

No. 784,797.

PATENTED MAR. 14, 1905.

H. M. LEONARD.
WOOD FIBER CUTTING MACHINE.

APPLICATION FILED MAY 16, 1904.

4 SHEETS—SHEET 1.

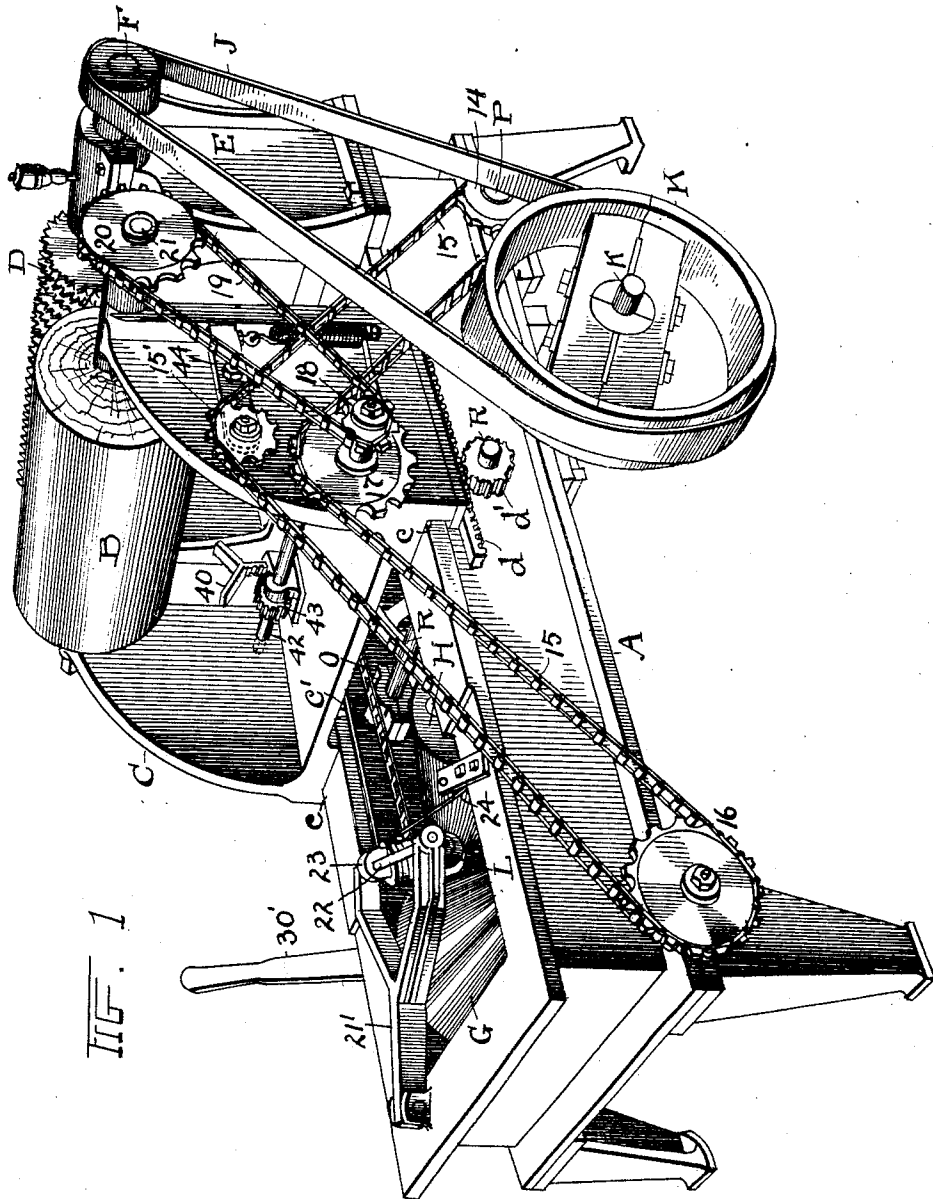


FIG. 1

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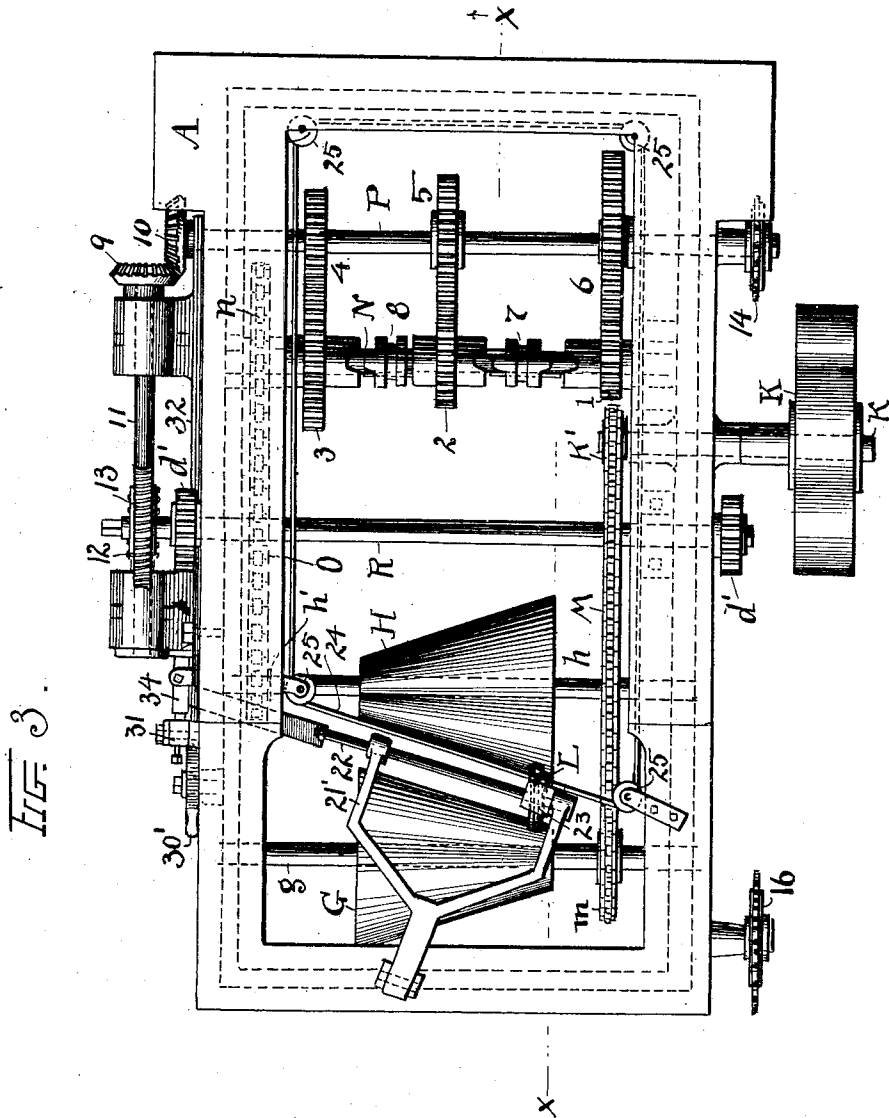


FIG. 3.

WITNESSES:

