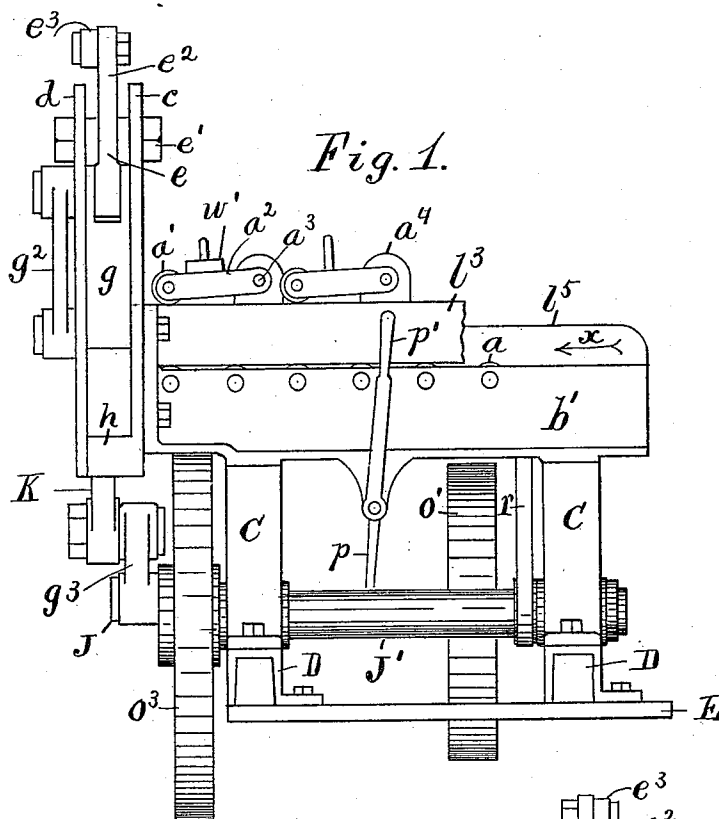
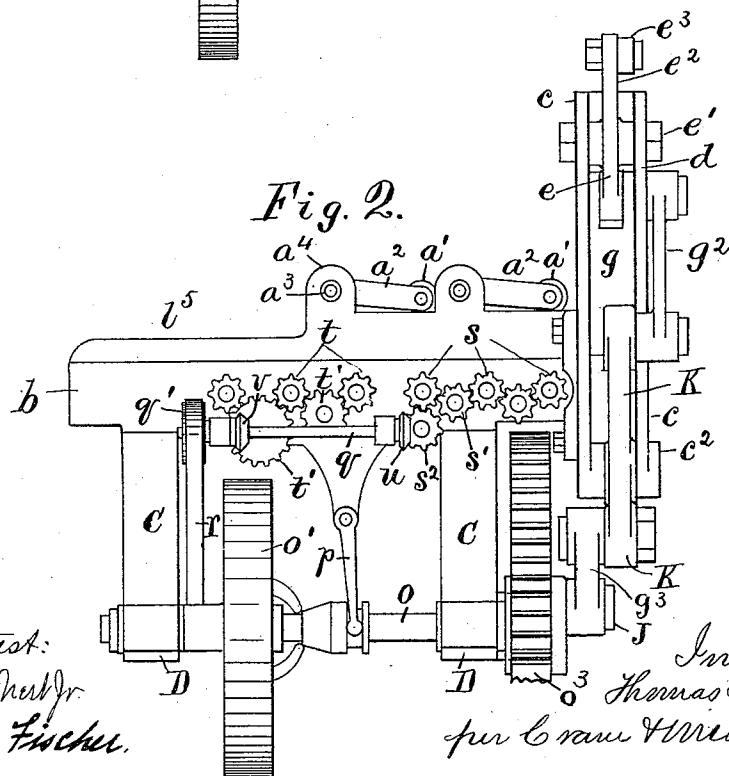


4 Sheets—Sheet 1.

No. 447,462.

Patented Mar. 3, 1891.



