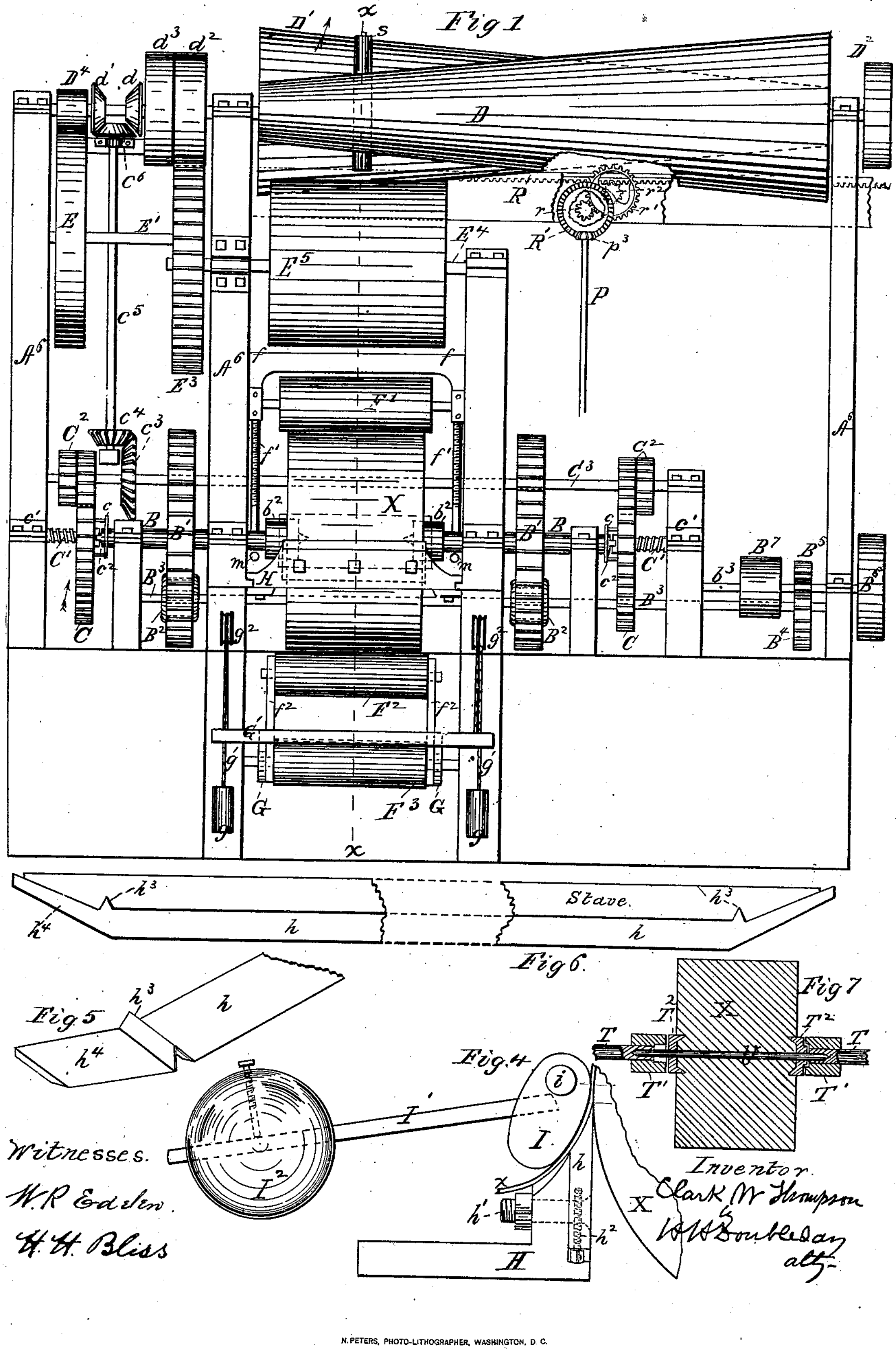
2 Sheets—Sheet 1

C. W. THOMPSON.

Machine for Cutting Veneers.

No. 211,436. Patented Jan. 14, 1879.