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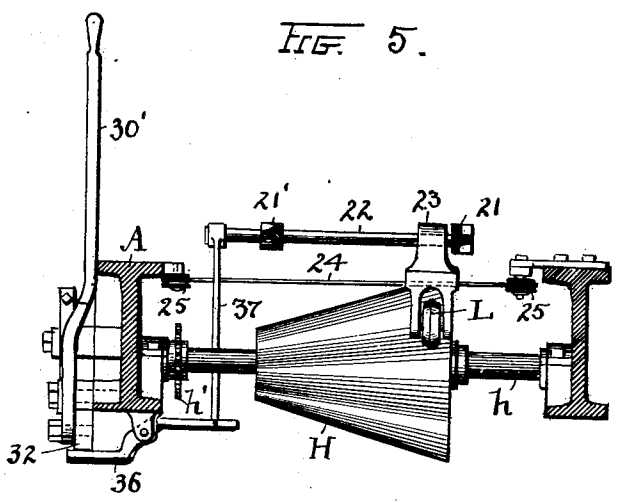
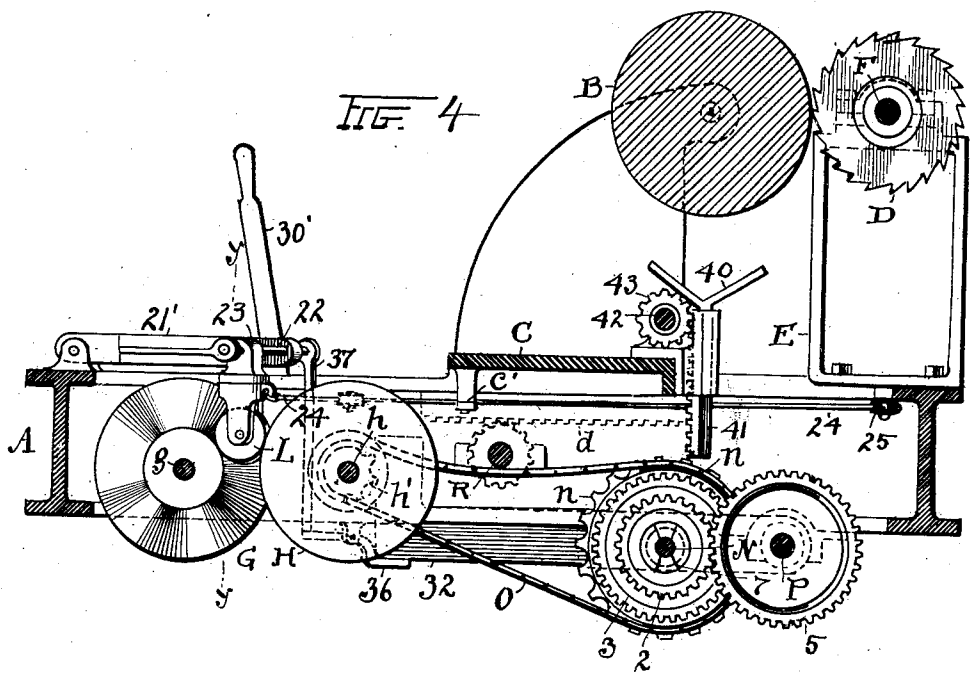
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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WOOD-FIBER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 784,797, dated March 14, 1905.

Application filed May 16, 1904. Serial No. 208,168.

To all whom it may concern:

Be it known that I, HOWARD M. LEONARD, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Wood-Fiber-Cutting Machines; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in wood-fiber-cutting machines; and the invention consists in the construction and combination of parts, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective combined front and side elevation of the machine, showing the side which carries the main drive mechanism; and Fig. 2 is a perspective side and top view showing the opposite side from that of Fig. 1. Fig. 3 is a plan view of the machine with the log-carrier and the saw and its supports removed. Fig. 4 is a longitudinal sectional elevation of the machine on line *x x*, Fig. 3; and Fig. 5 is a cross-section on line *y y*, Fig. 4.

Having reference now to the several parts of the machine, A represents the bed or main frame, B the log, and D the saws.

C is the log-carriage, and E represents the saw-supports fixed permanently to frame or bed A. The carriage C is adapted to travel or move back and forth on frame or bed A and is actuated by means of a rack *d* thereon at each side outside the main frame and pinions *d'* upon a cross-shaft R engaging said racks and which has its bearings in or upon the frame A. The said carrier or carriage is also engaged over the overhanging edges of frame A at each side and provided with guide portions *c* along said edges.