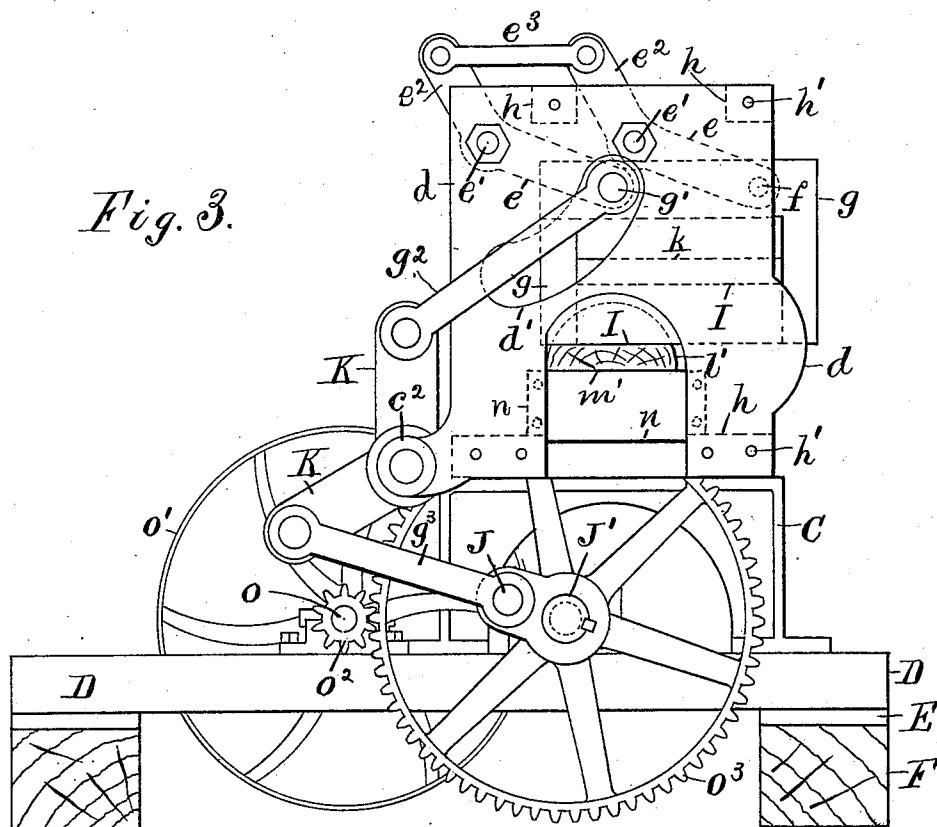
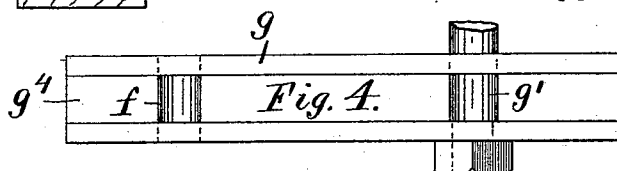
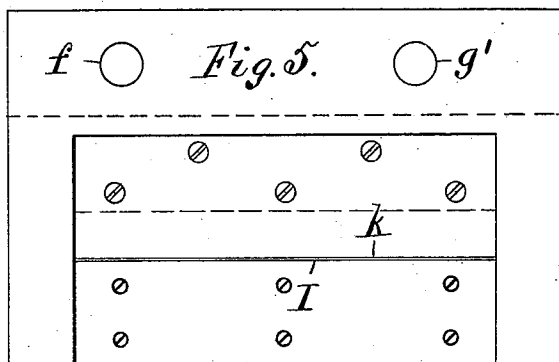
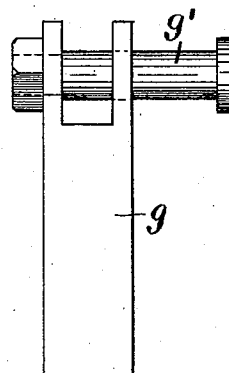
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J. Van Hook Jr.
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 Inventor.
Thomas S. Crane
per Crane & Miller, Atty.

T. S. CRANE.
LOG CROSSCUTTING MACHINE.

No. 447,462.

Patented Mar. 3, 1891.

*Fig. 6.*

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(No Model.)

4 Sheets—Sheet 3.

T. S. CRANE.
LOG CROSSCUTTING MACHINE.

No. 447,462.

Patented Mar. 3, 1891.

