSE.

No. 508,147.

Patented Nov. 7, 1893.

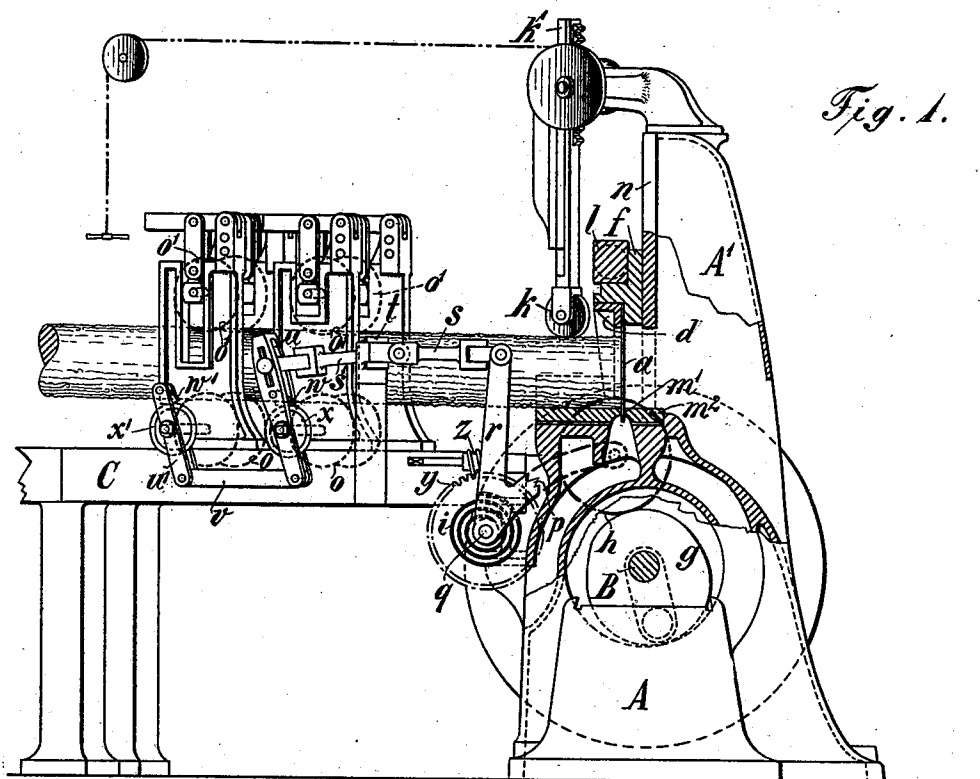


Fig. 1.

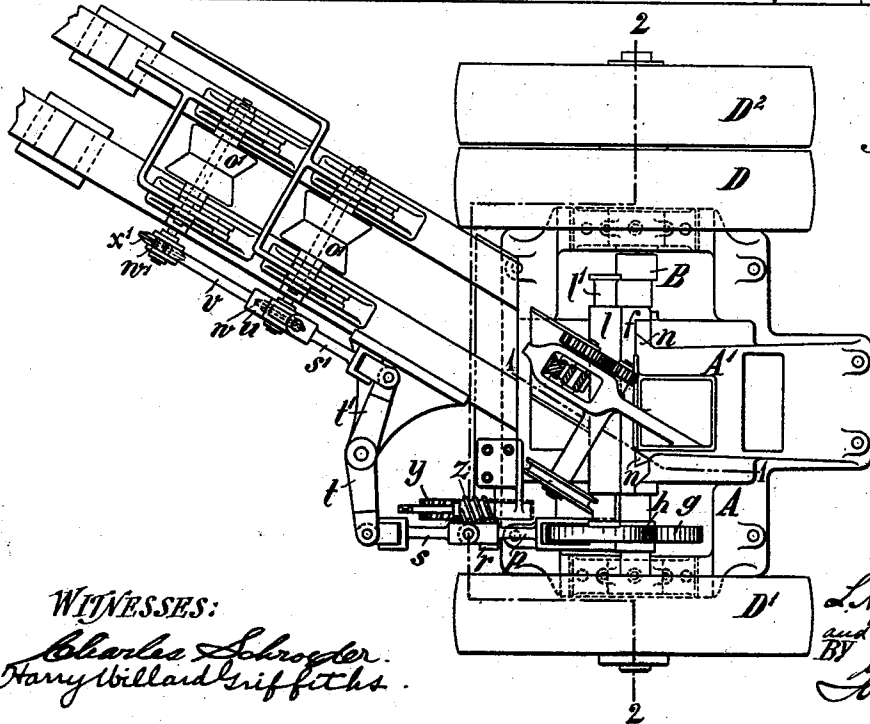


Fig. 3.