Witnesses.
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Fig 2

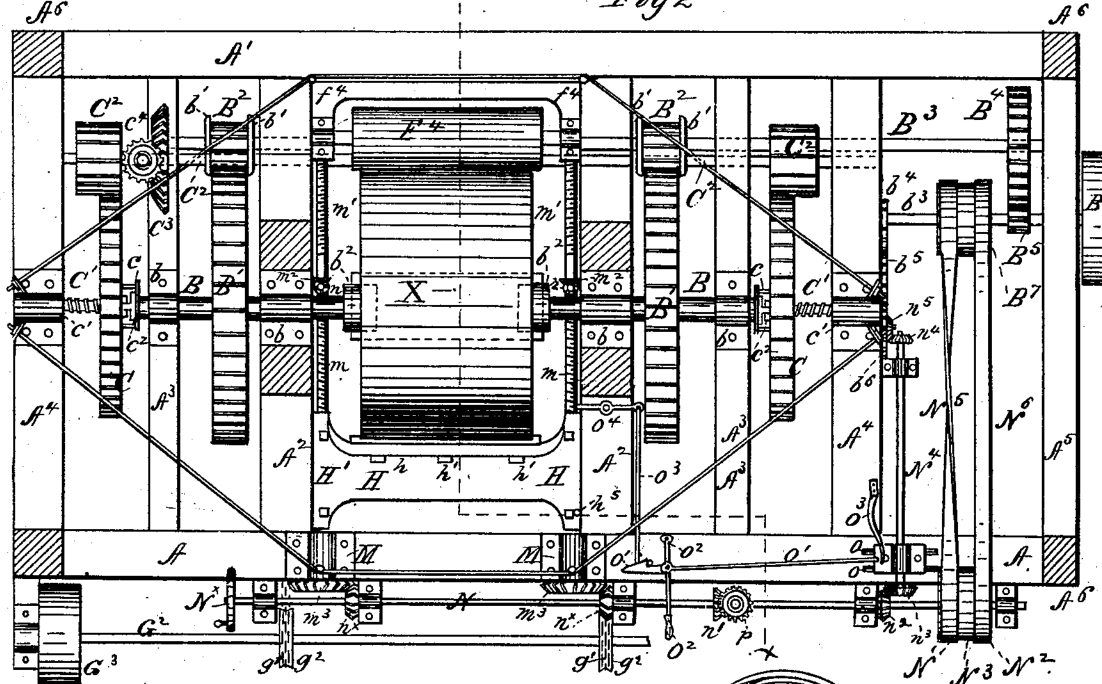


Fig. 8.

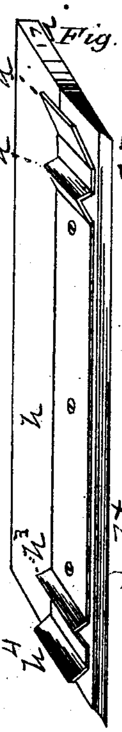
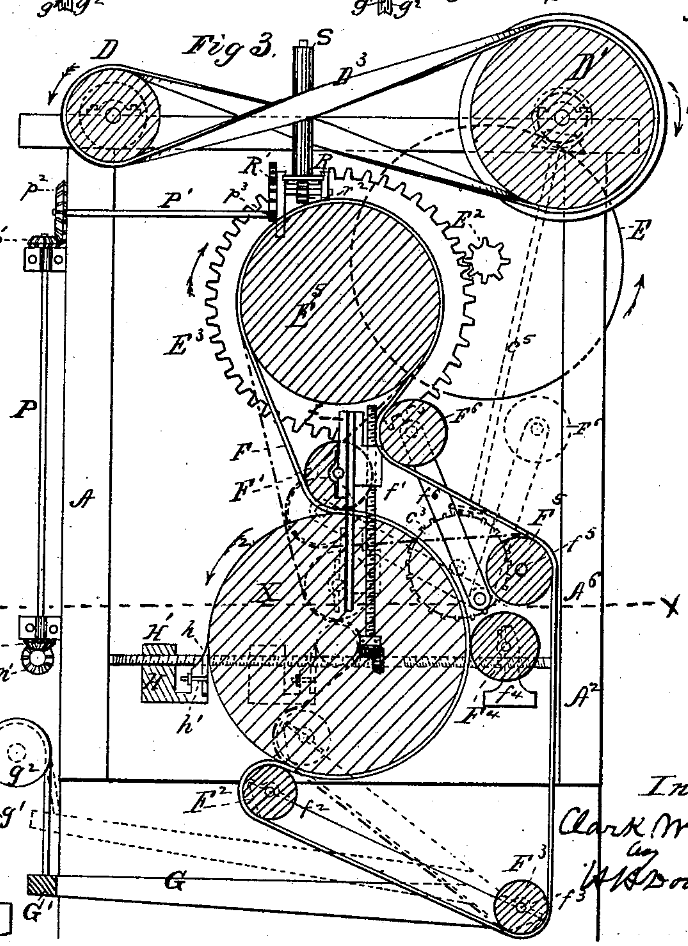