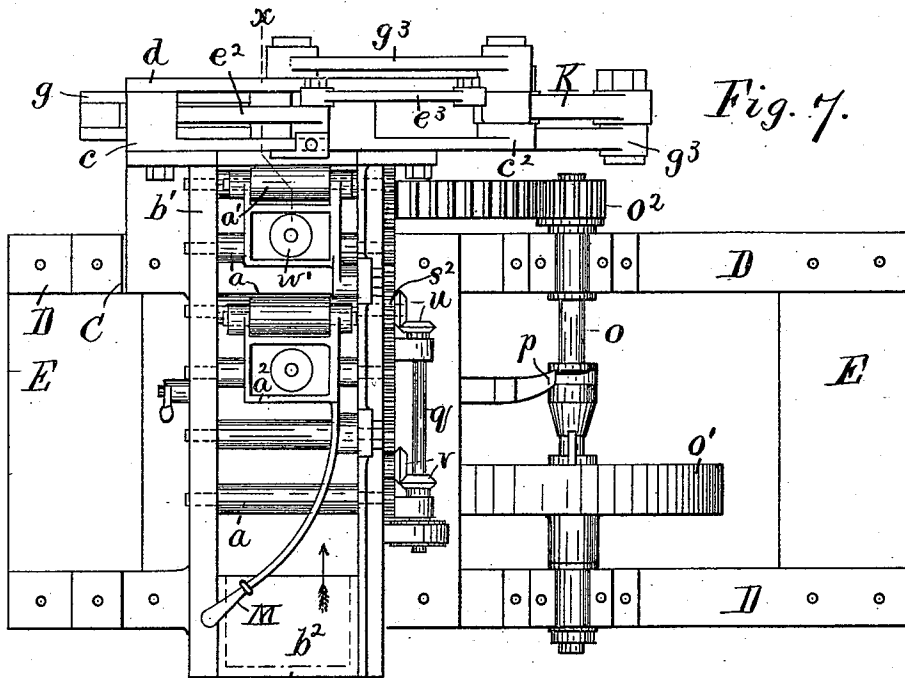


Fig. 7.

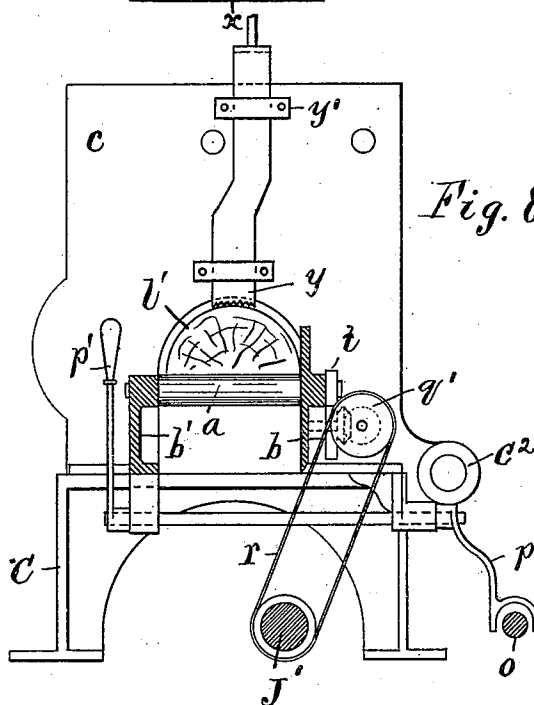


Fig. 8.

