2 Sheets—Sheet 1.

H. T. BARTLETT.

MACHINES FOR CUTTING VENEERS.

No. 174,056. Patented Feb. 29, 1876.

FIG 1

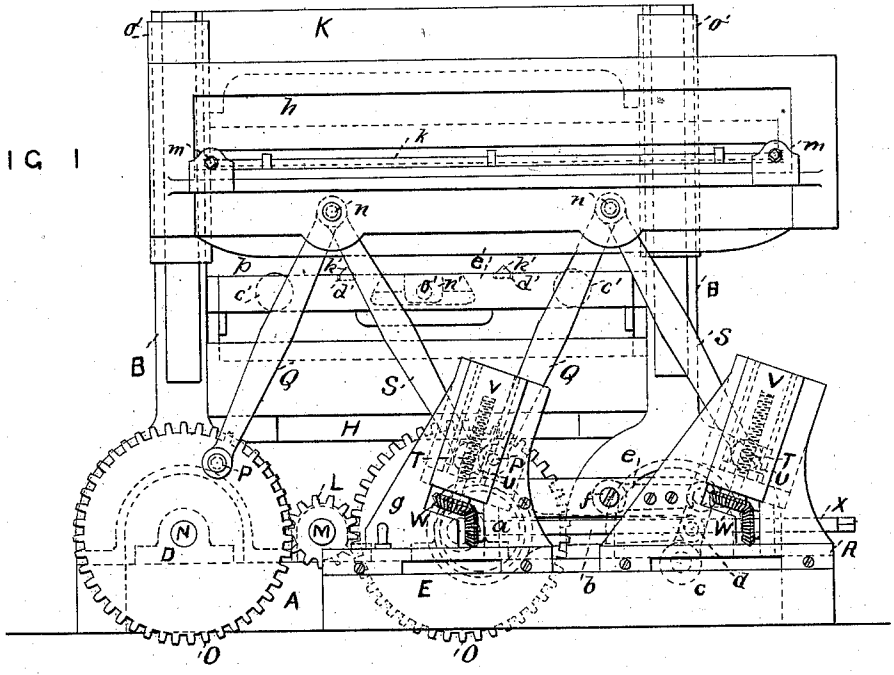
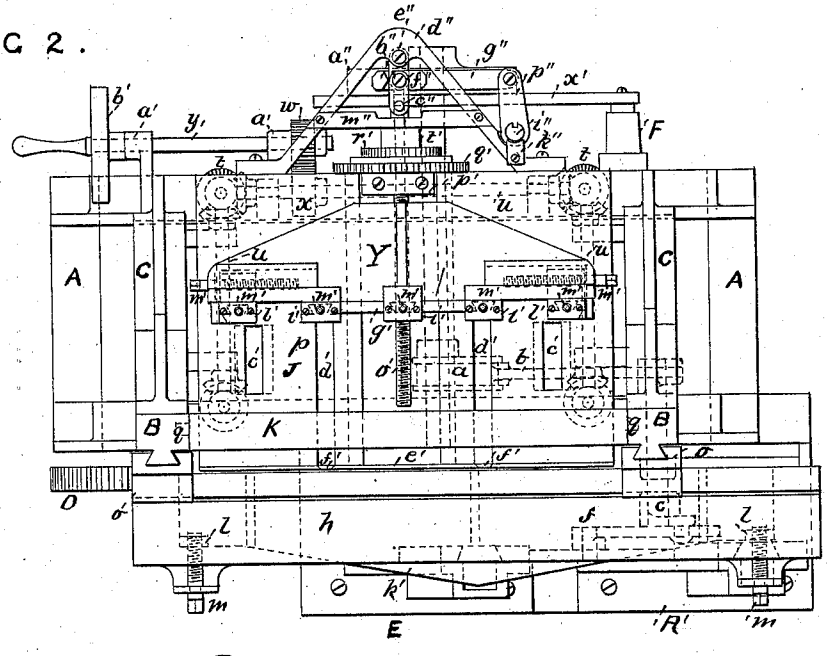


FIG 2.



