2 Sheets-Sheet 1.

C. Hart,

Cutting Veneers.

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Fig. 3

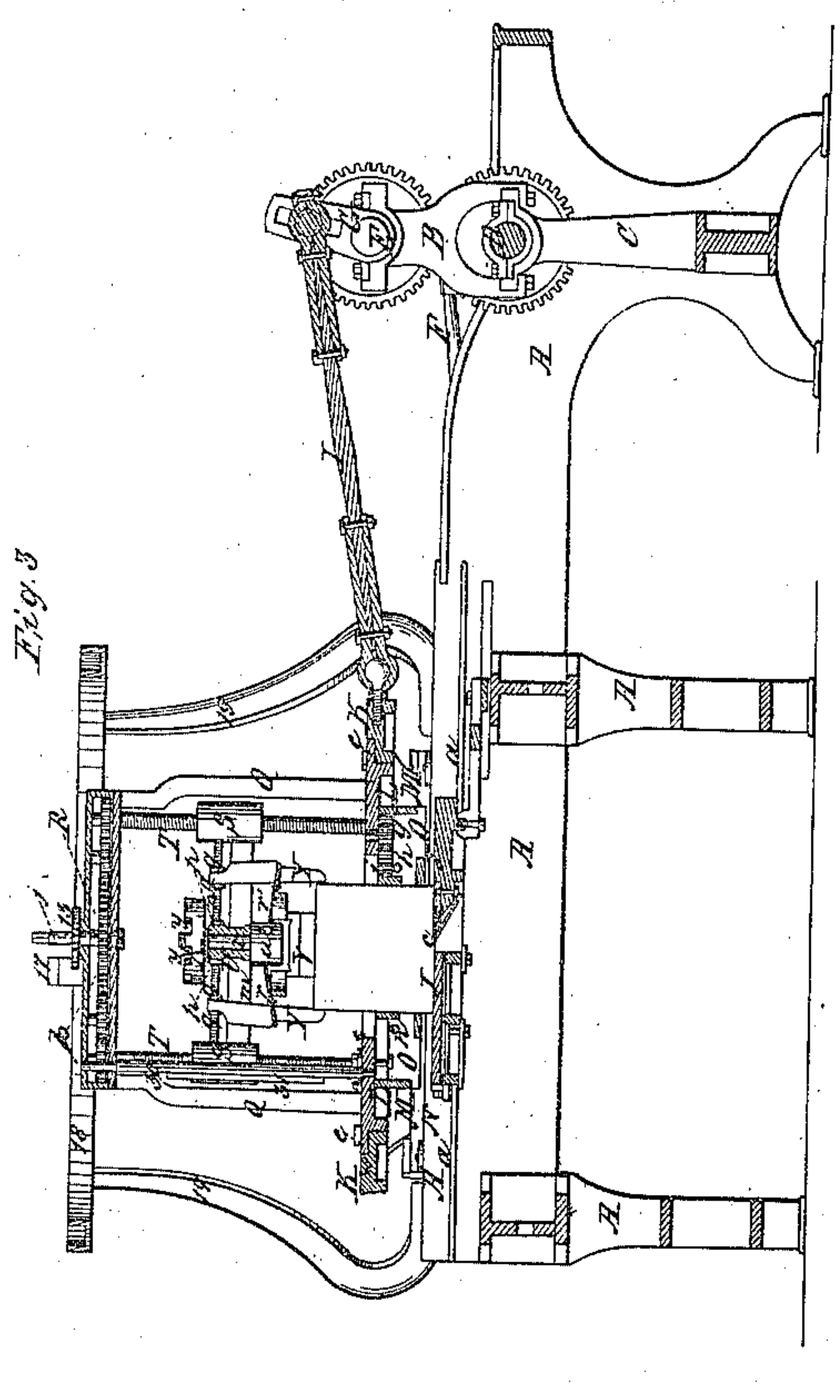

Fig. 6

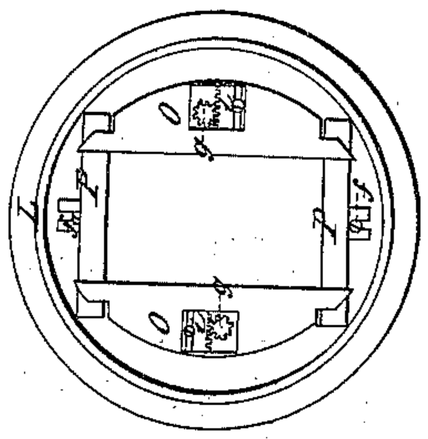

Fig. 5.