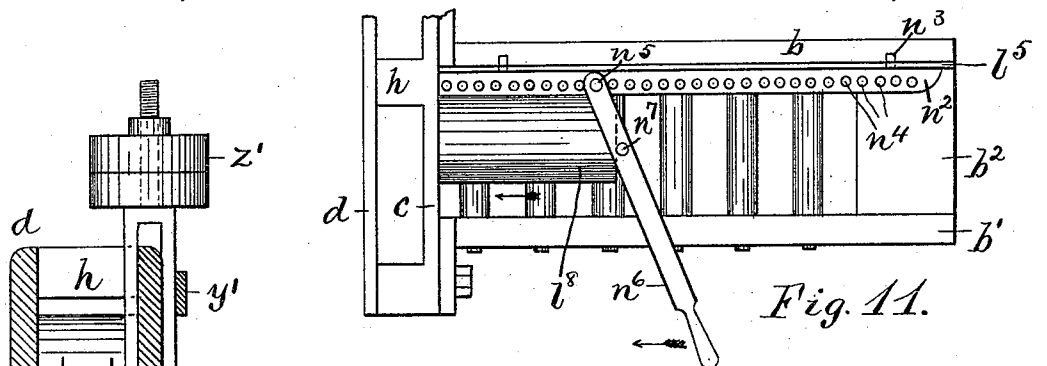
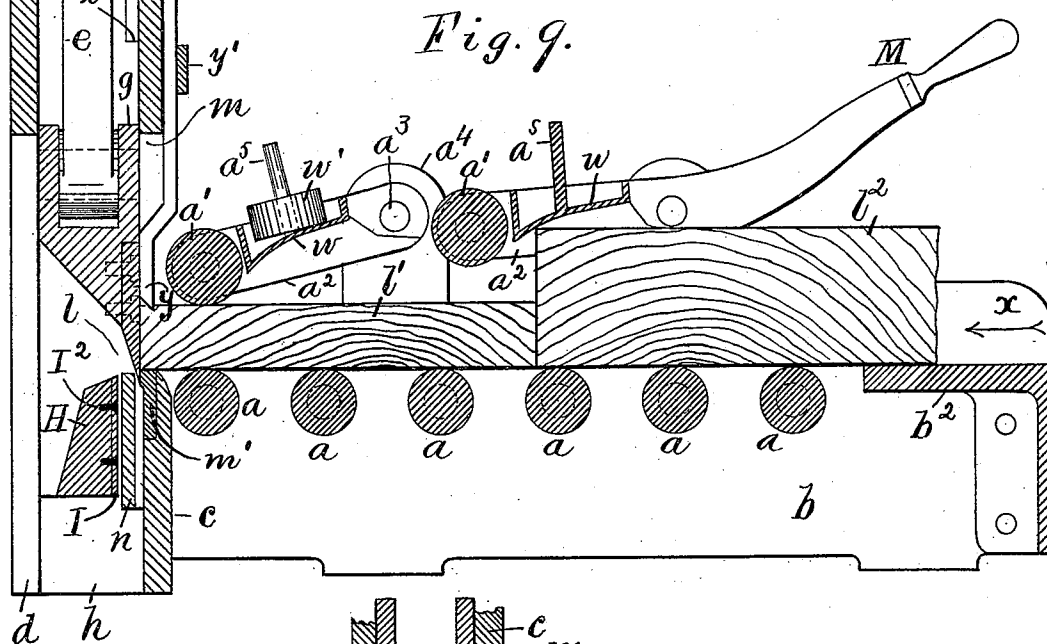
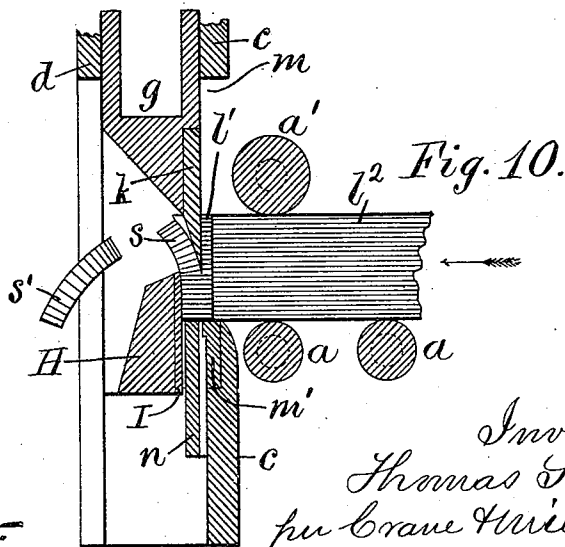
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T. S. CRANE.
LOG CROSSCUTTING MACHINE.

No. 447,462.

Patented Mar. 3, 1891.



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UNITED STATES PATENT OFFICE.

THOMAS S. CRANE, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO EDWARD BRADLEY, OF NEW YORK, N. Y.

LOG-CROSSCUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 447,462, dated March 3, 1891.

Application filed May 1, 1890. Serial No. 350,195. (No model.)