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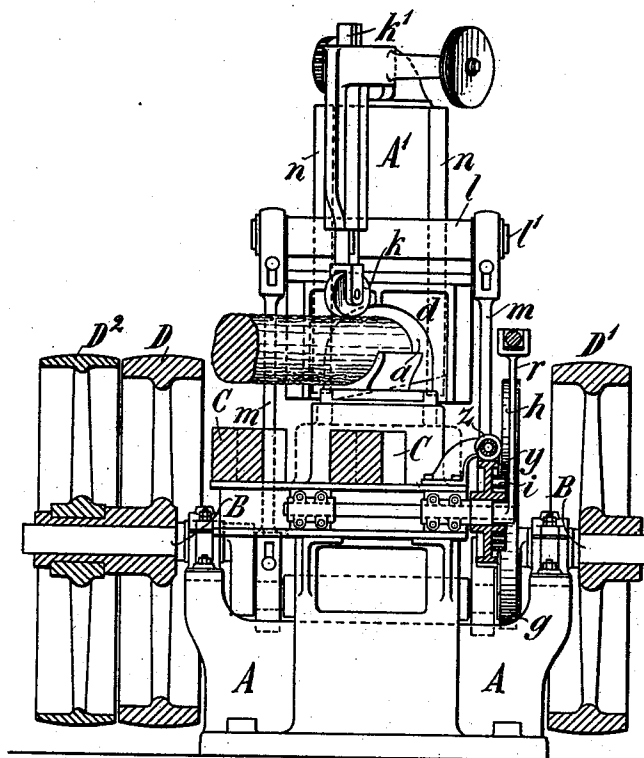


Fig. 2.

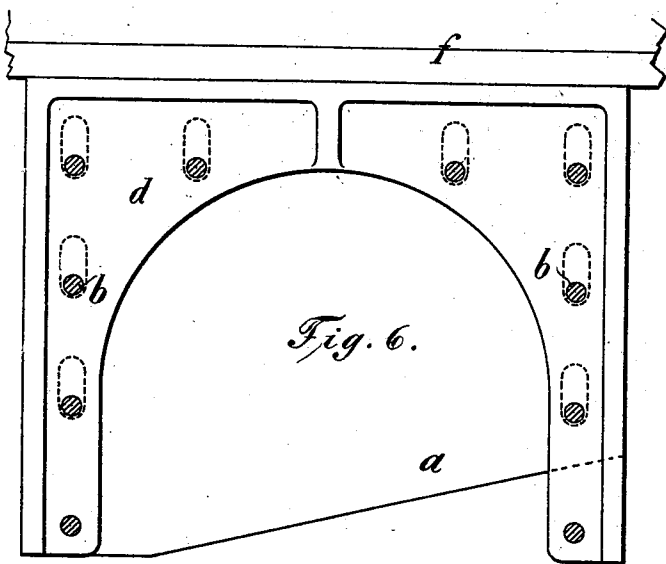


Fig. 6.

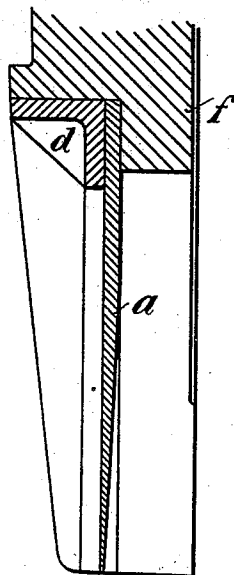


Fig. 7.

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Harry Willard Griffiths.

