(No Model.) 2 Sheets—Sheet 1.

F. L. WILSON.

MACHINE FOR CUTTING VENEER FROM LOGS.

No. 394,898. Patented Dec. 18, 1888.

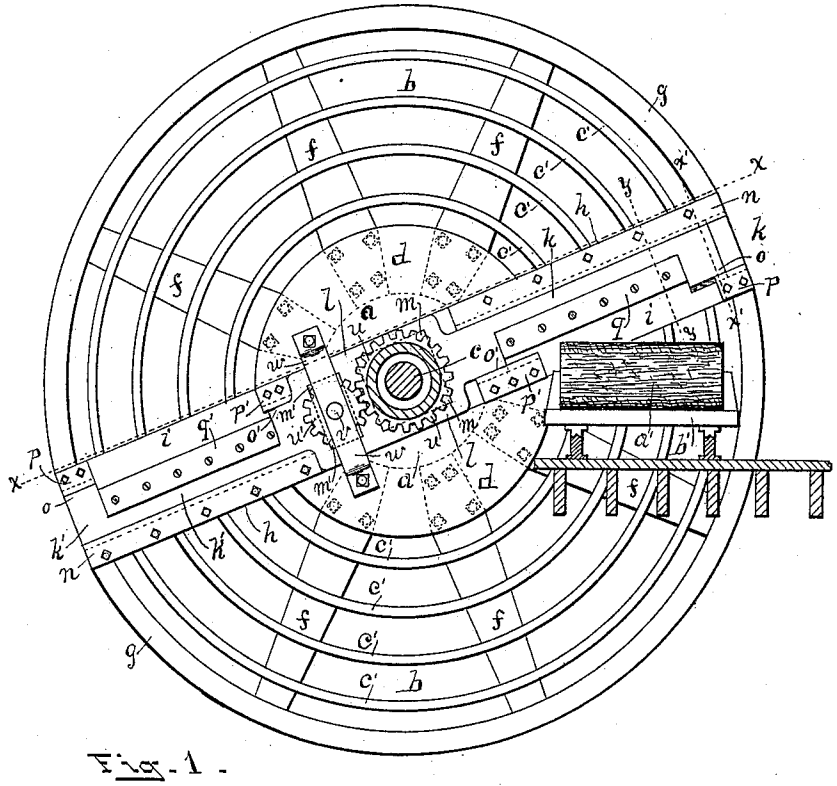


Fig. 1.

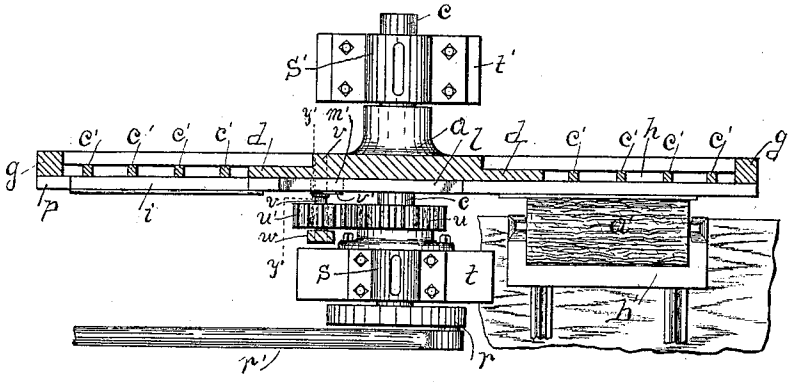


Fig. 2.

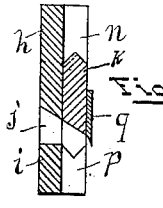


Fig. 3.

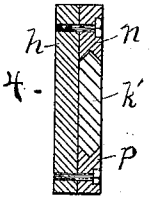


Fig. 4.

Attest:
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Jas. E. Thomas
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(No Model.) 2 Sheets—Sheet 2.

F. L. WILSON.

MACHINE FOR CUTTING VENEER FROM LOGS.

No. 394,898. Patented Dec. 18, 1888.