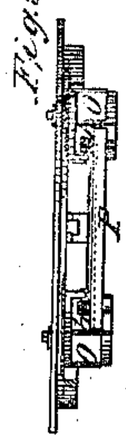

Fig. 4

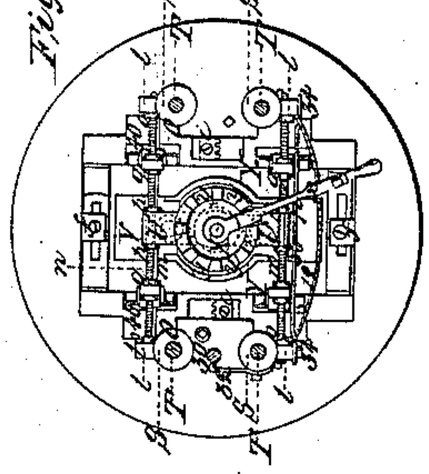

Fig. 7.

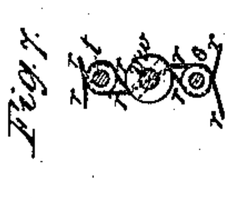

Fig. 1

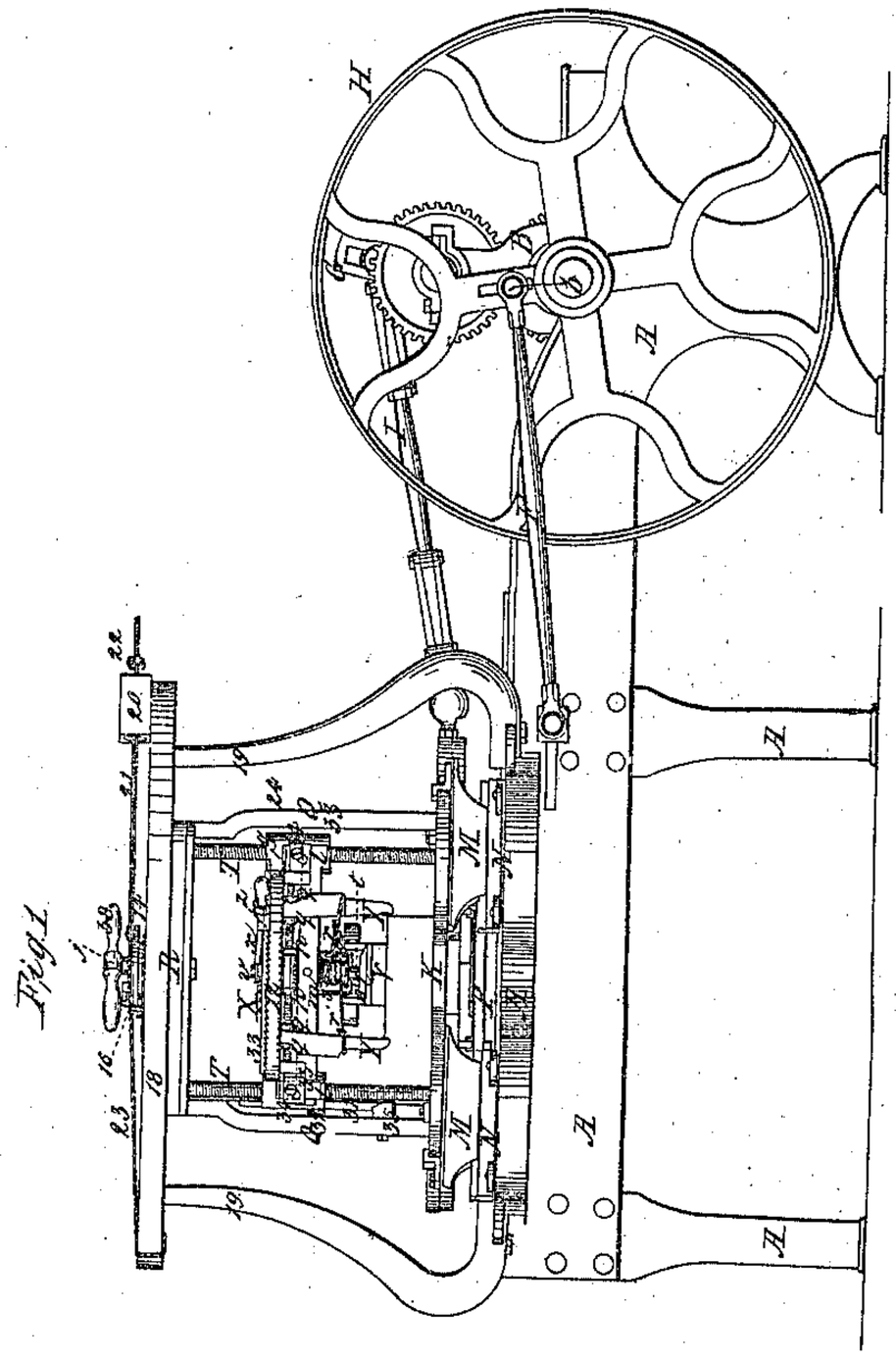

Fig. 2

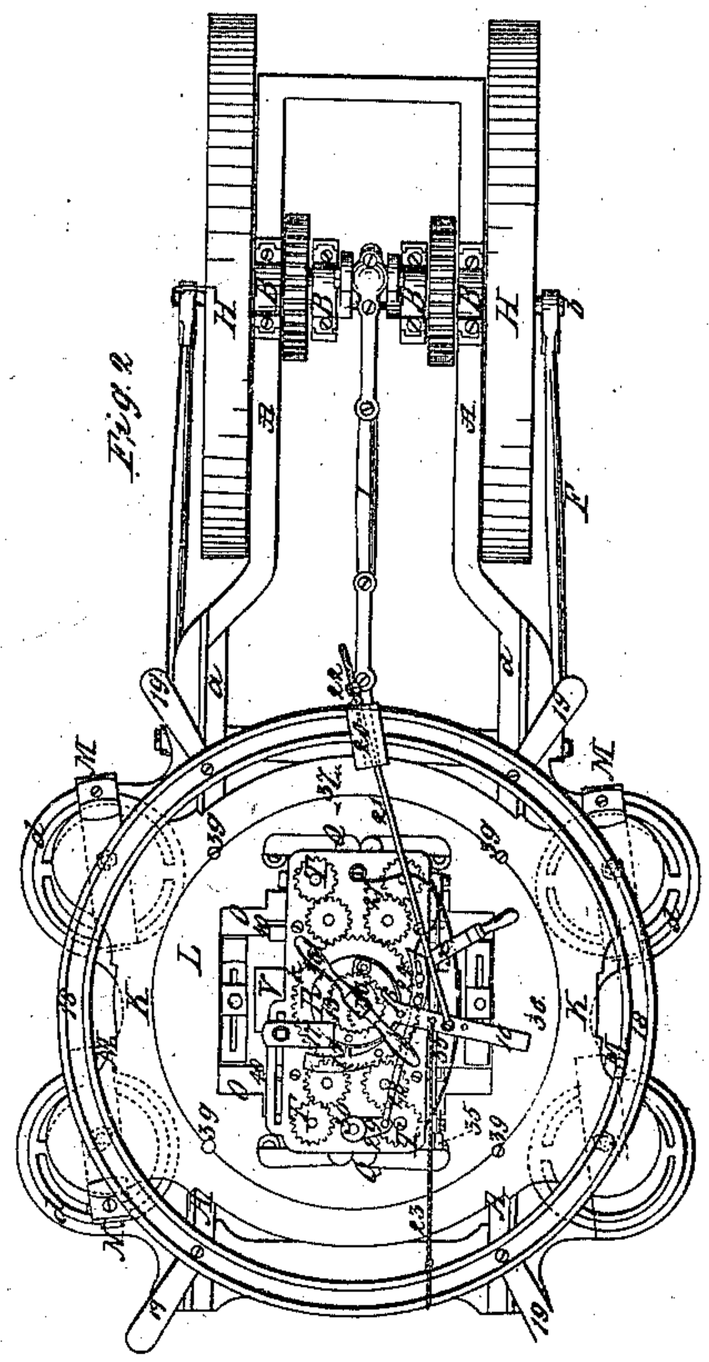

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Fig. 8.