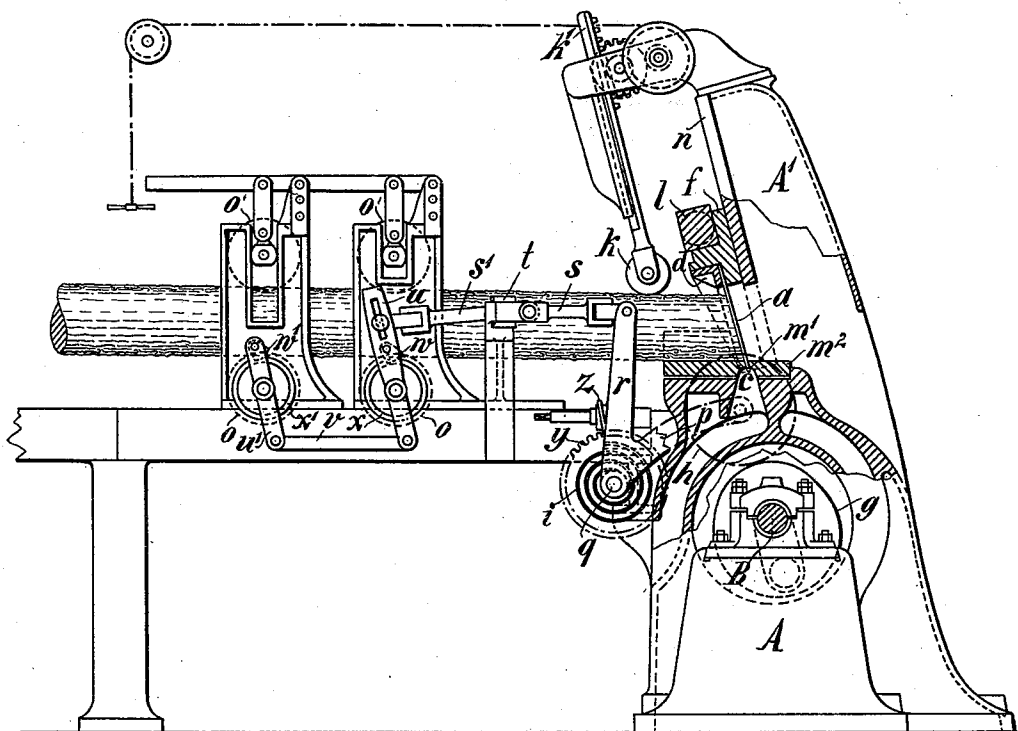
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Fig. 4.



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(No Model.)

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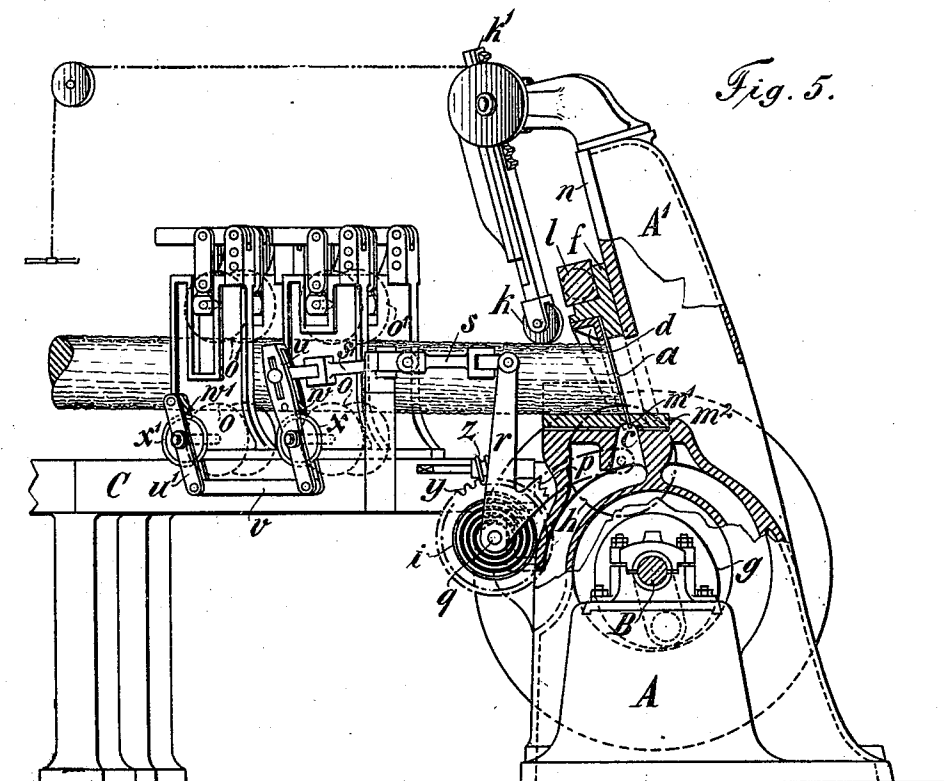


Fig. 5.

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UNITED STATES PATENT OFFICE.

LUDWIG ALBERT JULIUS NIETHAMMER, OF KRIEBSTEIN, NEAR WALDHEIM,
AND ADOLPH PFARR, OF HEIDENHEIM-ON-THE-BRENTZ, GERMANY.

MACHINE FOR CUTTING WOOD FOR THE MANUFACTURE OF CELLULOSE.

SPECIFICATION forming part of Letters Patent No. 508,147, dated November 7, 1893.

Application filed October 29, 1890. Serial No. 369,665. (No model.) Patented in Germany March 9, 1888, No. 45,991.