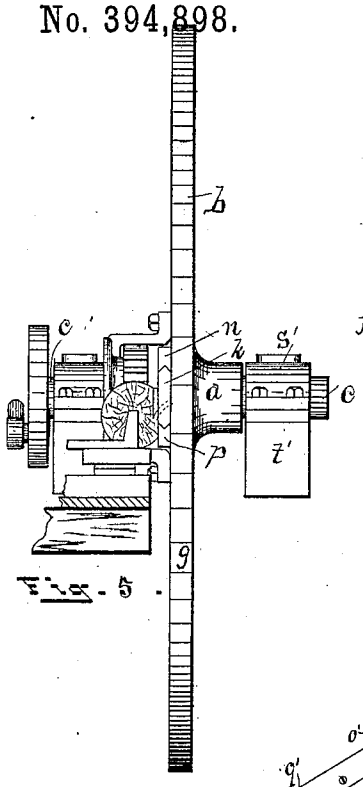


Fig. 5.

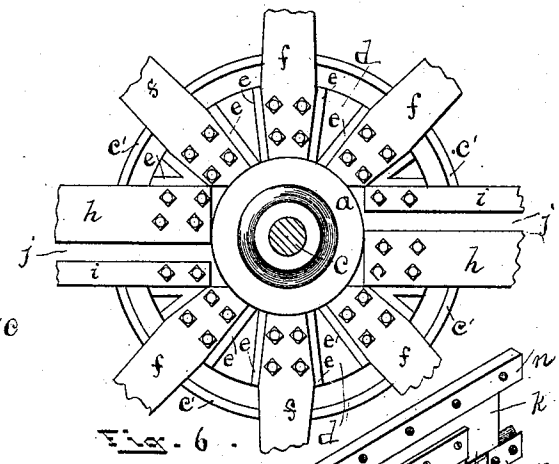


Fig. 6.

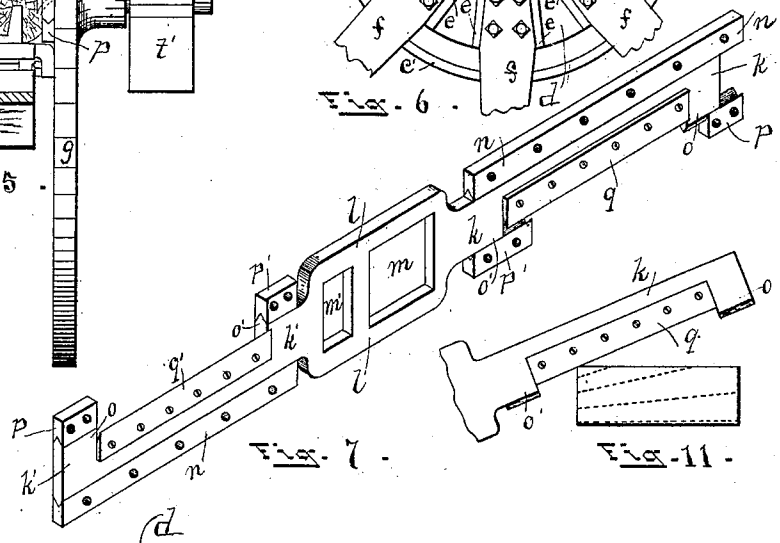


Fig. 7.

Fig. 11.

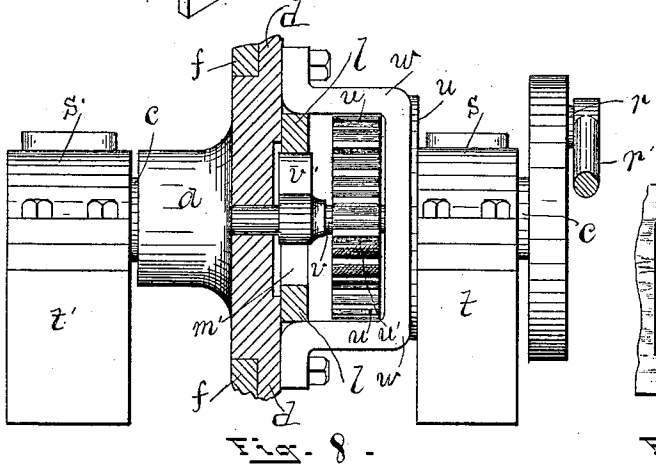


Fig. 8.

