

W. D. HOPKINS.
WOOD SAWING MACHINE.

No. 492,746.

Patented Feb. 28, 1893.

Fig. 1.

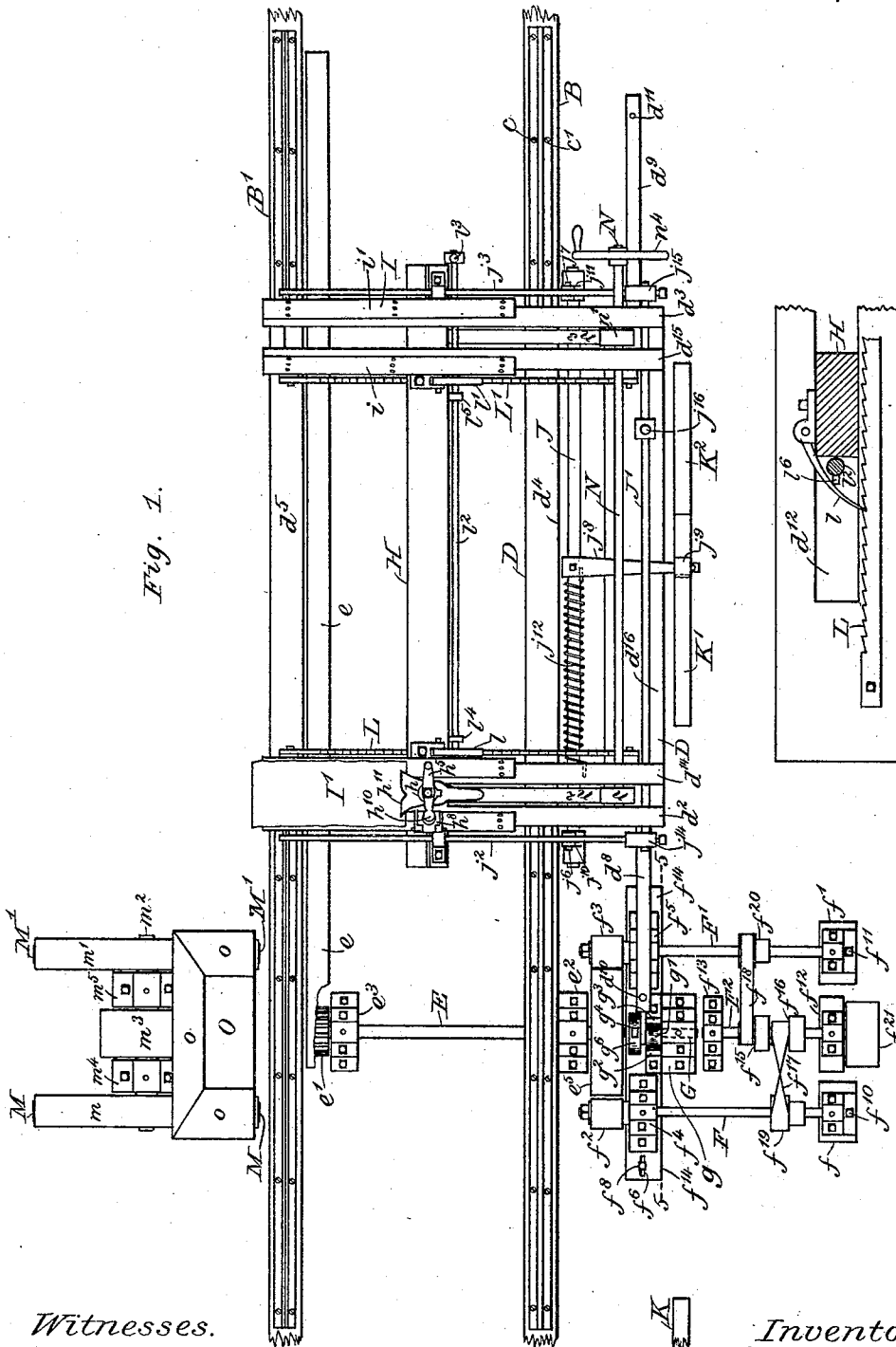


Fig. 2.

Witnesses.

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By Albert M. Moore,
His Attorney.