To all whom it may concern:

Be it known that I, THOMAS S. CRANE, a citizen of the United States, residing at East Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Log-Crosscutting Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The present invention is adapted particularly for the preparation of fiber to be used in the manufacture of paper and pasteboard; but the apparatus may be used for other purposes.

15 The apparatus is intended to operate a knife to cut slices from the end of a wooden log, the slices then being boiled (in paper-manufacture) with suitable chemicals to wholly separate the fibers.

20 In the manufacture of paper-pulp it is desirable to wholly remove the bark from the wood before the fiber is disintegrated, and such operation is performed by machines adapted to operate upon short logs, say two
25 feet in length.

The apparatus shown herein is adapted to operate upon a succession of such short logs and to firmly support the last end of each log during the cutting operation.

30 The construction will be understood by reference to the annexed drawings, in which—

Figure 1 is a front elevation of the machine; Fig. 2, a rear elevation; Fig. 3, an elevation of the delivery. Fig. 4 is a plan of the knife-beam. Fig. 5 is a side view of the same; Fig. 35 6, an end view of the same; Fig. 7, a plan. Fig. 8 is a rear elevation of the machine above the cross-bars D, with the parts in section where hatched adjacent to the pulley g' ; Fig. 40 9, a section on line $x-x$ in Fig. 7; Fig. 10, a similar section of the head, a portion of the feed-roll s , and a log with a slice half cut therefrom; Fig. 11, an alternative construction.

45 A series of feed-rolls a is journaled in beams b b' , which are sustained by a frame consisting in legs C, cross-bars D, and ties E. The latter in Fig. 3 are shown mounted upon foundation logs or beams F. The logs are omitted
50 in Fig. 1, and the parts D and E are omitted in Fig. 2. A head formed of plates c and d

is secured transversely to the beams b b' . The plates are connected by blocks h and bolts h' , and a knife-carriage g is fitted to slide snugly between the plates. The carriage is adapted to slide up and down in a curved path between the plates by means of links e , pivoted at their lower ends to the top of the carriage by pins f and g' and at their upper ends to stationary studs e' , secured
60 in the plates. Arms e^2 , connected by a link e^3 , are shown attached to the links e to give them a parallel motion. The carriage is reciprocated by suitable gearing. Rolls a' are provided to press the log toward the rolls a ,
65 which latter are suitably operated to feed the log forward when the knife is raised, the knife cutting a slice from the end of the log at each reciprocation. The thickness of the slices is determined by a gage-plate attached
70 to the knife-carriage, against which plate the end of the log is pressed when fed forward.

The knife-carriage is formed of a square frame with grooves in the top to admit the links e , and having the knife k secured at the
75 inner side of a beveled opening l for discharging the cut wood. The lower part of the frame consists in a bar H, faced with a steel gage-plate I, the upper edge of which is adjacent to the lower edge of the knife. The plate is
80 arranged parallel with the path of the knife, and at a suitable distance therefrom to gage the thickness of the slices and to form a throat through which the slices are discharged when cut, as shown in Fig. 10. The plate I
85 moves with the knife and carriage, but obstructs the movement of the log when fed forward beneath the knife, the end of the log remaining in contact with the plate as it moves
90 downward until the slice is severed and discharged through the throat, as indicated in Figs. 9 and 10.

An aperture m is formed in the head, through which the log is fed, and the lower edge of such aperture is provided with a
95 shear-plate m' , past which the inner face of the knife cuts at the close of each stroke, as shown in Fig. 9.

A supporter n , formed of a steel bar thinner than the wooden slice and having its top
100 level with the plate m' , is fixed to the head-plate c a little distance from the plate to sup-

port the slice while cutting, as shown in Fig. 10, where the knife is represented half-way through the log, with a slice s partly cut and another slice s' discharged from the throat and falling over the bar H.

In Fig. 10 the slice s is shown severed from the last end of a log L' , with another log L^2 pressed toward the same by the feed-rolls a a' during the cutting operation. The short end of a log is thus sustained upon one side by the gage-plate I, while the log L^2 sustains it upon the opposite side, and the supporter n sustains it at the bottom, so that it is held immovably while the knife divides it, as shown in Fig. 10.