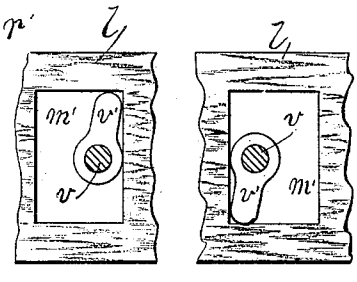


Fig. 9.

Fig. 10.

Attest:

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UNITED STATES PATENT OFFICE.

FITZLAND L. WILSON, OF WEST BAY CITY, MICHIGAN.

MACHINE FOR CUTTING VENEER FROM LOGS.

SPECIFICATION forming part of Letters Patent No. 394,898, dated December 18, 1888.

Application filed January 10, 1888. Serial No. 260,306. (No model.)

To all whom it may concern:

Be it known that I, FITZLAND L. WILSON, a citizen of the United States, residing at West Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Machines for Cutting Veneer from the Log; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to machines for cutting veneer or for slicing thin lumber from a log; and the objects of the invention are, first, to construct a machine which will be more rapid and effective in its operation of cutting the veneer from the log; second, to provide a veneer-cutting machine that will operate to advantage upon logs of small size, and that will cut the log entirely into veneer and avoid leaving a large portion at the last uncut to be lost as refuse; and a third object of my invention is to construct and arrange a machine for cutting veneer or thin lumber in such a manner that the cutting operation thereof upon the log shall be performed relative to the grain of the timber, that smoother and more even boards will be produced; and a fourth object of the invention is to provide a machine which will operate to cut veneer or thin lumber from soft or porous timber without steaming the log previous to the cutting operation, whereby the labor of the veneer-cutting operation is greatly reduced and a better and more desirable article of commerce will be produced; and a fifth object is to provide a knife having a high speed for cutting veneer or thin lumber, which operates to pass through and sever the fiber of the timber with greater ease and precision, and reduces the liability of doubling and drawing the fiber downward before the knife-edge.

A sixth object of the invention is to provide a veneer-cutting knife having a high-speed rotary motion with a reciprocating motion, whereby a draw or shearing cut is produced when the knife is passing through the timber, which reduces the tendency of the knife to "lead" or "draw" with the grain of the timber when passing through the log.

A seventh object is to arrange a veneer-cutting machine having knives provided with a rotary movement, and also with an intermittent to-and-fro movement in the direction of their length in such a manner that the equilibrium of the knife-bar will be changed during the cutting operation, so that the excess of weight is placed upon the knife making the cut and during the cutting operation, whereby the said knives will be held in position by the centrifugal action of the overbalancing end of the knife-bar during the intervals of inaction between the said reciprocating movements thereof.

The invention consists, chiefly, in a revolving wheel or disk of suitable size, and provided with radial cutting-knives which operate to slice boards or thin lumber from the side of a log or cant properly presented thereto, and in devices for producing a sliding or reciprocating movement of the radial knives while making a cut through the log, and also in the combination and arrangement of the several devices and parts which enter into the construction of the machine, as I hereinafter more fully describe and claim.