To all whom it may concern:

Be it known that we, LUDWIG ALBERT JULIUS NIETHAMMER, manufacturer, a subject of the King of Saxony, residing at Kriebstein, near Waldheim, Saxony, and ADOLPH PFARR, chief engineer, a subject of the King of Württemberg, residing at Heidenheim-on-the-Brenz, Württemberg, German Empire, have invented certain new and useful Improvements in Machines for Cutting Wood for the Manufacture of Cellulose, (patented in Germany under date of March 9, 1888, No. 45,991;) and we do hereby declare that the following is a full, clear, and exact specification of the said invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to a machine for cutting logs or blocks of wood into condition for use in the manufacture of paper pulp.

The object of the invention is to secure a straight, smooth and uniform cut at the least expenditure of power.

In the accompanying drawings, Figure 1 is a side-view of our improved machine for cutting tree trunks, parts being in section on the line 1, 1, of Fig. 3. Fig. 2 is a vertical transverse sectional view on the line 2, 2, of Fig. 3. Fig. 3 is a plan-view. Fig. 4 is a view similar to Fig. 1, showing a modified construction. Fig. 5 is a view similar to Figs. 1 and 4, showing a further modification. Fig. 6 is a detail face-view of the frame carrying the blade or knife, parts being in section. Fig. 7 is a vertical transverse sectional view of the same.

Similar letters of reference indicate corresponding parts.

The frame A, Figs. 1 and 2 on which the driving shaft B is mounted, is extended upward to form a standard A', the front face of which is vertical, see Figs. 1 and 2. On said vertical face of the standard A' the guide-rails *n* are fixed, on which a slide or carriage *f* can be moved up and down. To said slide *f* the blade *a* is fastened, a bar *d* partly overlapping the top of the blade, being secured to

the carriage *f*, as shown in Fig. 1. A cross-piece *l* is connected with the carriage *f* and is provided at each end with a pivot, on which the upper ends of the connecting rods *m* are mounted, the lower ends being mounted on the cranked part B' of the main-shaft B, see Fig. 1. On said shaft B the fly-wheels D and D' are mounted, one at each end and outside of the bearings, the wheel D serving as the driving pulley and adjacent to the same the idle pulley D² is mounted. The sliding carriage *f* with the knife is moved upward for each stroke of the machine a distance equal to twice the length of the crank on the shaft B. By using two connecting-rods *m* the knife is guided straight and true and protected from injury. By providing the two fly-wheels at the ends, a uniform and even movement is obtained, and the greatest power can be obtained from the crank-shaft at the moment when the cutting edge of the knife strikes the trunk or log. Said log rests upon a frame C, which is arranged horizontally, but at an incline to the axis of the shaft B, so that the plane of the knife will be at an inclination to the direction of the length of the fibers and the fibers of the trunk or log are thus cut diagonally, see Fig. 3. The fibers can also be cut diagonally, if the frame C is so arranged that the trunk is moved at right angles to the axis of the shaft B in the horizontal plane, but in this case the front or guiding surface of the standard A', on which the carriage F slides, must be arranged at an inclination to the vertical, as shown in Fig. 4. If the knife-guides are inclined to the vertical and the frame C on which the log or trunk is guided is arranged at an oblique angle to the knife blade, as shown in Fig. 5, the cutting plane of the knife will be on a bias with the direction of the fibers, both horizontally and vertically. Repeated experiments have proved that this manner of cutting the log requires the least power, and that particles of wood do not chip off, and a straight and smooth cut is produced.

In order to obtain a perfect cut and perfect disks, the blade must be made as thin as possible, and is not only fastened at the upper edge, but also at the sides, by means of