WITNESSES.

Geo. W. Read

Saml. C. Hyde

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INVENTOR.

2 Sheets—Sheet 2.

H. T. BARTLETT.

MACHINES FOR CUTTING VENEERS.

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FIG. 3.

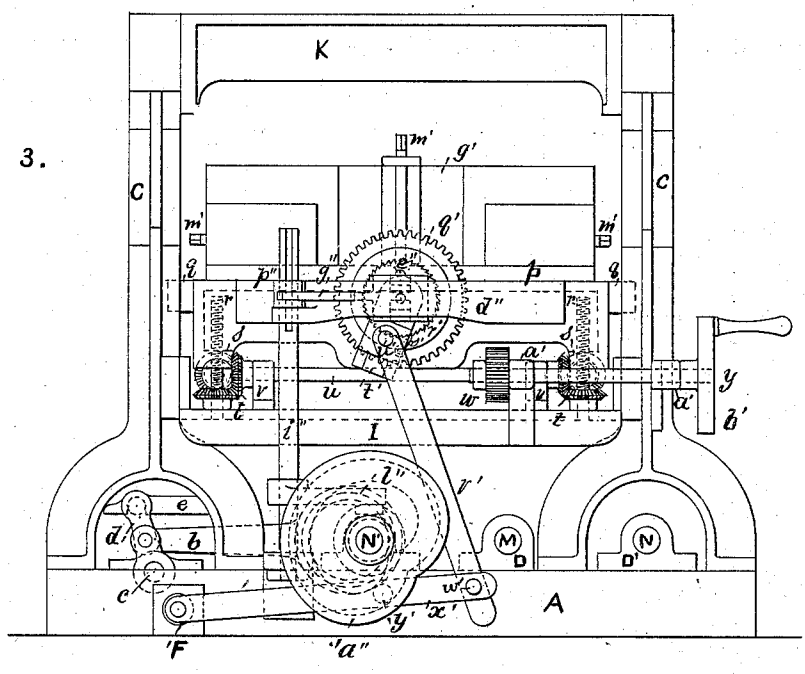

FIG. 4.

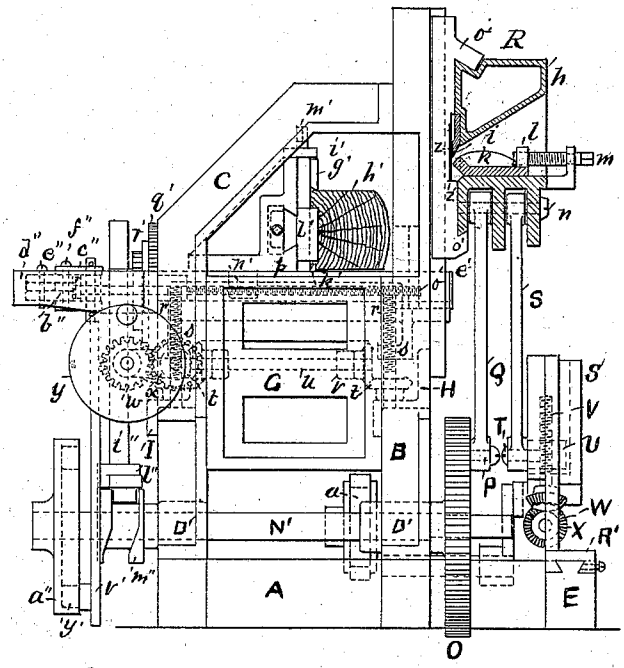

FIG. 5.

FIG. 6.

WITNESSES.

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UNITED STATES PATENT OFFICE.

HENRY T. BARTLETT, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE W. READ, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR CUTTING VENEERS.

Specification forming part of Letters Patent No. **174,056**, dated February 29, 1876; application filed December 14, 1875.