Now in order to bring about the two essential operations of gradually feeding the log to the saws as it becomes reduced or cut away and of increasing the speed of rotation of the log proportionately and automatically with its reduction I employ lines of mechanism

which proceed from two cones or cone-shaped drivers G and H, supported, respectively, on shafts *g* and *h* across one end of the machine. The drive-cone G rotates constantly and the driven cone H intermittently and variably, as we shall see.

Power enters the machine through shaft F, which carries the saws D, and said shaft is provided with a band-pulley *f*, Fig. 2, or its equivalent for connection with the source of power, and a band J on the opposite end of shaft F runs over band-wheel K on short shaft *k*, Fig. 3. This shaft carries a sprocket-gear *k'* on its inner end and is engaged by a sprocket-chain M, which in turn engages a sprocket-gear *m* on drive-shaft *g*, so that power is transmitted directly through this line of mechanism, comprising, saw-shaft F, band-wheel K, and chain M to cone G. From cone G power is transmitted through driven cone H by means of intermediate friction wheel or roller L, operatively connecting said cones, cone-shaft *h*, wheel *h'* thereon, sprocket-chain O, engaged upon wheels *h'* and running over sprocket-wheel *n* on cross-shaft N. A series of three several pinions 1, 2, and 3 of varying sizes are arranged on shaft N and mesh with three gears 4, 5, and 6, respectively, upon a counter-shaft P. Said gears also are of varying sizes, and said pinions are provided with clutches 7 and 8, by which any one of the three several pinions may be thrown into operating engagement with its corresponding gear on shaft P, thus communicating power to shaft P at a rate of speed which varies with the varying sizes of both said pinions and gears. From shaft P power is communicated to the log-carriage C through a line of mechanism seen in Fig. 3 and comprising two beveled gears 9 and 10 on shafts 11 and P, respectively, and a worm 12 on shaft 11, meshing with gear 13 on cross-shaft R. Said shaft carries pinions *d'*, above described, whereby the carriage C is caused to feed forward, with its log, to the saws at a predetermined rate, the speed of course being only as fast as the saws will take care of and without overfeed or underfeed of the log. Obviously if the saws be run at a low rate of speed there will be a correspond-

ingly-slow rate of speed to the log, because the rate of speed is determined through shaft F, which carries the saws and which is the power-shaft of the entire machine. Passing
 5 now to the means for rotating the log, we have a line of gears and chains seen mostly in Fig. 1 and comprising shaft P, on which is a gear-wheel 14 outside frame A, a chain 15 over
 10 the same and over idler sprocket-wheels 15' and 16, respectively, and over the intermediate sprocket-wheel 17, which controls pinion 18 at its outside and which is engaged by a sprocket-chain 19 running over wheel 20 on the spindle 21, which engages and rotates log
 15 B. It will be noticed that power to this line of mechanism is initially from shaft P, carrying the differential gears 4, 5, and 6 and forming part of the speed-varying mechanism associated with pinions 1, 2, and 3, so that the
 20 speed of this line of mechanism can be changed regardless of the rate of travel of shaft F and its saws; but the travel or feed of the log-carriage is effected through shaft P in like manner and degree. In the foregoing description, however, no reference has been made to
 25 varying speed obtained through cones G and H and which are adapted to affect the speed of both the direct travel of the log by carriage C and of its rotation regardless of the
 30 several pinions 1, 2, and 3 and gears 4, 5, and 6, constituting the differential-speed mechanism above referred to. These fix the speed to a definite rate faster or slower; but by the
 35 cones the rate of both direct and rotary feeds are increased. To this end I employ the beveled friction wheel or roller L, supported on a carrier 23, slidable on a rod 22, running through the forked ends of a pivoted support 21'. The rod 22 affords sliding adjustment
 40 for said wheel substantially the full length of cones G and H, so as to engage the same here or there according to the speed wanted, and the said wheel L and its carrier is adapted to be moved back and forth on rod 22 by means
 45 first of an endless cord, cable, or chain 24, engaged with said carrier and with carriage C at *c'* and which runs over sheaves 25 in the angles of frame A, Fig. 3, whereby said cord or band is supported or held up in working
 50 position. The manner of connecting said cord with the carrier for wheel L and the carriage C is such that as the carriage moves forward with the log toward the saws the carrier 23 and the power-transmitting friction-wheel L
 55 thereon gradually moves toward the point of maximum speed between said cones, whereby when the log has about reached its smallest reduction the speed of rotation will also be the greatest, and all this occurs automatically
 60 and is wholly determined by the size of the log before the saws.