screws *b* on the carriage *F*, see Fig. 6, and the said carriage, as well as the frame *d*, are curved on a semi-circular line, as shown in Fig. 6. The blade is provided with slots *b'* through which the screws or bolts pass, whereby said blade is adjustable. As shown in Fig. 7, the cutting edge of the blade is not in the straight plane of the knife facing the trunk, but is arranged so that while cutting the impact acts on the middle of the blade, thus avoiding the danger of bending the blade when cutting a heavy trunk. The blade, the cutting edge of which is slightly inclined, as shown in Fig. 6, does not act against a fixed knife, but the cutting edge enters a slot *m'* in a suitable piece *m*², on which the end of the trunk rests. The trunk or log is moved toward the knife by means of two pairs of rollers *O*, *O*, *O'*, *O'*, the trunk resting on the rollers *O*, *O*, and the rollers *O'*, *O'*, resting on the trunk, for the purpose of holding the same during the time that the knife passes through the trunk while moving downward and cutting and while moving upward on the return stroke. The trunk is fed intermittently and only then when the knife is completing the upper part of its stroke—that is, during about the quarter of the time required for the rotation of the shaft *B*, and thus it is possible to cut trunks or logs the diameter of which is about three quarters of the length of the stroke of the knife. The shaft *B* carries an eccentric disk *g*, upon which a roller *h* runs that is mounted in one shank *p* of an angle-lever *p r*, mounted to turn on the pivot *q*. The other shank *r* is connected by the rods *s* having a universal joint with the shank *t* of an angle-lever *t t'*, the shank *t'* of which is connected by the rod *s'* having universal joints with the lever *u*. When the machine is so constructed that the trunk is to be moved forward in a direction at right angles to the axis of the shaft *B* the universal joints and the connecting rods can be dispensed with. When the roller *h* is raised by the eccentric *g* the rod *s'* is moved to the right and thereby the upper ends of the levers *u u'*, which are connected by a rod *v*, are also moved to the right. The upper parts of these levers carry the friction pawls *w w'* adapted to engage the disks *x x'*, and said pawls rotate the disks in a direction from left to right, whereas when the levers *u u'* swing to the left the friction pawls slide over the disks *x, x'*, which remain stationary. The levers *u u'* are mounted to turn loosely on the shafts of the disks *x x'*. On said shafts of the disks *x x'* the supporting rollers *O O* are fixed, so that when said disks *x x'* are turned in a direction from left to right the rollers *O O* will also be turned in the same direction and the trunk or log moved toward the knife. The connection of the rod *s'* with the lever *u* is adjustable, so that the stroke can be varied. The roller *h* resting upon the eccentric *g* follows the same when the rotation is not too great,

but when the speed of rotation is as much as eighty to ninety a minute the inertia of the roller would prevent it from following the descending part of the curve of the eccentric speedily enough, and the machine would be unduly strained. To avoid this, a coil spring *z*, Figs. 1 and 2, is arranged, one end of which is connected with the angle-lever *p r*, and the other with the worm-wheel *y* that engages a worm *z* that can be turned by means of a suitable key, so that the tension of the spring can be increased as much as may be desired. A small roller *k* on the end of the rack *k'* serves to hold the end of the trunk or leg in position for the knife.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a machine for cutting wood for pulp, the combination of a log feeding mechanism, a sliding blade carrier provided with a cutting blade, and means for operating said carrier, said log feeding mechanism being disposed at and adapted to feed the log on a line at an oblique angle to the length of said blade, substantially as set forth.

2. In a machine for cutting wood for pulp, the combination of a horizontal log feeding mechanism, a sliding blade carrier provided with a cutting blade, and means for moving the blade carrier on a plane inclined to the vertical and disposed at an acute angle to the line of motion of the log, substantially as set forth.

3. In a machine for cutting wood for pulp, the combination of a log feeding mechanism, a sliding blade carrier provided with a cutting blade and means for moving the blade carrier on an inclined plane disposed at an acute angle to the line of motion of the log, said log feeding mechanism being disposed at and adapted to feed the log on a line at an oblique angle to the length of said blade, substantially as set forth.

4. In a machine for cutting wood, for pulp, a blade carrier comprising a U-shaped carriage and a U-shaped clamping frame for embracing the blade on three sides thereof, substantially as set forth.

5. In a machine for cutting wood for pulp, the combination of a reciprocating cutter, intermittently actuated rolls for supporting and feeding the log, mechanism for actuating said rolls, a cam, a forked lever one arm of which is actuated by said cam, and a lever connecting the other arm of said forked lever with said actuating mechanism by universal joints, substantially as set forth.

6. In a machine for cutting wood for pulp, the combination of a reciprocating cutter, intermittently actuated rolls for supporting and feeding the log, mechanism for actuating said rolls, a cam, a forked lever, one arm of which is actuated by said cam, and a lever connecting the other arm of said forked lever with said actuating mechanism by universal

joints, a spring for holding said arm in contact with said cam, substantially as described.

7. In a machine for cutting wood for pulp,
5 the combination of a reciprocating cutter,
intermittently actuated rolls for supporting
and feeding the log, mechanism for actuating
said rolls, a cam, a forked lever, one arm of
which is actuated by said cam, a lever connecting
10 the other arm of said forked lever
with said actuating mechanism by universal
joints, a spring for holding said arm in con-

tact with said cam, and means for regulating
the tension of said spring, substantially as
described.

In testimony that we claim the foregoing as
our invention we have signed our names in
presence of two subscribing witnesses.

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ADOLPH PFARR.

Witnesses:

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