To all whom it may concern:

Be it known that I, HENRY T. BARTLETT, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Machine for Cutting Veneers and other Lumber; and I do hereby declare the following to be such a full and exact description thereof as will enable others skilled in the art to which it pertains to construct the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon—similar letters indicating corresponding parts in the different figures.

Figure 1 is a front elevation of the machine, showing the arrangement of the driving mechanism, connecting-rods, radius-rods, by means of which motion is imparted to the cutting-knife. Fig. 2 is a plan, showing the relative arrangement of the reciprocating cutter, and for holding devices, with the mechanism by which the latter is operated. Fig. 3 presents a rear elevation, showing the arrangement of the mechanism for feeding the log to the cutter. Fig. 4 is an end view, partly in section, and exhibits the general relative arrangement of the different parts of the machine. Figs. 5 and 6 represent half and quarter logs, showing the grain of the wood, and the position of the cutting-knife relatively thereto during the operation of cutting the log into veneers.

The nature and objects of my invention are as follows: In the first place, to produce a machine which shall give a drawing cut or stroke with the veneer-cutting knife, variable in depth and length to suit the exigencies of the work to be done; secondly, to hold the log to be cut steadily and firmly in position, and feed it forward under the knife with perfect accuracy, then to withdraw it as soon as the cut is completed, to keep it from the edge of the knife during its upward stroke; and the first part of my invention consists in the combination of a cutting-knife with a guide and presser bar or roll attached to and operating with a suitable frame, to which a vertical motion is imparted by cranks suitably connected, and a horizontal motion by one or more radial guide-rods.

The second part of my invention consists in the means employed for guiding the knife-frame, being the compound gibs or shoes, constructed and operating as hereinafter described.

The third part of my invention consists in the arrangement of the radial guide-rods which impart a horizontal motion to the knife-frame, thus giving a longer or shorter movement to the knife, as the nature of the log being cut may require.

The fourth part of my invention consists in a vertically-adjustable cutting-table, which is raised or lowered by suitable mechanism, so as to suit the thickness of the log to be cut.

The fifth part of my invention consists in an improved means for clamping the logs to be cut to the stay-log or face-plate of the machine by a traveling clamp head or frame moving upon horizontal ways.

The sixth part of my invention consists of the devices which cause the log to recede from the knife after each downward stroke, as hereinafter described.

The seventh part of my invention consists in the construction and arrangement of the devices by which the horizontal movement of the cutting-knife is controlled, being the radial guide-rods attached to adjustable bearings in a frame, as hereinafter described.

The machine is constructed as follows:

A represents the base, rectangular in shape, having an extension, E, upon one side, and which may be constructed of wood or iron, care being taken to give it sufficient strength and rigidity to sustain without change the strain to which it may be subjected when the superincumbent machinery is in operation. To this base the frame consisting of the two pairs of uprights B B and C C are securely bolted. These are formed, preferably, of cast-iron, those in the rear, C C, being inclined forward at the top in such a manner as to bring them in contact with those in front, to which they are securely attached. The frame is still further stiffened by the transverse beams I and K, the beam K connecting the front pair of uprights B B, and the beam I the other pair, C C. The lower ends of all the uprights are bifurcated, thus giving them a broader bearing upon the base A, and allowing space for the pillar-blocks D′, carrying the shaft N, to be placed upon the base within the bifurcation. The frame is still further strength-