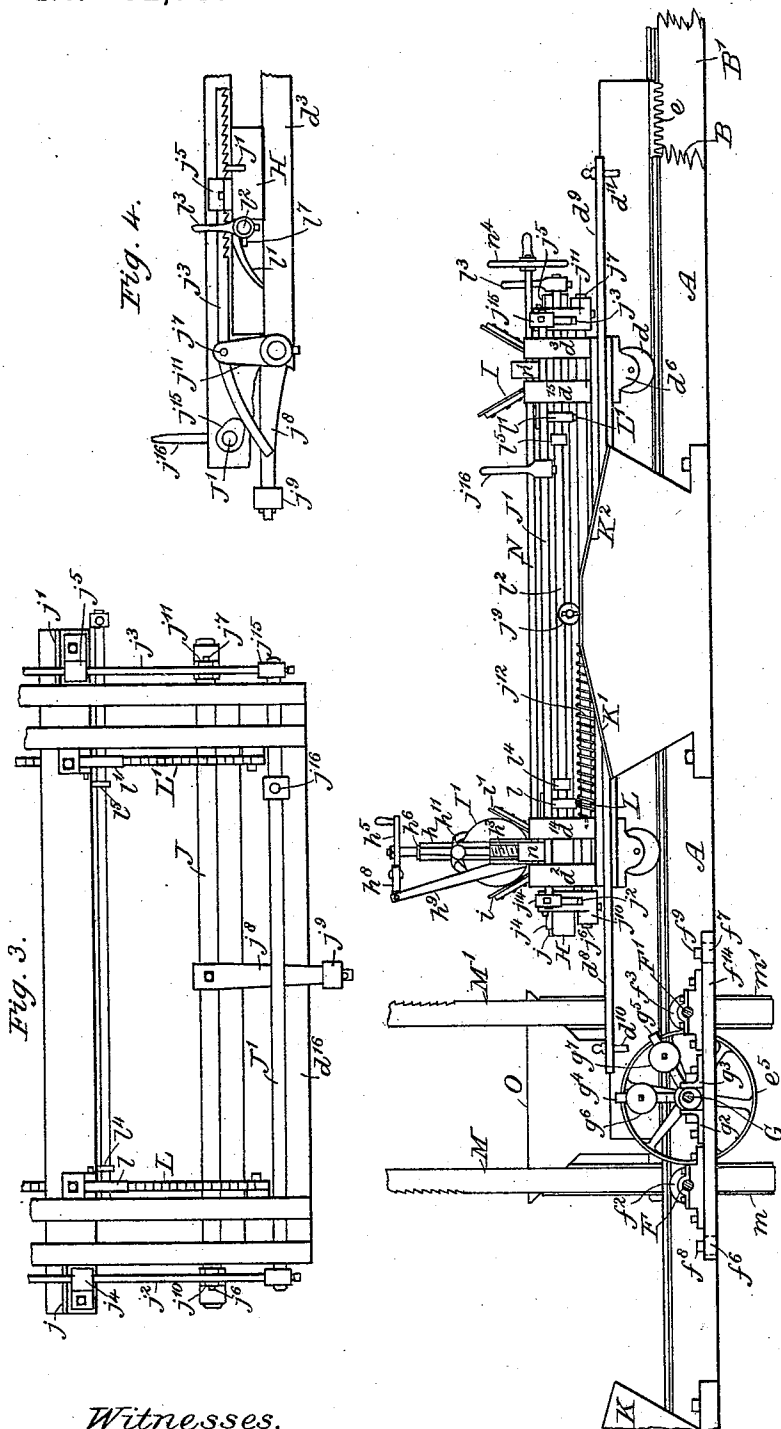
(No Model.)