Fig 3.



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UNITED STATES PATENT OFFICE.

CLARK W. THOMPSON, OF WELLS, MINNESOTA.

IMPROVEMENT IN MACHINES FOR CUTTING VENEERS.

Specification forming part of Letters Patent No. **211,436**, dated January 14, 1879; application filed May 1, 1877.

To all whom it may concern:

Be it known that I, CLARK W. THOMPSON, of Wells, in the county of Faribault and State of Minnesota, have invented certain new and useful Improvements in Machines for Cutting Veneers; and I do hereby declare that the following is a full, clear, and exact description thereof, 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.

Figure 1 is a front elevation. Fig. 2 is a top or plan view of that part of the machine which lies below the line *x x*, Fig. 1. Fig. 3 is a vertical section taken on line *x x*, Fig. 2; Fig. 4, an end view of the knife, knife-carriage, and the eccentric presser-bar. Fig. 5 is a perspective view of a portion of the knife. Fig. 6 is a plan view of the knife and an edge view of the cut veneer, and Fig. 7 shows devices for supporting the log. Fig. 8 is a perspective view, detached and enlarged, of the cutting, crozing, and chamfering knife.

The bed of the frame-work consists of the sills A A^1, girts A^2 A^2 A^3 A^3 A^4 A^4 A^5. (See Fig. 2.) From this rise four corner-posts, A^6, and upon these posts are mounted suitable plates or cap-pieces.

I will first describe the devices for supporting the log X.

B B are spindles, mounted in bearings *b*, so as to rotate and slide endwise therein. B^1 B^1 are spur-gears, secured to shafts B B by splines. B^2 B^2 are pinions, keyed to shaft B^3 and meshing with spur-wheels B^1 B^1, these pinions having flanges b^1, of such diameter as to overlap and embrace both ends of the cogs on spur-wheels B^1, for a purpose which will soon be explained.

B^4 is a spur-gear, keyed to the shaft B^3, and driven by a pinion, B^5, which, in turn, is driven by a band-pulley, B^6, keyed to the same shaft. b^2 b^2 are flanges or dogs, secured to the inner end of each shaft B. C C are spur-gears, keyed to screw-threaded shafts C^1, which work in correspondingly screw-threaded boxes c^1 upon girts A^4. *c c* are rings, attached to spur-gears C C by means of studs or arms, the rings fitting in grooves formed for their reception in the outer ends of the shafts B B. These ends of shafts B have center-points on them, with which seats in the ends of screw-shafts C^1 engage. (See Fig. 1 at c^2.)

C^2 C^2 are spur-pinions, mounted on shaft C^3 and meshing with spur-gears C C. The teeth of pinions C^2 are twice as long as the teeth of spur-gear C. c^3 is a bevel-gear on shaft C^3. c^4 is a bevel-pinion on shaft c^5, meshing with bevel-gear c^3. c^6 is a bevel friction-pulley on the upper end of shaft c^5, and made to engage alternately with bevel friction-pulleys d d^1, which are mounted on the shaft of cone-pulley D^1.

Pulley B^6 is belted to pulley D^2 on the shaft of cone-pulley D. Hence the speed of rotation of the spindles B B is determined by the speed of cone-pulley D, which is connected by belt D^3 with cone-pulley D^1, (see Fig. 3;) and as the motive power of uniform speed is applied to cone-pulley D^1 through pulley d^2 on its shaft, it is apparent that the speed of spindles B B and of the log E (which may be driven by these spindles) can be regulated at will by shifting the position of belt D^3 upon the cone-pulleys. d^3 is a loose pulley on the shaft of cone-pulley D^1.