ened by the girts or panels G, placed at each end of the machine, between the front and rear uprights, and securely bolted thereto. M is the driving-shaft of the machine, and is carried in the journal-boxes D, which rest upon and are secured to the base A. This shaft may receive its motion from any suitable prime mover, and is provided with a pinion, L, which gears into, and imparts motion to, the toothed wheels O and O′ upon the shafts N and N′. The toothed wheels are each provided with a crank-pin, P, to which is connected, by the connecting-rods Q, a reciprocating knife-carrying frame, R. The wheels O and O′, being provided with an equal number of teeth, are synchronous in their movements, thus causing the crank-pins P to occupy the same horizontal line at all times, and, consequently, retaining the frame R in a position parallel with such line. This frame is of metal, and is, preferably, cast in one piece, having an elongated rectangular opening through it for the passage of the veneer after it is cut from the log. Above this opening, on the inner side, is formed a recess, to receive the cutting-knife *i*, which is securely fastened therein. The top of the opening in the frame R is inclined upward and outward, so as to present no obstacle to the passage of the veneer in its exit from the machine. The bottom of the opening is flat and horizontal, carrying a presser-bar, *k*, which is moved forward by means of the screws *m* passing through lugs attached to the frame R, and acting upon the nuts *l*, secured to each end of the presser-bar. This bar is provided with a sharp angle, which presses into the log from which the veneer is to be cut a little below the edge of the knife, thus preventing the knife from checking or producing cracks in the veneer. This knife-carrying frame is also provided with dovetailed grooves upon its upper and lower edges, which are inclosed by the projecting lugs *o′* upon the gibs or shoes *z*, thus allowing the frame R to have a horizontal motion upon the gibs, while they have a vertically-reciprocating movement on suitable ways formed upon the front of the supports C C. The horizontal movement is given to the knife-frame by the radial connecting-rods S, the lower ends of which are attached to sliding block U within the guide-frames S′. These blocks are made vertically adjustable by means of the screws V, the lower ends of which are provided with bevel-gear wheels W, gearing into bevel-wheels upon the horizontal shaft X, carried in suitable bearings upon the frames S′. It will be apparent that by revolving this shaft X the blocks U, to which the lower ends of the radial connecting-rods S are attached by means of pins T, will be raised or lowered. These guide-frames have also a reciprocating movement upon a dovetailed way formed upon part E, projecting from one side of the base A, the bottom of the guide-frames being provided with a suitable groove and adjusting-screws, to fit the projecting way upon the base E, as shown at R. Motion is communicated to the guide-frames by means of an eccentric, *a*, upon the shaft N′, through the eccentric rod *b*, rock-shaft *c*, arm *d*, and connecting-rod *e*, attached to a pin, *f*, in a bar, which connects the two guide-frames.

It will be apparent that while the revolution of the shafts N and N′ give to the cutting-frame a vertically-reciprocating movement through the connecting-rods Q, it at the same time has a horizontal reciprocation through the agency of the connections S and their operating mechanism.

A vertically-adjustable table, J, moves upon suitable guideways within the frame, and is adjusted by means of the screw *r*, one of which is placed at each corner of the table, the whole being so connected as to operate simultaneously by means of the bevel-gears *s* and *t* upon the horizontal shafts *w*, upon one of which is placed a spur-gear, *x*, which connects with a similar gear-wheel, *w*, upon the shaft *y*, revolving in bearings *a′*, attached to the girt I of the frame, said shaft being provided with a hand-wheel, *b′* upon its outer end, by turning which the table is raised or lowered. The top of the table is provided with two or more rollers, *c′*, so embedded as to project slightly above its surface, upon which the log to be cut rests, and by which its adjustment is facilitated. They may also be so arranged as to drop entirely below the surface of the table, if desired, so that the log during the process of cutting may rest firmly thereon.

The stay-log Y rests upon the table J, being retained in position thereon by a projecting tongue upon its under side, which enters a groove crossing the top of the table. Other grooves, *d′*, are also formed across the table, in which the dogs *k′*, intended for holding the bottom of the log of wood to be cut, move. These dogs, as well as the dogs *g′*, which enter the top of the log, move in suitable guideways *i′*, and are operated by the screws *m′*. Other dogs, *l′*, operated by screws in a similar manner to those just described, enter the ends of the log to be cut and assist in retaining it in position. This stay-log receives two motions—one a regular feeding movement, by which it is carried forward the thickness of a veneer or other piece of lumber at each cut, the other a retrograde motion, which takes the log out of the path of the knife as it rises after each cut. In order to impart to it the first of these movements a cam, *a″*, is secured to the rear end of the shaft N′. This cam is provided with a groove, into which the pin *y′* upon the lever *x′* enters. One end of this lever oscillates upon a stationary fulcrum, F, secured to the base of the machine; the other end is connected by the pin *w′* to the connecting-bar *v′*, the upper end of which is attached by the pin *u′* to the pawl-carrier *t′*. This carrier is provided with spring-pawls, which engage with the teeth of the ratchet-wheel *r′* upon the screw-shaft *o′*, which crosses the table and passes through a suitable nut in the