The knife-carriage is reciprocated by suitable connections to a crank-pin J, rotated with a shaft J' , which, for convenience of construction, is arranged beneath the log-bed formed by the rolls a . The crank-shaft is mounted in boxes upon the beams D, and a pulley-shaft o , provided with a pulley o' and pinion o^2 , is mounted upon the same beams and rotates the crank-shaft through the medium of a large cog-wheel o^3 . Owing to the location of the crank-shaft, the motion of the crank is communicated to the carriage by a bell-crank K, one arm of which is connected with the pin g' upon the carriage by a link g^2 and the other arm to the crank-pin J by a link g^3 . The bell-crank is pivoted to the head-plates c and d in bearings c^2 , and a slot d' is formed in the plate d , through which the pin g' projects to receive the link g^2 . The pulley o' is shown provided with a clutch actuated by a clutch-lever p and handle p' , projected upward near the stand of the operator upon the front side of the bed. (Shown in Fig. 1.)

Six feed-rolls are shown in the section in Fig. 9, three of the rolls being arranged at suitable distances to support one of the logs L' , while the other three rolls are arranged ahead of the same toward the inlet x of the machine to support an additional log L^2 . The feed-rolls nearest the inlet of the machine are preferably rotated at a higher speed than the others, so that when a log is laid on the rolls it may be pressed forcibly against the rear end of the preceding log, so as to remain in close contact therewith when fed forward by the feeding-rolls a a' , adjacent to the knife. Such close contact is very desirable to sustain the last end of the log during the final cut upon such log, as shown at L' in Fig. 10.

The ends of the logs are preferably squared in advance to make them fit evenly against one another for the purpose just described.

The means for rotating the rolls at different speeds is shown in Figs. 2, 9, and 7, and consists in connected cog-wheels driven at different speeds. s are the wheels upon the slow feed-rolls a nearest the knife, and t are the wheels upon the three rolls beneath the log L^2 in Fig. 9. The motion is imparted to these gears by a shaft q , connected by a pulley q' and a belt r with a pulley upon the

shaft J' . The gears s are connected by intermediates s' , and by means of a gear s^2 with a pair of miter-wheels u upon the shaft q . The gears t are connected by intermediates t' , and one of the latter is connected with the shaft q by miter-gears v . The wheel connected with the miter-gears v is nearly twice the size of that connected with the miter-wheels u , so that a much higher speed is imparted to the rolls which are actuated by the gears t than the rolls connected with the gears s . The pressure-rolls a' are journaled in frames a^2 , pivoted at one end by studs a^3 to lugs a^4 upon the beam b .

In Fig. 1 a long log L^2 is shown beneath the rolls a' and the frames a^2 lifted to the same level; but the logs L' and L^2 in Fig. 9 are shown of different thicknesses, and one of the frames a^2 elevated above the log L' by the contact of the log L^2 with a seat w upon such frame. Such seat is suitably sloped for the end of each log to wedge beneath it in raising the frame a^2 , and is provided to adapt the pressure-rolls a' to operate automatically upon short logs of different thicknesses.

The two pressure-rolls shown in the drawings are arranged at a suitable distance from the knife to bear upon a log of the required length, so that one of such rolls may be operative upon the log when the other is lifted, as shown in Fig. 9, by the introduction of a thicker log behind it.

The feed-rolls a are preferably made smooth, so as to be rotated continuously and operate merely by friction, the rolls slipping in contact with the wood during the cut, as shown in Figs. 9 and 10, and operating to push the log forward (as soon as the knife is lifted) in contact with the gage-plate I, which is then lifted in front of the log, as shown in Fig. 3, and as is also apparent in Fig. 10.

The roll-frames a^2 are shown each provided with a stud a^3 , projected upward to receive auxiliary weights w' , by which the pressure of the rolls a' may be graduated.

The rolls a may be fluted, if desired, and operated intermittently by a ratchet-connection with the reciprocating cross-head, and the rolls a' may also be rotated by a chain-connection with one of the rolls a , or by expansion-gearing, such as is commonly used in actuating similar feed-rolls.

A handle M is shown attached to one of the roll-frames in Figs. 7 and 9, by which the frame may be elevated to facilitate the introduction of a thick log behind a thin one, or to diminish or increase the pressure upon the log at the pleasure of the operator. Both the frames a may be provided with such levers, if desired.