The devices which I employ to attain these objects are illustrated in the accompanying drawings, in which—

Figure 1 is a front side view in elevation of my improved machine, partly sectional. Fig. 2 is a horizontal section of Fig. 1, taken at x x. Fig. 3 is a section at y y in Fig. 1. Fig. 4 is a section at x' x' in Fig. 1. Fig. 5 is an end view of Fig. 1, looking from the right. Fig. 6 is a rear view of the hub and central disk and a portion of the radial arms. Fig. 7 is a perspective view of the knife-bar and slides detached. Fig. 8 is a side view of a vertical section of the central portion of the wheel, taken at the dotted line y' y'. Fig. 9 shows a portion of the yoke which joins the knife-bars, having a central vertical slot and the arm in position within the said slot at the beginning of the end or reciprocating movement of the knife-bar in one direction. Fig. 10 is the same ready for movement in the op-

posite direction. Fig. 11 shows the log and knife and the position of the cutting-edge as it passes through the log.

a represents the hub of a wheel, *b*, and *c* is a shaft upon which the hub *a* is mounted and secured, and *d* is a disk portion which surrounds the hub and extends outwardly toward the rim *g*, and is provided with the flanges *e* upon its rear surface for strengthening and supporting the radial arms *f*, which are secured by bolts to the disk between the flanges, and the outer ends are rigidly bolted to the rim *g*.

h and *i* are parallel arms extending from the hub *a* to the rim *g*, and are secured in position in a similar manner to the arms *f*, but having, however, the radial slots *j* between the arms.

k and *k'* are knife-bars placed upon the surface of the bars *h*, with their edges reaching to or partly over the slots *j* between the arms, and with their inner ends connected to each other by the yoke *l*, which is provided with an opening, *m*, through which passes the hub *a* and the shaft *c*, and the yoke is also provided with a slot, *m'*, which extends across the central portion of the yoke upon one side of the opening *m*.

The outer edges of the bars *k* and *k'* are each provided with a V projection extending the entire length of the arms and fitted into the V-grooved slides *n*, which are firmly secured to the faces of the arms *h*, and the opposite edges of the bars on the portions at the outer and also the inner ends thereof are each provided with a V projection, *o* and *o'*, which extend only a short distance from the ends toward the central portion of the arms and are fitted into adjustable V-grooved slides P and P', which are secured to the outer portions of the arms *i* and to the face of the disk *d*, and arranged to be adjusted to take up any looseness of the bar which may take place from wear or otherwise.

The fittings are herein shown and described as V slides and grooves, &c., as being the most convenient and easily constructed and adjusted for placing the knife-bar in proper alignment and to take up any looseness thereof; but other forms of slides may be used if more convenient, and I do not confine the construction of the slides entirely to the particular form described.

To the front or face side of the bars *k* and *k'* are secured in a suitable manner the knives *q* and *q'*. These knives *q* and *q'* extend from the V projections *o* to the projections *o'*, and are arranged with their cutting-edges coincident with their front surfaces, the bevel which forms the cutting-edge being from the rear side, or the side which lies upon the knife-bar, and the edge of the knife-bar is also cut away to conform to the contour of the bevel upon the rear side of the knives.

The shaft *c* is journaled into suitable boxes, *s* and *s'*, on the front and rear sides of the wheel, the front box, *s*, being supported upon a suitable block, *t*, and the rear box, *s'*, upon the support *t'*.

u is a gear-wheel of suitable size, passed over but not secured to the shaft, but is rigidly secured instead to the block or support *s* between the block and the hub *a* and concentrically with the shaft, so that when the shaft and wheel *b* revolve the gear-wheel *u* remains stationary.

u' is a gear-wheel provided with teeth in its periphery, which intermesh with the teeth in the wheel *u*, and are of a number equal to one-half of the number of teeth contained in the periphery of the rigid wheel *u*. The wheel *u'* is mounted upon a shaft, *v*, which is passed through the slot *m* in the yoke and suitably journaled into the disk *d*, while the opposite end of the shaft is journaled into and supported by a yoke, *w*, which reaches above and below the wheel *u'* and yoke *l*, with its ends turned inwardly and secured to the disk *d*.

v' is an arm, one end of which is provided with an opening and passed upon the shaft *v*, and is rigidly secured thereto in a position to bring the arm within the slot *m'*.