downwardly-projecting guide of the stay-log Y. By this means the revolutions of the shaft N′, acting through the cam a'' and connecting devices, cause the pawl-carrier to oscillate, thus giving to the ratchet-wheel r' and the screw to which it is attached an intermittent rotating movement, which causes the stay-log to move forward a certain distance at each revolution of the driving-shafts, and, consequently, at each reciprocation of the knife-frame, thus causing the log to be cut into veneers to move forward the exact distance necessary to form the lumber desired. In order to cut veneers or lumber of varying thickness, the pin w' is made adjustable upon the pawl-carrier, so as to vary its distance from the point of oscillation of the latter, thus causing the pawls to move over a greater or less part of the periphery of the ratchet-wheel at each reciprocation, and, consequently, imparting to the stay-log through the screw a proportional forward movement.

The second movement of the stay-log referred to, being its retraction during the upward movement of the knife-frame, is secured through the following mechanism: A cam-wheel, m'', is placed upon the shaft N′, and is provided with a cam-groove in its periphery, which receives a pin projecting from an arm, l'', secured to the vertical rack-shaft i''. The upper end of this shaft has a spline of sufficient length to allow an arm, p'', to rise and fall thereon with the table J. To this arm is attached a lever, g'', which connects it with a toggle, one end of which is connected by the pin c'' to the screw o', which moves the stay-log forward in setting. The other end of the toggle is secured by the pivot-pin e'' to the supporting-bar d'', which is, in turn, securely bolted to the rear side of the table. By this arrangement each revolution of the shaft N′ will pass through the cam m'', and the connecting devices act upon the toggle in such a manner as to draw back the stay-log during the upward movement of the knife-frame, and force it outward as the frame begins its descent, thus avoiding all danger of dulling the knife by rubbing against the veneer log during its ascent.

The face of the table J, next to the cutting-knife, is formed of a separate piece of metal, e', secured to the latter by suitable bolts, and may be of harder material, the better to withstand the extra wear caused by the frictions of the log, the action of vegetable acids, and corrosion caused by the escaping steam as each veneer is severed. It can at any time be removed and turned up by grinding or other means, so as to keep the upper edge on the same plane as the table-top, and the angle parallel to the cut of the knife.

Having thus described the construction of the machine, its operation and the process of cutting veneers and other lumber upon it are as follows: The knife-frame, with its attachments properly adjusted, being raised to its greatest height by the mechanism arranged for the purpose, and the stay-log, with its clamps drawn out to their full extent, moved to a point upon the table farthest from the knife, the log, if of hard wood, having been properly steamed, is rolled upon the table generally from one end, and is then securely fastened to the stay-log by the clamps. The cutting-table is then adjusted to any desired elevation by the mechanism provided for that purpose. The stay-log is then fed forward by the screw and its operating mechanism, carrying the log before it until it projects over the adjustable face or edge of the table, when the knife descends and severs the projecting portion, which may be a veneer or thicker lumber for various purposes. After the stroke, and when the cranks are turning their lower centers, the log is caused to recede from the knife by means of the devices and in the manner heretofore described, so as to prevent friction and unnecessary wear to the cutting-edge of the knife when it is returning across the face of the log. When the cranks are approaching their upper centers, and the knife has passed above the top of the log, the latter is returned to its former position, and is again fed forward the necessary distance to form the piece of lumber to be cut, and the cutting repeated until the whole or any desired portion of the log has been converted into veneer or other lumber.