3 Sheets—Sheet 2.

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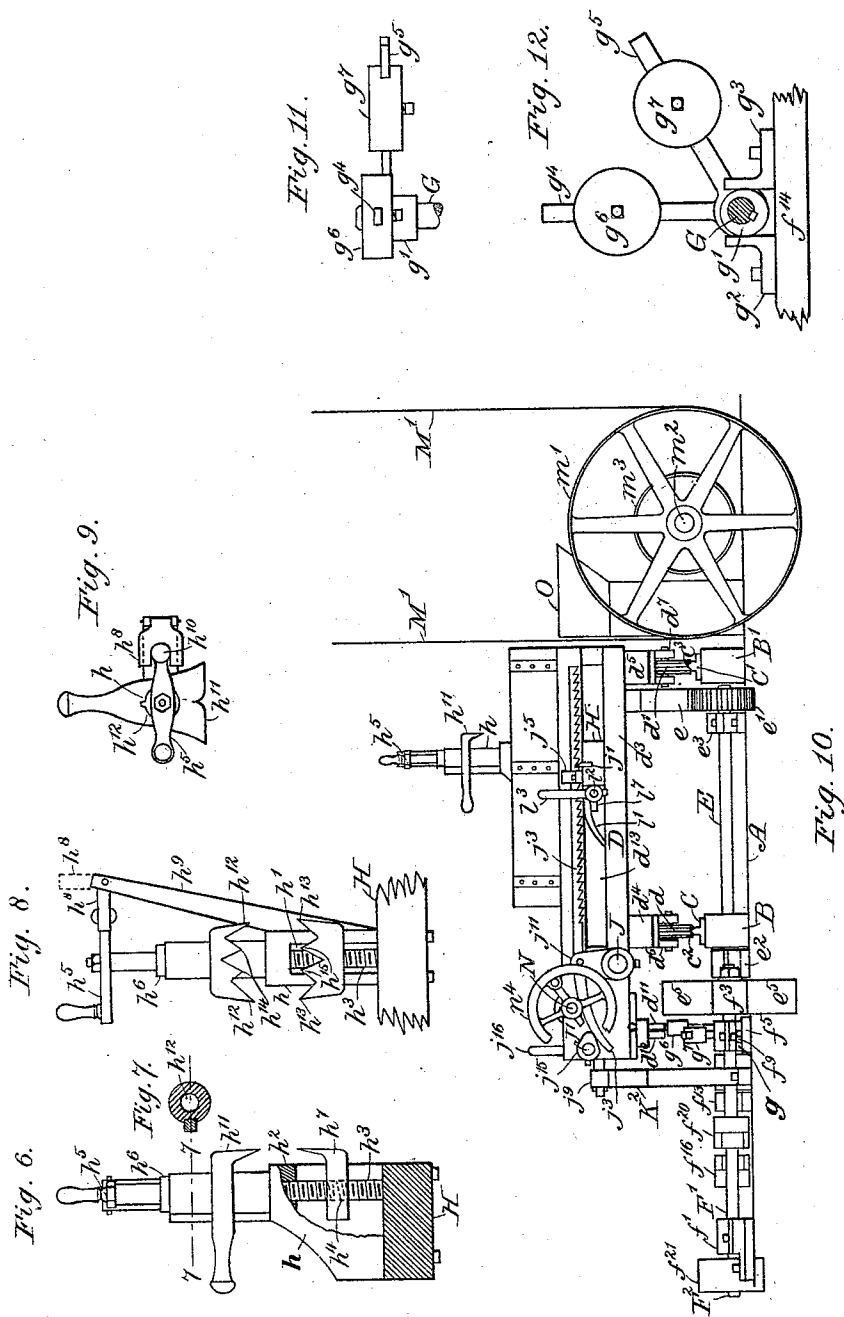
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UNITED STATES PATENT OFFICE.

WILLIAM D. HOPKINS, OF GOFFSTOWN, ASSIGNOR OF ONE-HALF TO HENRY W. HOPKINS, OF WILTON, NEW HAMPSHIRE.

WOOD-SAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 492,746, dated February 28, 1893.

Application filed August 6, 1891. Serial No. 401,851. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. HOPKINS, a citizen of the United States, residing at Goffstown, in the county of Hillsborough and State of New Hampshire, have invented a certain new and useful Improvement in Wood-Sawing Machines, of which the following is a specification.

My invention relates to wood sawing machines of the class adapted to saw a log or stick transversely into blocks and is particularly adapted for sawing logs or sticks into blocks to be converted partly by chemical means into wood-pulp for paper.