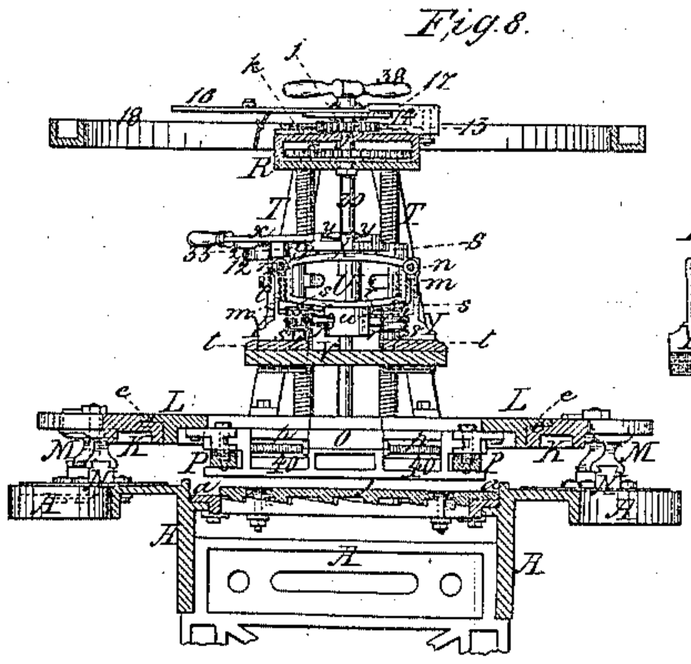

Fig. 11

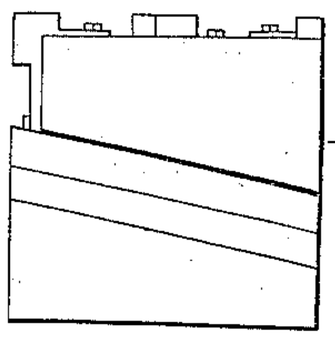

Fig. 9.

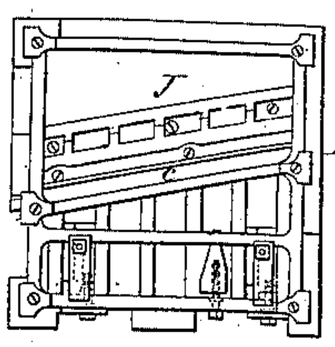

Fig. 10

UNITED STATES PATENT OFFICE.

CARMI HART, OF BRIDGEPORT, CONNECTICUT.

MACHINE FOR CUTTING VENEERS.

Specification of Letters Patent No. 10,739, dated April 4, 1854.

To all whom it may concern:

Be it known that I, CARMI HART, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machinery for Cutting Veneers and other Thin Stuff; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a machine containing all my improvements. Fig. 2 is a plan of the same. Fig. 3 is a longitudinal vertical section of the same through the center. Fig. 4 exhibits a horizontal section of the mechanism by which the block or log is fed to the cutting knife, and a plan of the clamping or holding apparatus, and the adjustable circular turn table to which the said mechanism and apparatus are attached. Fig. 5 is a side view of the adjustable circular turn table, with a part of the side broken away to show the adjustable pieces which form the sides of the opening for the block or log to pass through the table. Fig. 6 is an inverted plan or view of the under side of the above table. Fig. 7 is a plan of part of the mechanism by which the clamps are tightened to hold the block or log. Fig. 8 is a transverse vertical sectional view of the bed of the machine, the cutting table, the work carriage, and its adjustable circular turn table, the clamping apparatus which holds the block or log suspended, and the feeding mechanism. Fig. 9 is a plan of the cutting table. Fig. 10 is an inverted plan of the same. Fig. 11 is a face view of one of the clamps which holds the block or log.