Suitable rotary motion is imparted to the shaft *c* and the wheel *b* by means of the crank *r* and a pitman, *r'*, the pitman being connected with a steam-engine cylinder, (or other suitable means may be employed for revolving the shaft, if desired;) and *a'* represents a log to be cut into veneer, and is properly supported and firmly secured (in any convenient manner) to the carriage *b'*, and is presented with its side to the face of the wheel, and the size of the wheel is regulated to the length of the logs to be cut or operated upon, and the carriage is provided with any proper feeding mechanism (not herein shown) which moves the log intermittently toward the face of the wheel *b* and the cutters *q q'*.

As the wheel *b* is revolved, the gear-wheel *u'* is carried by the shaft *v* around the stationary wheel *u*, and the number of teeth in the wheel *u'* being one-half of the number of teeth in the wheel *u*, two revolutions of the wheel *u'* are effected while the wheel *b* performs one revolution, and the arm *v'* being revolved by the wheel *u'*, and operating upon the slot *m*, effects a movement of the bars *k* and *k'* and the cutter-knives outward and inward with each revolution of the wheel *u'*, and the wheel *u'*, making two revolutions while the wheel *b* makes one revolution, causes each of the cutter-knives to be reciprocated twice during one revolution of the wheel *b*.

The arm *v'* is arranged relative to the wheel *u* so that the knife entering the log will be moved in the direction of its length toward the rim of the wheel during the period it is making its cut through the log, and the width of the slot *m* is regulated so that the arm *v'* will move from one side of the slot to the other while the knife which has made the last cut passes the lower portion or quarter of its revolution, so that when one knife is moved outward in the direction of its length while

passing the downward portion of its revolution and while cutting the log the opposite knife is drawn inwardly while passing the upward movement of its revolution, and the reciprocating movement of the knives and bars ceases during the period the arm v' is passing from one side of the slot m to the opposite side thereof.

As shown in Fig. 11, the log is arranged relative to the knives in such a position that the knife passing over the downward portion of its revolution first begins the cut in the log at its inner end, so that the cutting-edge thereof will, when passing through the wood, lie diagonally to the grain thereof, which, together with the reciprocating movement of the cutters, obtains a draw or shearing cut as the knives pass through the log, which greatly reduces the power and energy necessary for driving the knives through the log, and also reduces the strain upon the operating parts of the machine, as the knife making the cut first buries its heel or portion nearest the hub into the wood, so that the energy of the impact of the wheel and bars is gradually expended upon the log without perceptible shock or jar. The knife-bar being moved outwardly while the knives are passing through the log, the end of the bar which then extends outward to the greatest distance will slightly overbalance the opposite end, and the centrifugal force of the heavy end of the bar retains the bar in position while the arm v' passes from one side of the slot to the other, and during the period that the heavy end of the bar is passing over the lower quarter of its revolution, and during which period the log is moved by the feeding devices toward the knives for presenting a new cut thereto.

c' are gage-pieces which are secured to the face of the wheel b for the purpose of preventing any projecting portion of the log from passing between the spokes or radial arms of the wheel.

The knife-edge passing through the log at an angle (as shown in Fig. 11) with the grain or fiber of the timber, and also having a sliding movement lengthwise of the log during the cutting operation, produces very smooth and uniform lumber or veneer, and the operation of the knives is so rapid and accurate that a veneer of superior quality is produced at a cost greatly less than by the old machines and methods, and by operating the cutters at an angle with the grain of the timber the board or veneer is rolled away from the log with the bend partially across the fiber of the wood, which avoids the checking and blistering of the lumber which occurs when the cutting is performed with the knife-edge parallel with the grain.

I have herein described as having the cutting-knives moving outwardly during their cutting operation; but I do not confine my invention entirely to that movement, as an inward movement can be obtained by the same mechanism by shifting the arm v', which will operate in a similar manner, and would be preferable in cutting many kinds of timber into veneer or thin lumber. It is also plainly evident that the form of the arm v' and its location upon the shaft v may be changed, if desired, and not depart from the spirit of my invention, for of course the form or location of the arm is not material, (it being an ordinary crank movement,) so long as the operation of the parts and the result produced thereby are the same.