The rear ends of the beams b and b' are shown connected by a tie b^2 , the top of which serves as a seat to receive the impact of the logs when thrown upon the rolls nearest to the inlet of the machine, which is indicated by the arrow x in Figs. 1 and 9. It is obvious that a smooth bed may be furnished in place

of the series of rolls a , and only a single pair of feed-rolls provided to propel the logs. It is, however, desirable that mechanism be provided to press the end of each log forcibly against the preceding one when fed into the machine and before reaching the knife, to sustain the short ends of the logs during the cutting operation, as indicated in Fig. 10.

The machine shown in the drawings is designed to cut slices of uniform thickness for the manufacture of wood pulp, and the gage-plate I is therefore set at a suitable distance from the shear-plate. The thickness of the slice is varied by removing the plate I (which is shown in Fig. 9 attached removably to the bar II by screws I²) and substituting a similar plate of suitable thickness, or by inserting a packing of suitable thickness between the plate I and the beam H, to which it is fastened. Screws I² are shown in Fig. 9 to hold the plate I removably upon the beam to facilitate such change or adjustment or the replacement of the plate when worn.

The sole object of using the plates I and m' in the machine is to compensate for wear by the substitution of new plates when the old ones are too much worn to perform their functions.

The shear-plate m' is formed at its upper corner with a narrow strip projecting toward the knife, and it is obvious that such narrow strip greatly facilitates the sharpening or grinding of the shear-plate when its upper corner becomes worn by use. Without such narrow strip or projection in contact with the knife it would be necessary to grind off the whole surface of the shear-plate to renew the upper corner.

The principal function of the gage-plate I is not to gage the thickness of the slices, as that may be effected by suitable feeding mechanism, but to sustain the slice upon one side during the cutting operation and prevent it from slipping off of the shear-plate when the last cut is being made upon the short end of a log.

In Figs. 1 and 8 the log is shown ripped in half to furnish a flat side that it may be laid upon the bed-rolls a , and a guide b is shown projected above the bed-rolls at one side of the log to direct the same toward the aperture m in the head, Fig. 10, and to sustain the lateral thrust upon the log, which is produced by the draw cut of the knife. It is not, however, essential that the logs should be split, and a round log is shown in Fig. 11 in connection with a hand-lever for pressing the log toward the gage-plate when the knife is raised.

In Fig. 11 a strip n^3 is shown doweled by pins n^3 to the guide b , and provided with a row of holes n^4 to receive a pin n^5 upon the end of a pushing-lever n^6 . The pushing-lever is provided with a presser pin n^7 , projected toward the end of the log, and the pin n^5 may be inserted in any of the holes n^4 , so as to bring the presser-pin n^7 to bear upon the rear

end of the log and pry it toward the gage-plate I. The piece provided with the holes n^4 would require to be of nearly the same height as the log b , (shown upon the rolls a in Fig. 11,) that the lever n^6 may be extended across it, as shown, and the object of doweeling the strip to the guide b is to permit the removal of such perforated strip to substitute others of different heights to correspond with logs of different dimensions.

The pushing-lever n^6 is a desirable adjunct to the machine for feeding logs of some particular class that may resist the cutting action of the knife more forcibly than usual. With such logs the roll-frames a^2 would be removed by withdrawing the studs a^3 from the bearings a^4 and applying the perforated strip n^2 to the guide b . In such case the lower rolls a would operate as feed-rolls by their contact with the under side of the log, but the operator would be enabled to hold the log firmly up to the gage-plate during the cutting operation, and thus prevent it from slipping back under the dog y , as might be the case if the knife were dull or the wood particularly hard or knotty.

A dog y , to grip the logs during the cutting operation, is shown in Figs. 7, 8, and 9 in the form of a vertical slide secured movably upon the plate c by gibbs y' , and having an arm z projected above the knife-carriage g , to be lifted thereby near the upper end of its stroke.