I employ other devices for rotating the log, as follows: D^4 is a friction-pulley on the shaft of cone-pulley D^1. E is a larger friction-pulley, mounted on shaft E^1, and engaging with friction-pulley D^4. E^2, Fig. 3, is a spur-pinion on shaft E^1, meshing with spur-gear E^3 on shaft E^4, which carries a large drum, E^5. F is a belt, driven by drum E^5. This belt is kept in contact with the log and under proper tension as follows: F^1 is a roller, mounted in a frame or yoke, *f*, which slides vertically in the supporting frame-work while actuated by screws f^1. F^2 is a roller mounted in vibrating arms, which are pivoted at f^3, which is the center of roller F^3. F^4 is a roller mounted in a frame or yoke, f^4, which slides horizontally upon the frame-work. F^5 is a roller mounted upon stationary bearing f^5. F^6 is a roller mounted in vibrating arms f^6. The belt F wraps around about one-half of the circumference of the log, and is kept in close contact therewith by means of these rollers.

G, Fig. 3, is a lever, pivoted at f^3, and connected with arm f^2. There are two of these levers, one at each end of rollers F^2 F^3. G^1 is a cross-bar attached to the free ends of levers G. *g g* are weights. g^1 g^1 are cords attached to weights g g and cross-bar G^1, and running over pulleys g^2 g^2, to press belt F and roller F^2 firmly against the under side of the log.

H H′ is the knife-carriage, mounted to slide horizontally in the girts A^2 A^2. h h^3 h^4 is the knife, secured to the inner vertical face of its carriage by means of bolts h^1, and is adjusted vertically by set-screws a^2. (See Fig. 4.)

As represented in Figs. 5, 6, and 8, the knife consists of a straight cutting-edge, h, extending the entire width of the log, and beveled upon its outer face, but straight or flat upon its inner face—that is to say, the face which engages with the uncut portion of the log.

The portions h^3 h^3, which cut the croze, and the parts h^4 h^4, which chamfer the edges of the veneer, are arranged upon the beveled side of the knife, and a short distance below the termination of the bevel, as is plainly shown in Fig. 8.

Thus it will be seen that by the use of this construction of knife I am enabled to cut a veneer which is flat and smooth upon one side—that side which is shaped or formed by the inner flat part of the knife—and also cut the croze and chamfer upon the opposite side of the sheet—that is to say, the side which in cutting passes down upon the beveled side of the knife—the smooth or unbroken side of the sheet moving in contact with a presser-bar, I, to be hereinafter more fully described.

While I prefer to make the outer side of my knife with a bevel, as indicated in Fig. 8, and have referred to it as being beveled, I do not wish to be limited to making it in this form, but only refer to it as being thus beveled to distinguish that side of the knife from the inner side, which is in contact with the uncut portion of the log.

I is an eccentric presser-bar, pivoted at i, and carrying a lever, I^1, and an adjustable weight, I^2. This presser-bar performs two functions: first, it supports the veneer against splitting as the knife is cutting it from the log; and, secondly, it materially assists in straightening the sheet by crimping or upsetting the wood upon that side of the veneer which is next to this roller, it being apparent that this operation tends to prevent the checking of the inside of the sheet, which might otherwise occur in straightening, in consequence of the fact that the inside of the veneer represents a smaller circle than the outside does.

As shown in Fig. 4, this presser-bar is oblong in cross-section, and is mounted eccentrically upon its axis i. Another advantage which grows out of pivoting it thus eccentrically, and so arranging its center of rotation relatively to the cutting-edge of the knife, is that the bar will swing upon its shaft to accommodate any increase in the thickness of the veneer; and in case of such thickness and the consequent difference between the circles represented by the inner and outer faces of the veneer, it (said bar) will produce a corresponding increase in the pressure of the bar upon the outer face of the veneer, which in turn will correspondingly upset the fiber of the wood upon the outside of the sheet without necessitating a change in the position of the weight I^2. This increase in the pressure upon the veneer will be readily understood when it is noticed that, in case of an increase of the thickness of the veneer, such veneer will engage with the presser-bar at a point higher upon the bar relative to its center of rotation or vibration, and of course the leverage of the weight will be correspondingly increased; and it will be readily understood that, as the croze and chamfer cutters are rigidly supported upon the knife h at a short distance below the edge of said knife, and upon that side of said knife which is next to the eccentric-roller or presser-bar I, this combination and arrangement of parts insures a great uniformity of croze and chamfer.

m m^1 m m^1 are two shafts, each provided at one end with a right-hand screw-thread, and at the other end with a left-hand screw-thread. The front ends of these shafts are mounted in boxes M M on sill A, (see Fig. 2,) in such manner as to rotate freely therein, but to have no longitudinal movement, and carry bevel-wheels m^3 m^3.