The grooved guides P and P′ may be firmly set up to the knife-bars and the bars held thereby rigidly in position, first, however, placing the knife-bars in position to balance each other and removing the arm v', and then the wheel may be revolved without imparting to the knives a reciprocating motion, which is an advantage in cutting many kinds of timber—as hard wood or timber having compact fiber and minute sap-cells, &c.

A great advantage is obtained by the use of the radial knives moving at a very high speed through the timber, as the grain of the timber divided by devices moving with velocity is much less liable to eat in or sliver, and this result more especially obtains with the cutting of thin veneer or timber, which is usually produced from logs which have a curled or knurled grain and present every condition unfavorable to the cutting of smooth and even lumber.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a log-carriage and a wheel having its side face presented to the carriage and mounted upon a shaft having a rotary motion, of one or more radial bars secured by slides to the side face of the said wheel and carrying one or more cutter-knives and capable of a reciprocating movement, and suitable devices for producing the said reciprocating movement, whereby the timber is cut shearingly, substantially as set forth.

2. In a machine for cutting veneer from the log, the combination of a wheel mounted upon a shaft having a high-speed rotary motion with the radial bars k and k', carrying cutter-knives and secured to the face of the wheel on opposite sides of the hub by grooved slides, and having their inner ends connected together by a yoke and provided with a reciprocating motion, whereby the timber is cut shearingly, substantially as and for the purpose described.

3. In a veneer-cutting machine, the combination, with a log-carriage and a wheel mounted upon a shaft having a rotary motion, of the radial knife-bars carrying cutter-knives and adjustably secured to the face of the said wheel, and having their inner ends connected by a yoke and provided with an intermittent to-and-fro movement in the direction of their length, substantially in the manner and for the purpose set forth.

4. In a veneer-cutting machine, the combination, with a log-carriage and a wheel suit-

ably mounted upon a shaft and provided with a rotary motion, and having radial knife-bars carrying cutter-knives and adjustably secured to the face of the wheel on opposite sides of the hub, of a yoke, as *l*, having its opposite ends joined to the inner ends of the knife-bars and provided with a transverse slot, an arm, *v'*, within the said transverse slot, a shaft, *v*, passed through the said slot and carrying the arm, and journaled to the said wheel between its axis and its periphery, and having a revolution around the axis of the wheel in connection therewith and an independent revolution around its own axis, substantially as and for the purpose set forth.

5. In a veneer-cutting machine, the combination, with a log-carriage and a wheel, *b*, mounted upon a shaft having a rotary motion, and provided with radial knife-bars carrying cutter-knives and adjustably secured to the face of the wheel on opposite sides of the hub thereof, a yoke having an opening for the said hub and connected by its opposite ends to the inner ends of the said knife-bars, and provided with a transverse slot, as *m'*, and a gear-wheel, *u*, placed concentrically with the said shaft and secured to a rigid support, of a shaft, *v*, passed through the said slot *m'* and journaled into the wheel *b*, and capable of revolution around its own axis, and also around the periphery of the said wheel *u*, a gear-wheel, *u'*, mounted upon the shaft *v* and engaging with the wheel *u*, and an arm, *v'*, mounted upon the shaft *v* within the slot *m'*, substantially as and for the purpose set forth.

6. In a machine for cutting veneer from the log, the combination, with the log-carriage, the shaft *c*, having a rotary motion, and a wheel, *b*, mounted upon the shaft, the radial bars *k* and *k'*, carrying cutter-knives and secured on opposite sides of the hub and against the face of the wheel by grooved slides, the yoke *l*, coupling the inner ends of the bars together and provided with an opening, *m*, and a slot, *m'*, of a rigid gear-wheel, *u*, surrounding the said shaft *c*, the gear-wheel *u'*, engaging with the gear-wheel *u*, a shaft, *v*, carrying the gear-wheel *u'*, and passed through the slot *m'* and journaled into the disk *d*, and the arm *v'*, secured upon the said shaft *v* within the slot *m'*, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FITZLAND L. WILSON.

Witnesses:
J. E. THOMAS,
W. A. WRIGHT.