In Fig. 9 the knife is shown at the extreme lower end of its stroke with the point of the dog bedded in the top of the log, against which it is pressed by weights z' , secured upon the top of the dog. In this figure the top of the carriage (to which the letter g is applied) is shown retracted below the arm z a little farther than the depth of the log l' . The arm is thus constructed that the dog may not be lifted until the edge of the knife has been raised above the top of the log. The log is thus held from its feeding movement (toward the gage-plate I) until the knife is clear from its upper surface, and the edge of the knife is thereby prevented from abrasion or injury by rubbing against the top of the log, which would result if the log were held back solely by the knife and slipped forward beneath it as soon as the edge of the knife reached the upper surface. If an intermittent feed were used, such dog would not be necessary to hold the log back from abrading the edge of the knife; but with such a feed the dog would be useful to clamp the log more rigidly upon the log-bed during the cutting operation than would be effected by the mere pressure of the weighted feed-roll a' .

It will be observed that by pivoting the roll-frames a^2 at one side only (as by the stud a^3) the front sides of the logs are rendered more accessible for inspection and management if the feed becomes obstructed. It will be noticed by reference to Figs. 9 and 10 that the shear-plate m' is made with a narrow projection toward the knife at its upper edge to

form a very narrow space in which the edge of the knife penetrates, and that the space between the plate and the supporter n is thus widened toward the bottom to form a clearance which greatly facilitates the escape of chips or foreign material which may be crowded by the knife into the narrow space between the upper edge of the supporter and shear-plate. The thickness of the supporter would obviously be less than that of the intended slice to permit the movement of the gage-plate I past the supporter. By forming the head which guides the knife-carriage of flat plates c and d the rigidity of the carriage is maintained during the cutting-stroke by the extended support afforded to its opposite faces, and the expense of fitting the knife-carriage to guides of special form is wholly avoided. Both economy and strength are secured by this construction.

Having thus set forth the nature of my invention, what I claim herein is—

1. In a log-crosscutting machine, the combination, with a shear-plate and a knife movable past the same for cutting the logs, of feed-rolls arranged to propel a series of logs toward the knife, the rolls farthest from the knife being propelled at a higher rate of speed than those adjacent to the knife, as and for the purpose set forth.

2. In a log-crosscutting machine, the combination, with a suitable bed for sustaining the logs, of a knife-carriage reciprocated transversely to the bed, with the knife g and gage-plate I , the slide movable vertically adjacent to the knife and provided with the dog y at its lower end, the weight z' upon the slide, and the arm z , projected from the slide in the path of the knife-carriage and lifted by the carriage during the feeding movement of the log, substantially as herein set forth.

3. In a log-crosscutting machine, the combination, with a suitable bed to support the logs, a knife reciprocated transversely to the bed, and a gage-plate movable with the knife, of feed-rolls rotated in the bed to propel the logs, and one or more rolls a , mounted in roll-

frames a^2 , pivoted at one end only by studs a^3 and provided with the weight-studs a^5 and removable weights w' , substantially as herein set forth.

4. In a log-crosscutting machine, the combination, with a suitable bed for sustaining the logs, of a head consisting in the plates c and d , sustained transverse to the bed, the knife-carriage g , carrying the knife k and gage-plate I and pivoted movably within the head by links e , and a crank and connections to the carriage for reciprocating the same, substantially as herein set forth.

5. In a log-crosscutting machine, the combination, with a suitable bed for sustaining the logs, of a head consisting in the plates c and d , fixed transverse to the bed, the knife-carriage g , carrying the knife k and gage-plate I and pivoted movably within the head by links e , the crank-shaft J' , arranged beneath the bed and provided with the crank J , the bell-crank K , pivoted upon the head, and the links g^2 and g^3 , the whole arranged and operated substantially as set forth.

6. In a log-crosscutting machine, the combination, with a suitable bed for sustaining the logs, of a head consisting in the plates c and d , fixed transverse to the bed, the knife-carriage g , carrying the knife k and gage-plate I and pivoted movably within the head by links e , the crank-shaft J' , arranged beneath the bed and provided with the crank J , the bell-crank K , pivoted upon the head, and the links g^2 and g^3 , the series of rolls a in the bed, the shaft q , connected with the shaft J' , as described, and gearing connecting the shaft q with the feed-rolls and adapted to rotate the rolls at different speeds, as and for the purpose set forth.

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

THOMAS S. CRANE

Witnesses:

J. VAN NEST, Jr.,
CHARLES M. LUM,