When the log has been finished or cut practically out, the mechanism for feeding carriage C is automatically disengaged through
 65 a long substantially hook-shaped catch 30 on

the carriage engaging a spring-pressed pivot-dog 31, Fig. 2, and which is adapted to hold up or support the plate 32, which carries worm-shaft 11 in suitable bearings thereon and has a right-angled end 33 slidably supported on the side of frame A and carrying a
 70 projection 34, engaged by dog 31. When catch 30 presses inward on the upper end of dog 31, it releases it from projection 34 and plate 32 drops down with worm 12, and feed
 75 of the log instantly stops by the disengagement with wheel 13. As this occurs said plate 32 strikes pivoted lever 36, Fig. 3, and through arm 37 on carrier-rod 22 for the friction-wheel
 80 raises said wheel out of working engagement with the cones. Thus substantially the entire machine is automatically thrown out of action and stopped, except the saws, which are subject to independent control.

Any suitable means may be employed for
 85 raising the log to position for engagement in carriage C; but in this instance I show a set of forked supports 40, provided with racks 41 and a shaft 42, with pinions 43 engaging
 90 said racks, and a crank or the like will serve to rotate said shaft, which may be locked with a dog or other locking mechanism against backward rotation.

The value of the three several pinions 1, 2, and 3 and gears 4, 5, and 6 is to set the feed
 95 of the log to get different grades of fiber, and one or another gear connection is made, as a coarser or finer fiber is wanted. Then having set the machine to one of the three grades
 100 thus provided for, the cone and friction-wheel mechanism and the connection of wheel L with the log-carriage serves to keep the fiber uniform at that grade, whether it be fine or otherwise.

Idler-wheel 15', Fig. 1, has a spring-engaged
 105 pivoted support 44, under which said wheel is held yieldingly up in working position.

In order to secure uniformity of product in converting a log into fiber, the speed of the
 110 saws remaining constant, the same number of linear inches of log-surface must be presented to the saw in a given unit of time from start to finish, and also the same depth of cut which the saws take from the log with each revolution of the log must be maintained. This necessitates that both the speed at which the log
 115 revolves and the speed at which the carriage bears the log toward the saws must increase in direct proportion as the diameter of the log diminishes.

It is to be observed that the forward travel
 120 of the carriage is the primary cause of the travel of friction-wheel L to higher speed, and the return of said carriage to starting position for a new log returns the said wheel to a corresponding
 125 position and according to the size of the log. This makes the said carriage the governor for the wheel L as to all its positions—first and last—and there is no hand adjustment at all.