The ears H′ H′, which rise from the ends of knife-carriage H, have screw-threads, with which the threads on the front ends of shafts m m^1 engage; and the roller frame or yoke f^4 has at each end screw-threaded bearings, with which the screw-threads on the rear ends of shafts m m^1 engage, Figs. 2 and 3.

N is a shaft, carrying bevel-pinion $n^\times$ n^1 n^2, hand-wheel $N^\times$, and loose pulleys N^1 N^2, and keyed pulley N^3.

A shaft, N^4, is arranged at right angles to shaft N, and connected therewith by bevel-pinion n^3, meshing with pinion n^2.

n^4 is a bevel pinion on the opposite end of shaft N^4, meshing with a pinion, n^5, which is attached to and carried by a spur-gear, b^6. b^5 is an intermediate gear or idler, meshing with both the spur-gear b^6 and a spur-pinion, b^4, on shaft b^3, which is driven by band-pulley B^6.

Spur-gear b^6 is a number of times—say, six times—larger than pinion b^4; hence it is apparent that six revolutions of shaft b^3 will be required to produce one revolution of screw-shafts m m^1.

B^7 is a wide band-pulley, keyed to shaft b^3, and connected with loose pulleys N^1 N^2 by belts N^5 N^6, belt N^5 being crossed. A bearing, O, carrying one end of shaft N^4, slides longitudinally of sill A.

O^1 is a link, connected at one end with bearing O, and armed at the other end with a latch-hook, o^1. O^2 is a hand-lever, pivoted to sill A and passing through a slot in link O^1, near the latch-hook o^1. O^3 is a spring, secured to sill A^4, the free end of the spring pressing against the bearing O to throw pinion n^3 out of mesh with pinion n^2 whenever the latch-hook o^1 is released from pin o^2 in sill A, as will be readily understood without further explanation.

When pinion n^3 has been thus disengaged from pinion n^2, belt N^5 may be shifted upon keyed pulley N^3, when the shaft N and screws $m\ m^1$ will be driven in a direction the reverse of that in which it was driven by bevel-gears $n^2\ n^3$ from shaft N^4, and its speed, together with the speed of screw-shafts $m\ m^1$, will be increased from one revolution, while shaft b^3 makes six, to one revolution for each revolution made by said shaft b^3—in other words, it will be increased sixfold.

Any ordinary or desired shifting-lever or other device may be employed for shifting belts $N^5\ N^6$ from the loose pulleys to the tight pulley N^3.

$m^2\ m^2$, Figs. 2 and 3, are bevel-pinions on the lower ends of screws $f^1\ f^1$, and meshing with corresponding pinions of the same size on shafts $m\ m^1$.

The screw-threads $m\ m^1 f^1$ are all of the same pitch, so that, as they all revolve in equal times, the knife-carriage H and rollers $F^1\ F^4$ are simultaneously advanced toward or withdrawn from a common center, which is the spindles B B.

P is a vertical shaft, carrying at its lower end a bevel-pinion, p, which meshes with pinion n^1 on shaft N, and carrying at its upper end a similar pinion, which meshes with a pinion, p^1, meshing with a bevel-gear, p^2, on one end of a horizontal shaft, P′. (See Fig. 3.)

p^3 is a lever-pinion, on the inner end of shaft P^1, meshing with bevel-gear R′, which carries a spur-pinion, r, meshing with a spur-gear, r^1, which, in turn, carries a spur-pinion, r^2, meshing with a cogged rack, R. This cogged rack slides longitudinally of the machine, between the cone-pulleys D D^1, in or upon ways fitted for its reception, (see Figs. 1 and 3,) and carries with it a roller-standard or belt-shifter, S, which is arranged between the two lines of the belt D^3, and serves to shift said belt upon said pulleys.