In the accompanying drawings, on three sheets, Figure 1 is a plan of a wood-sawing machine constructed in accordance with my invention; Fig. 2, a side elevation of a part of the carriage, one of the racks by which the carriage is prevented from moving backward, the dog which engages said rack and a transverse section of the dog-releasing shaft and feed-bar; Fig. 3, a plan of a part of the carriage, omitting the log-holding troughs; Fig. 4, a side elevation of the devices which set over the stock for a new cut and the devices which disengage the feed-racks and the feed-bar; Fig. 5, a rear elevation of the machine, omitting the upper parts of the band-saws, their upper pulleys, a part of the track-supporting rails and a part of one of the double inclines; Fig. 6, a side elevation of the dog-post and dogs; Fig. 7, a horizontal section on the line 7 7 in Fig. 6; Fig. 8, a front elevation of said dog-post and dogs; Fig. 9, a plan of the same; Fig. 10, a left end elevation of the machine; Fig. 11, a plan of the reversing-arms and their eccentric; Fig. 12, a rear elevation of said reversing-arms, their eccentric, a part of the sliding journal-box which supports the shafts of the friction wheels and the brackets between which said eccentric revolves.

Upon the floor or other surface A rest parallel stringers or longitudinal supporting timbers B B', on which are secured, by screws c c', rails C C', represented as having longitudinal ways or raised V's c² c³, on which run the grooved supporting-wheels d d' of the carriage D. The carriage D is a rectangular frame, the front rail d⁵ and back rail d⁴ of which are parallel with the track-rails C C'

and have hangers d⁶ d⁷, secured to their under sides, in which hangers are journaled the supporting-wheels d d' in a well known manner.

Secured to the back side of the front-rail d⁵, parallel with the said front-rail, is a rack e of sufficient length to be engaged at all times by the pinion e', fast on the front end of a shaft E, supported in suitable journal-boxes e² e³ which rest on the floor A. On the rear end of the shaft E is fast the friction-drum e⁵. Two equal nearly parallel shafts F F' are journaled at their rear ends in boxes f f' and carry at their front ends friction-wheels f² f³ fast on said shafts and lying in the same vertical planes with said friction-drum. The front journal-boxes f⁴ f⁵ of said shafts are secured on a slide f¹⁴, said slide having longitudinal slots f⁶ f⁷, through which bolts f⁸ f⁹ are passed, to hold said slide down to its supporting-surface while allowing a longitudinal movement of said slide sufficient to bring either of the friction-wheels f² f³ into contact with said friction-drum and, to facilitate the longitudinal movement of the slide, the rear journal-boxes f f' may turn slightly upon vertical pivot-bolts f¹⁰ f¹¹. Another shaft F² is supported in journal-boxes f¹² f¹³, between the shafts F F', and is provided with a fast pulley f²¹, connected by a suitable belt, not shown, to any motor. The shaft F² is provided with speed-cones f¹⁵ f¹⁶, connected by belts f¹⁷ f¹⁸ to other speed-cones f¹⁹ f²⁰ fast on the shafts F F' respectively, said speed-cones being used for the obvious purpose of changing the speed of the shafts F F', the belt f¹⁷ being a crossed belt and the belt f¹⁸ being an open belt, to drive the friction-wheels f² f³ in opposite directions and to reverse the movement of the friction-drum e⁵ and thereby reverse the direction in which the carriage moves as said friction-wheels are alternately brought into contact with said friction-drum, the shaft F² having a constant rotation in the same direction.

A reversing-shaft G is supported in a journal-box g and is provided with an eccentric g', fast thereon and arranged between two brackets g² g³, rigidly secured on the slide f¹⁴ in contact with said eccentric, so that a partial revolution of said reversing-shaft G will

give a longitudinal movement of said slide sufficient to bring one of the friction-wheels $f^2 f^3$ against the friction-drum e^5 and carry the other of said friction-wheels out of such

5 contact.

Upon the reversing shaft G are secured in different planes and at angles with each other, two arms $g^4 g^5$ and to the carriage D are rigidly secured two laterally-extending arms d^8
10 d^9 each provided with a down-hanging stud $d^{10} d^{11}$, one d^{11} of said studs being in the same vertical plane in which the arm g^4 swings and the other d^{10} of said studs being in the vertical plane in which the other arm g^5 swings,
15 that is, the stud d^{10} or d^{11} which follows (when the carriage is moving in either direction) strikes the arm g^5 or g^4 last reached by said following stud. The arms $g^4 g^5$ are provided with weights $g^6 g^7$ which cause said arms to
20 complete their movement (in the direction to which their combined center of gravity is thrown by the action of either of the studs $d^{10} d^{11}$), the movement of said arms being limited by the striking of the friction wheels $f^2 f^3$,
25 against the friction-drum e^5 . When the arms $g^4 g^5$ are at rest, one of said arms g^5 is in a vertical or nearly vertical position and the other is inclined, as shown in Figs. 5, 11 and 12, and the friction-wheel (f^2 or f^3) on the
30 same side of the reversing shaft G with such inclined arm is in contact with the friction-drum e^5 .