If the nature of the wood has been previously determined, the radial guide-rods may be set so as to give the knife the most advantageous draw; or, after a few cuttings have been made, in order to develop the quality and direction of the fiber, and as these change during the cutting operation, the position of the guide-rods may be changed by the operator without stopping the machine, so as to increase or diminish the horizontal movement or drawing cut of the knife as the exigencies of the case may demand.

In cutting round logs the process may continue until the center or heart is reached, when they may be turned down on the straight surface or reversed, again commencing at the bark side; or they may be squared up by cutting from opposite sides, and then proceeding as the nature of the wood and work may suggest.

It will be seen that in the process of slicing veneers through the log, the concentric rings representing the growth of the wood present a constantly-varying line to the direction of the cut, as is clearly shown by Figs. 5 and 6 of the drawings, in which the relative positions of the cutting-knife and grain of the wood is illustrated. The variable drawing motion of the knife enables the machine to accommodate itself to all the variations in the texture of the material, and while it has no dead-point during the cut, which is continuous, it does its work with comparatively little friction upon the presser-bar, thereby saving the power this friction consumes, which often amounts to double that required to force

the knife alone through the wood. Another novel and excellent feature of the machine is the adjustability of the table to any required height, so as to bring narrow logs into the first or longest part of the drawing stroke, and the facility with which logs of any shape, whether circular, semicircular, or rectangular, may be secured to the stay-log by using the suitable fastenings, enables a great variety of work to be done upon the machine, and a saving of labor and time is thereby effected.

It will be evident that the machine may be so constructed as to give the motion to the log which is now given to the knife without departing from the principle of my invention; but I prefer the method of construction herein described as being the best.

I am aware that machines have been constructed in which a drawing cut has been given to the knife by means of radial guide-rods, and by inclined guides to the knife-carrying frame; but both of these methods lacked the element of adjustability while the machine was in operation, which is an essential feature of mine.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The combination of the knife *i'* with the reciprocating frame and horizontal adjustable presser-bar, as specified.

2. The reciprocating knife-carrying frame R, in combination with the gibs *z* and vertical guide upon the uprights B B, as and for the purpose set forth.

3. The gibs L, provided with a recess and lugs *o'*, as shown and described, for the purpose of guiding the knife-frame in its reciprocations.

4. The radial rods S, in combination with their adjusting devices, as set forth.

5. The reciprocating frame R', in combination with the mechanism by which it is operated.

6. The cutting-table J, in combination with the screws, gears, and shafts by which it is rendered vertically adjustable.

7. The vertically-adjustable table, in combination with the reciprocating knife-frame R and their operating mechanisms, as described.

8. The vertically-adjustable table, in combination with the stay-log Y, and the devices by which it is fed forward toward and retracted from the cutting-knife.

9. The stay-log Y, in combination with the toggle and the mechanism by which it is operated, as and for the purpose specified.

10. The shaft N', cam *a''*, lever *x'*, and adjustable connections *v'*, in combination with the pawl-carrier *t'*, ratchet-wheel *r'*, and screw *o'*, for the purpose of feeding forward the stay-log, as set forth.

11. The shaft N, cam *m''*, arm *l''*, vertical rock-shaft *i''*, sliding arm *p'*, and connection *g''*, in combination with the toggle and stay-log, for the purpose of retracting the latter during the ascent of the cutting-knife, as described.

12. The shaft N', eccentric *a*, eccentric rod *b*, rock-shaft *c*, arm *d'*, and connection *e*, in combination with the reciprocating frame R', radial rods S, and cutting-frame R, for the purpose of giving to the latter a horizontal movement or drawing cut, as explained.

13. The shaft M, spur-gears L and O, the latter provided with the crank-pins P, the connecting-rods Q, and cutting-frame R, in combination with the radial rods S, adjusting-blocks U, and reciprocating frame R', as and for the purpose set forth.

14. The combination and arrangement of all the devices, as shown and described, for the purpose set forth.

HENRY T. BARTLETT.

Witnesses:
GEO. W. READ,
SAM. C. HICKEY.