My machine may be operated as follows: The log being in the position shown, it may be driven by the spindles B and clutches or flanges b^2 only, or by the belt F, or by these two agencies acting conjointly, as circumstances may require.

I will first describe the method of driving by the spindles. The power is applied to band-pulley d^2, Fig. 1, which drives cone-pulley D^1 in the direction indicated by the arrow 1, Fig. 3, and, by means of the crossed belt D^3, drives cone-pulley D and band-pulley D^2. A belt from pulley D^2 drives pulley B^6, shaft b^3, and spur-pinion B^5. Pinion B^5 drives spur-gear B^4, shaft B^3, spur-pinions B^2, spur-gears B^1, and the spindles B, which, through their flanges or dogs b^2, support and rotate the log X in the direction indicated by the arrow 2.

The belt F, which partially wraps the log, is driven as follows: A friction-pinion, D^4, on the shaft of cone-pulley D, drives friction-pulley E, spur-pinion E^2, spur-gear E^3, shaft E^4, and drum E^5. The belt F is kept in close contact with log X by means of pulley F^2, forced up toward the log by weights g, acting through levers G f^2, and roller F^1 is forced down toward the log, as will be explained. Roller F^6, on pivoted arm f^6, maintains a proper tension of the belt. As the log is rotated in the direction indicated by arrow 2 the knife cuts a veneer, chamfers its edges, and crozes it, as will be readily understood without further explanation.

It will be observed that the train of gears $m^3\ n^\times\ n^2\ n^3\ n^4\ n^5\ b^4\ b^5\ b^6$, which rotates the feeding-screws $m\ m^1$, derives its motion from shaft b^3, which also drives the train of gears which rotates the spindles B B, and the relation in speed between these two trains of gearing is such that as the log makes one complete revolution the knife is advanced just the thickness of the sheet of veneer; and even if the belt be removed from pulleys $D^2\ B^6$, and the log be driven by belt F only, the gearing would continue to advance the knife at the proper speed for cutting a veneer of the desired thickness.

I have found that in order to produce the best results the veneer should be cut at a uniform speed; and as the diameter of the log is constantly decreasing, I maintain the desired speed by increasing the number of revolutions of the log within a given time by means of the cone-pulleys D D^1; and it will be readily seen that as shaft N revolves and moves the knife toward the center of the log the cogged rack R, actuated by shafts N P P′ and their connecting-gears, and carrying the belt-shifter S, moves the belt D^3 toward the largest end of cone-pulley D^1 and the smaller end of cone-pulley D, thereby increasing the speed of the gearing; and the belt F also rotates the decreasing log faster, when said belt is used.

When the log has been cut down small enough, pin h^5 on the knife-carriage strikes the inner end of pivoted lever o^4, thus tripping the latch o^1 from pin o^2, when the spring O^3 thrusts the pinion n^3 out of gear with pinion n^2, which stops the advance of the knife.

Belt N^5 is now shifted upon pulley N^3. The feed-screws $m\ m^1$ and screws f^1 are rotated in the opposite direction, and the knife and roller $F^1\ F^4$ are simultaneously withdrawn from the log, and the belt-shifter S is returned to the position which it occupied when the log was of full size.

In order to remove the uncut portion of the log from the machine, I force the friction-pinion c^6, Fig. 1, against one of the friction-wheels $d\ d^1$ in such manner as will screw the screw-shafts C^1 into their bearings c^1, (by means of the connecting-train of gearing,) thus withdrawing spindles B and the dogs or flanges b^2 from the ends of the log, the spindles sliding within the spur-gears B^1, and the spur-gears C sliding upon the long pinions C^2; or, when preferred, spur-gears B^1 may be keyed to the spindles, and pinions B^2 constructed to slide upon shaft B^3. The motion of belt F is never stopped by releasing friction-wheel E from pinion D^4.

Weights g are now lifted so as to permit arms f^2 and rollers F^2 to fall so low that a new log can be rolled above roller F^2 upon suitable ways, the log being hoisted into position between the knife-carriage and rollers F^1 F^2 F^4.