The end-rails $d^2 d^3$ of the carriage D are provided with horizontal slots $d^{12} d^{13}$ in which
35 slides a horizontal feed-bar H. Other transverse rails $d^{14} d^{15}$, as many as may be desired, precisely like the end rails $d^2 d^3$ and parallel with said end-rails are secured like said end-rails to the back-rail d^4 and front-rail d^5 .

To the feed-bar H in each interval between an end-rail and the adjacent transverse rail is secured a vertical dog-post h , see Figs. 6 to 9, the lower part of said post h having a vertical slot h' and the upper part of said post
45 having a hole h^2 which is in the same line with said vertical slot. In the hole h^2 turns the vertical screw h^3 , the lower portion of which passes through a screw-threaded hole h^4 (shown in dotted lines in Fig. 6), in the shank
50 of the lower dog h^7 , so that by turning the crank or handle h^5 of said screw the lower dog is raised or lowered, said screw having a collar h^6 , fast thereon, which rests upon the top of the post and prevents a downward
55 movement of said screw. When the lower dog is in its proper position, the screw h^3 is prevented from turning by a fork or holder h^8 , pivoted on an arm h^9 or bracket, secured to the post h , said fork engaging an enlarged
60 end h^{10} of the crank h^5 , thereby preventing not only the lower dog from movement but also holding the crank parallel with the front-rail d^5 of the carriage D and out of the reach of the saws M M', hereinafter referred to.

65 On each transverse rail, including the end-rails, is supported one half or inclined side i of a trough I, there being as many such

troughs as there are dog-posts and the sides of said troughs flaring upwardly, as shown in Fig. 5. In each trough I is placed, transversely
70 of the carriage D, a log I', after squaring the ends of the log, the rear end of the log being arranged above the dog h^7 . Another dog h^{11} surrounds the reduced upper part of the post h , said upper part of said post being, as shown
75 in Fig. 7, thicker from front to back than laterally and passing upward through a hole in said upper dog, said hole h^{12} being slightly larger than the part of the post h which it surrounds to allow said dog to be raised upon
80 said post to admit the end of the log and the sides of said hole engaging said post and preventing the rising of said dog on said post when the front end of said dog is raised. The upper dog is substantially like the lower dog
85 h^7 , except as above stated, and except also that it is provided with a handle to enable said dog to be raised and lowered quickly and conveniently. The log being placed in the
90 trough I, when the lower dog h^7 is in its lowest position, the upper dog is lowered against the top of the log and its teeth may be driven into said log, if desired, the handle being pressed downward, and the lower dog h^7 is raised by the screw h^3 , as above described,
95 until said lower dog enters the lower side of the log. The outer teeth $h^{12} h^{13}$ of each dog are longer than the inner teeth $h^{14} h^{15}$ of the same to adapt said dogs to the curvature of
100 the log.

The feed-bar H is provided, at each end thereof, with a fixed dog $j j'$ adapted to be engaged by the teeth of a feed-rack $j^2 j^3$, held
over said dog by a guide $j^4 j^5$, in which said rack is capable of a vertical movement, said
105 rack near its rear end being pivoted, at $j^6 j^7$, to a radial arm $j^{10} j^{11}$ of the rock-shaft J. The rock-shaft J is journaled in the transverse rails of the carriage D and between the ends of said rock-shaft is provided with a rear-
110 wardly-extending arm j^8 carrying an anti-friction roll j^9 , adapted to run up on either of two inclines K K', similar to each other except that they are inclined in opposite directions, each incline descending toward the
115 other and toward the shaft E. When the arm j^8 is raised by either incline the racks $j^2 j^3$ are pushed forward, carrying the dogs $j j'$ and the feed-bar H forward and therefore carrying the post h and log I' forward and this forward
120 movement takes place just after the carriage D passes the saws M M' in either direction and pushes the logs forward far enough to be cut by the saws when the motion of the carriage is reversed. A stop, represented as
125 a rail or bar d^{16} extending from end to end of the carriage and secured to the undersides of the rear ends of the end rails below said arm prevents said arm from falling below said inclines. The arm j^8 is brought down to said
130 stop by its own gravity or by a spring which may be a spiral spring j^{12} surrounding said rock-shaft J and attached at one end to said arm j^8 and at the other to one of the trans-