What I claim is—

1. In a wood-fiber-cutting machine, a set of saws and a carrier for the log supported to slide to and from said saws, and means to move said carrier and to rotate the log automatically with increasing speed as the log is reduced, said means having initial controlling connection with the said carrier and comprising friction-cones and a friction device therewith and endless connections with one of said cones having actuating connection with said log-carrier, substantially as described.
2. In a wood-fiber-cutting machine having saws, a slidable support for the log, means to feed said support toward the saws and means to raise the log on said support, a set of power-driven friction-cones and means operatively engaging said cones to actuate the said log-support and to vary the speed of rotation for the log according to the size thereof, said means having fixed connection with said log-support and comprising a pair of oppositely-arranged friction-cones and a roller between them, substantially as described.
3. In a wood-fiber-cutting machine, a set of saws, a suitable support for the log and means to feed the same forward toward the saws with increasing speed, in combination with power-actuated means to rotate the log with increasing speed as the log is reduced, whereby both the feed of the log and the speed of rotation are automatically controlled, said means having cable-controlling connection with the support for the log, a set of cones and a rotating member between said cones controlled by said cable, substantially as described.
4. In a wood-fiber-cutting machine, a log-support and means to feed said support forward comprising racks on the sides of the support and pinions engaging said racks, a drive-cone and a driven cone and a rolling friction device between said cones to change the speed of one cone from the other, means for rotating the log operatively connected with the said driven cone, and means connected with the said log-support and with the said friction device to automatically increase the speed of rotation of the log as it is reduced, substantially as described.
5. In a wood-fiber-cutting machine, a drive-cone having power connections and a driven cone, a friction-roller operatively connecting said cones, a movable log-carrier and means to rotate the log operatively connected with the said driven cone, and a cable to move the said friction-wheel over said cones having connection with said log-carrier, substantially as described.
6. A wood-fiber-cutting machine comprising a pair of friction-cones and a friction-wheel between the same, and a pivoted support carrying said wheel having a rod on which the wheel is slidable, in combination with a log-carrier and means connecting said carrier operatively with said friction-wheel, whereby the said wheel is caused to traverse said cones in one direction as the log is fed to the saws and in the opposite direction as the said carrier is moved back, substantially as described.
7. In a wood-fiber-cutting machine, a carrier for a log and means to rotate the log, in combination with a drive and a driven cone, a friction-operating roller between said cones and means to move said roller axially over the surface of said cones, said means comprising an endless cable having controlling connection with said log-carrier, substantially as described.
8. In a wood-fiber-cutting machine, a log-carrier and means to rotate the log, in combination with variable-speed gears to rotate the log and move said carrier, a pair of friction-cones, a friction-roller operating therewith and means operatively connecting said roller with said log-carrier, whereby the said wheel is moved when the said carrier is moved, substantially as described.
9. In a wood-fiber-cutting machine, a log-carrier and means to feed said carrier forward and to rotate the log, mechanism to automatically vary the speed of said rotation and the feed of the log, a friction-cone to drive said mechanism, a friction-wheel in engagement with said cone and a sliding carrier for said wheel and flexible connection between said carrier and the log-carrier, substantially as described.
10. In a wood-fiber-cutting machine, a series of differential gears and pinions to vary the cut of the fiber as to grade, and log-rotating mechanism having power connections to maintain the grade of the fiber through the reduction of the log, said mechanism constructed to increase in speed as the log is reduced, substantially as described.
11. In a wood-fiber-cutting machine, a set of saws, a carriage to support the log, lines of mechanism to rotate the log and to feed the carriage toward the saws, and automatic controlling mechanism for said log and said carriage to proportionately drive the same at increasing speed as the diameter of the log is reduced, said mechanism comprising a traveling cord having fixed connection with the log-carriage, substantially as described.
12. In a wood-fiber-cutting machine, the saws, a carrier for the log, means to drive said saws and carrier, variable-speed mechanism for said carrier comprising gears and pinions of different sizes meshing therewith, and means to automatically throw out said variable-speed mechanism and stop the feed of the carrier at the minimum reduction of the log comprising a worm-gear and a pinion and means to disengage said parts, substantially as described.
13. In a wood-fiber machine, saws and a log-carrier movably mounted opposite thereto, means to feed said carrier and to rotate the log comprising drive mechanism with va-

riable-speed cones therefor, a friction-roller for said cones, and means to automatically disengage said roller from the cones, substantially as described.

5 14. In a wood-fiber-cutting machine, a set of saws, a movable log-carrier and feed mechanism therefor, racks on the bottom of said carrier and gear mechanism for centering and raising the log to working position compris-

ing racks having fixed ends, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

HOWARD M. LEONARD.

Witnesses:

R. B. MOSER,

C. A. SELL.