The knife and rollers F^1 F^4 are now advanced toward a common center by means of the band-wheel $N^\times$ or belt N^6 and the screw-shafts m m^1 f^1, the weighted roller F^2 yielding to permit the log to take a central position and after the log has been thus centered the flanges or dogs b^2 are forced against or into its ends by a reverse movement of the screw-shafts C^1.

The knife and rollers F^1 F^4 are now withdrawn to such distance as will cut a thin veneer from the greatest diameter of the log, the shipping-lever O^1 moved into the position shown in Fig. 2, and the cutting continued. It will, of course, be understood that under ordinary circumstances I steam the log before cutting.

I have found that in order to produce the best results the veneer should be cut at a uniform speed, and as the diameter of the log is constantly decreasing the number of its rotations within any given time should be increased. This result I secure by shifting the crossed belt D^3 toward the larger end of the driving cone-pulley D^1, which, as the belt is thereby moved toward the smaller end of the driven cone-pulley D, increases the speed of the driven pulley and of the gearing which rotates the log; and as the mechanism which shifts this crossed belt D^3—that is, the rack R, pinion r^2, and standard S—is driven by shafts P P′ from shaft N, which also drives the feeding-screws m m^1, it is apparent that the speed of rotation of the log by the gearing and spindles may be regulated to correspond exactly with the decreasing diameter of the log.

In Fig. 7 I have shown a method of mounting the log, which I propose to use under some circumstances.

T T represent the ends of spindles similar to spindles B. The inner end of each spindle is socketed to receive one end of a shaft, U, which passes through the log, and is further provided with a clutch-faced flange, T^1. T^2 is a corresponding clutch-faced flange, rigidly attached to shaft U. T^3 is a similar clutch-faced flange, secured to shaft U by means of a key, t, which passes through slots in the flange and the shaft after the jaws of the clutches have been driven into the log, as shown in the drawing, by means of a screw-press or by blows from a sledge-hammer. G^2 is a shaft to which the sprocket-wheels g^2 are keyed. G^3 is a band-pulley, keyed to shaft G^2; and it will be seen that by applying power to pulley G^3 the log X may be lifted into place between the spindles when its weight is too great to be counterbalanced by weight g.

An eccentric-lever or other suitable appliance should be used in combination with the friction-wheels D^4 E, to insure that the drum E^5 stands still while the dogs b^2 or the points of the spindles B (shown in dotted lines, Fig. 1) are withdrawn from the log; but as soon as a new log is mounted upon these spindles the belt F should be put in motion, to insure that its movement shall correspond substantially with that imparted to the log by the spindles.

What I claim is—

1. In a machine for cutting veneers, the combination, with the log-supporting spindles, of right and left handed screws C^1 C^1, screw-threaded boxes c^1 c^1, and mechanism connecting the screws C^1 C^1 with the driving-shaft of the machine, substantially as described, whereby the spindles can be simultaneously withdrawn from the log, substantially as set forth.

2. The combination, with the spindles B B and screw C^1 C^1, of the gears B^1 C B^2 C^2 and shafts B^3 C^3, whereby the spindles may be withdrawn from the log without throwing the gears B^1 C^1 out of mesh or stopping the rotation of the spindles.

3. In a machine for cutting veneers, a belt constructed to partially wrap and drive the log, substantially as set forth.

4. In a machine for cutting veneers, the combination, substantially as set forth, of the following elements, namely: spindles which engage with the ends of the log and rotate it, a lifter which elevates the log between the spindles, and guides which are advanced simultaneously upon opposite sides of the log to center it relative to the spindles.

5. In combination with the belt F, an automatic belt-tightener advanced upon the log by a positive mechanical movement.

6. In a machine for cutting veneers, the combination of the vibrating roller F^2 and the belt F, for lifting the log to the spindles, substantially as set forth.

7. In a machine for cutting veneers, the combination, with the feeding-screws m m^1 and shaft N, of the slow-speed gearing and the belt-pulleys N^1 N^3, substantially as set forth.

8. In a machine for cutting veneers, the combination, with the knife h, of the yielding eccentric pressure-bar I, substantially as set forth.

9. In a machine for cutting veneer, the combination, with the yielding eccentric presser-bar I, of the knife h and the crozing and chamfering edges h^3 h^4, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CLARK W. THOMPSON.

Witnesses:
H. H. DOUBLEDAY,
M. P. CALLAN.