verse rails or other fixed part of the carriage D. Other transverse-racks L L' are stationary on the carriage and are engaged by retaining pawls l l' pivoted on the feed-bar H and said last-named racks and retaining-pawls normally prevent a backward movement of the carriage or movement away from the cutting plane of the saws, the teeth of the feed-racks and retaining-racks all pointing forward. When the carriage has reached the limit of its forward movement, the racks $j^3 j^3$ are raised out of engagement with the dogs j j' by means of the cam-shaft J', journaled in the transverse-bars of the carriage and having cams $j^{14} j^{15}$, fast thereon, and having a radial arm j^{16} secured thereto, which arm j^{16} being turned over forward causes said cams to press upon said racks in the rear of their pivots in the arms $j^{10} j^{11}$ and raises the toothed front portions of said racks. The pawls l l' are raised out of engagement with the racks L L' by means of a shaft l^2 , journaled at $l^4 l^5$ on the feed-bar H and having radial arms $l^6 l^7$ which reach under said pawls l l' and raise them when said shaft l^2 is raised by turning forward the radial arm l^8 secured to said shaft l^2 . When all the racks $j^2 j^3$ L L' are out of engagement with their respective dogs or pawls, the feed-bar H may be drawn backward by turning the hand-wheel n^4 fast on the shaft N and causing the wheels $n n'$ also fast on said shaft N to wind up the straps $n^2 n^3$, each of said straps being secured at one end to said feed-bar and at the other end to one of said wheels $n n'$. The carriage D is then reloaded and all the racks are brought into engagement with their dogs or pawls by drawing backward the upper ends of the arms $j^{16} l^8$ and the carriage is started by setting the driving pulley f^{21} in operation. The track however may be made long enough to support a second carriage (not shown, but a duplicate of the carriage D) with its traverse rack e out of engagement with the pinion e' and far enough away from said pinion not to be in the way of the first carriage and by making the incline K' double, that is sloping said incline in both directions or adding to it the opposite incline K² the second carriage may be run (to the left in Figs. 1 and 5) past said inclines K² and K' until the traverse-rack e of said second carriage engages the pinion e' , care being taken, however, to remove the reversing-stud d^{11} from the arm d^9 before said stud comes in contact with the arm g^4 , to allow the rack e of the first carriage or carriage moving to the left to run so far as to get out of engagement with the pinion. Of course, in like manner the incline K may be made to slope in both directions for the same purpose and a stationary carriage at either end of the track may be filled while another carriage loaded with logs is traversing and gradually becoming emptied, to cause as little delay as possible in submitting a new load of logs to the action of the

saws after the sawing of a previous load is completed.

The traverse of the carriage carries the logs I' past the band-saws M M' which are of the usual construction and operation except that, in the machine herein described, two band-saws are used, their descending members arranged in the same vertical plane with their backs toward each other, so that as the carriage D passes said saws in either direction a cut is made, the logs being set over at or near each end of the traverse for a new cut, as above described. The lower band-wheels $m m'$ of the band-saws M M' are secured on the same shaft m^2 with each other and with the fast pulley m^3 , a belt (not shown) on which fast pulley drives said shaft m^2 which is journaled in suitable boxes $m^4 m^5$, at right angles with the shaft E, said saws being at equal distances from the front end of said shaft E. The upper wheels (not shown) of the band-saws are separately adjustable in the usual manner. A suitable hopper O, having a flaring upper end o is arranged between the wheels $m m'$ in the rear of the pulley m^3 and receives the blocks cut from the logs I' and may conduct such blocks into a lower room or on to an endless conveying belt of ordinary construction, which deposits the blocks in any convenient place.

The machine above described may be used not only for cutting logs into blocks of a suitable size to be placed in the boiler or converter, used in the process of making paper-pulp, but for cutting such blocks for any purpose, as blanks for spools and numerous other articles.

I claim as my invention—

1. The combination of the carriage, the feed-bar, adapted to slide thereon, dogs, fixed on said feed-bar, a rock-shaft, provided with arms, racks, pivoted to said arms and engaging said dogs, another shaft, journaled on said carriage, wheels, fast on said last-named shaft, and straps or flexible connections, each attached at one end to said feed-bar and at the other end to one of said wheels, as and for the purpose specified.

2. The combination of the carriage, the feed-bar, adapted to slide thereon, dogs, fixed on said feed-bar, a rock-shaft, provided with arms, racks, pivoted to said arms and engaging said dogs, a cam-shaft, provided with cams and adapted to be turned to press said cams against said racks and throw said racks out of engagement with said dogs, another shaft, journaled on said carriage, wheels, fast on said last-named shaft, and straps or flexible connections, each attached at one end to said feed-bar and at the other end to one of said wheels, as and for the purpose specified.

3. The combination of the carriage, the feed-bar, adapted to slide thereon, dogs, fixed on said feed-bar, a rock-shaft, provided with arms, feed-racks, pivoted to said arms and engaging said dogs, a cam-shaft, provided with

cams and adapted to be turned to press said
cams against said feed-racks and throw said
feed-racks out of engagement with said dogs,
retaining racks, fast on said carriage, dogs,
5 pivoted on said feed-bar and engaging said
retaining-racks, a releasing-shaft, having ra-
dial arms and adapted to be turned to disen-
gage said dogs from said retaining-racks, an-
othershaft, journaled on said carriage, wheels,
10 fast on said last-named shaft, and straps or
flexible connections, each attached at one end
to said feed-bar and at the other end to one of
said wheels, as and for the purpose specified.

4. The combination of the carriage, a
15 trough, secured on said carriage and having
a longitudinal opening or space between the
sides thereof, at the bottom thereof, a feed-
bar, adapted to slide on said carriage below
said trough, and dogs, secured to said feed-
20 bar, and arranged within said trough, as and
for the purpose specified.

5. The combination of the carriage, a
trough, secured on said carriage and having
a longitudinal opening or space between the
25 sides thereof, at the bottom thereof, a feed-
bar, adapted to slide on said carriage below
said trough, a dog-post, secured to said feed-
bar between the sides of said trough and pro-
vided with a slot, dogs, adjustable on said
30 post, one of said dogs being movable in said
slot, a screw, to draw said last named dog to-
ward the other of said dogs, to seize and hold
a log arranged in said trough, as and for the
purpose specified.

35 6. The combination of the carriage, a
trough, secured on said carriage and having
a longitudinal opening or space between the

sides thereof, at the bottom thereof, a feed-
bar, adapted to slide on said carriage below
said trough, a dog-post, secured to said feed- 40
bar between the sides of said trough and pro-
vided with a slot, dogs, adjustable on said
post, one of said dogs being movable in said
slot, a screw, to draw said last-named dog to-
ward the other of said dogs, to seize and hold 45
a log arranged in said trough, said screw be-
ing provided with a crank or handle, and a
fork or holder, adapted to engage said crank
or handle, to prevent the movement of said
screw, as and for the purpose specified. 50

7. The combination of two saws, arranged to
cut in opposite directions in the same plane,
a feed-carriage, having a reciprocating move-
ment past said saws in a direction parallel
with the cutting-plane of said saws, a feed- 55
bar, adapted to slide on said carriage, dogs,
fixed on said feed-bar, a rock-shaft, journaled
in said carriage and provided with arms,
racks, pivoted to said arms and engaging said
dogs, and stationary inclines, each adapted, 60
in the movement of said carriage, to raise an-
other arm, with which said rock-shaft is pro-
vided, and thereby to move said racks and
feed-bar after each movement of said car-
riage past said saws in either direction, as 65
and for the purpose specified.

In witness whereof I have signed this speci-
fication, in the presence of two attesting wit-
nesses, this 31st day of July, 1891.

WILLIAM D. HOPKINS.

Witnesses:

ALBERT M. MOORE,
MYRTIE C. BEALS.