Similar letters of reference indicate corresponding parts in the several figures.

In the machine which forms the subject of the present invention, the veneer is cut from the log or block by a knife, such as is used, but with only partial success, in other machines. The knife as used prior to my invention has always been driven straight through the log, without any drawing stroke, tearing and roughening the surface of, and cracking the veneer as it is shaved off.

The first part of my invention has for its object the prevention of the cracking and roughening the veneer as aforesaid and the cutting of perfect veneers from logs of any size by means of the knife.

It consists in giving to the knife and the log separate and distinct rectilinear motions as follows, namely, to the knife a rectilinear movement through the log, and to the log a rectilinear movement transversely or diagonally to the movement of the knife, commencing and terminating at or nearly at the same time therewith, and being about equal in length therewith, in order to give the log a long drawing stroke in contact with the edge of the knife at the same time the knife is being forced through it. The effect obtained by these combined movements, is the cutting of a veneer or shaving which is perfectly smooth and free from cracks.

The second part of my invention consists in making the ways upon which the log carriage moves, adjustable relatively to the ways upon which the knife moves, for the purpose of giving more or less of a drawing action to the cut as may be required by different varieties of stuff.

The third part of my invention consists in attaching all the necessary appendages for holding the log and feeding it to the knife, to a turn table of circular or other form which is fitted to a circular seat, or otherwise made capable of turning upon the log carriage, and being secured in any position, for the purpose of presenting the grain of the stuff at any desired angle to the edge or movement of the knife.

The fourth part of my invention relates to the manner of supporting the log or block from which the veneers are cut, during the cutting operation. The knife is rigidly attached to the upper side of a table of which all that portion of the surface behind the cutting edge is perfectly level with the said edge, and that portion in front of the said edge is at a distance below the said edge and upper part of the table, equal to the required thickness of the veneer to be cut. The log, previously to having a veneer or shaving cut from it, is in contact with the lower part of the table, and when the veneer or shaving has been taken off is on the upper part. In order to place it again on the lower part, to take off another shaving it must pass over the edge of the knife, and in so doing, if it rests on the table and knife is likely to break or injure the edge of the knife.

With a view to the prevention of the above injury, the nature of this part of my invention consists in suspending the log above the

knife and cutting table, by means of clamps which only allow it to descend under the control of a proper feeding mechanism, which comes into operation after the return of the knife subsequently to having taken off a shaving, and while the log is above the lower part of the table; so that when the log passes the edge, its weight does not rest upon, and therefore cannot injure it.

The fifth part of my invention consists, in a combination of mechanism for setting free the clamps and releasing the uncut portion of the log from them, when the weight of such portion of the log is no longer sufficient to injure the knife, and when the lower parts of the clamps have arrived so near the edge of the knife that their farther descent would endanger their being brought into contact with the said edge and causing injury thereto.

The sixth part of my invention consists, in a certain method of constructing the clamps which hold the log, whereby, when they are released from the log, the feed motion may be allowed to continue, but the farther descent of the clamps may be prevented by suitable stops provided for that purpose upon the log carriage.

The seventh part of my invention consists in a contrivance for rendering the feed motion inoperative and stopping the descent of the follower when the log is all cut up.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, is the main framing of the machine consisting of a bed supported upon standards, and having ways, *a*, *a*, see Figs. 2, 3, and 8, arranged longitudinally upon it to receive the cutting table and guide its motion. At one end of the framing suitable standards, B, C, are placed to carry the bearings for two parallel transverse shafts D, E, which are geared together by toothed wheels of equal size so that both will revolve at equal speeds. The shaft D is the driving shaft and receives rotary motion by means of a band from some prime mover, running on one of the two drums H, H. Motion is transmitted directly from the driving shaft to the cutting table, J, (see Figs. 3 and 8) which carries the knife *c*, by means of a wrist, *b*, on the outer side of one of the arms of each drum H, and a connecting rod, F, connecting the table therewith; the wrists being adjustable in slots in the arms, so that they can be set at any distance from the axis, thus constituting variable cranks capable of giving the table a movement of any desired length. The shaft E, transmits motion to the log carriage, K, by means of a crank, G, and connecting rod, I, the wrist of the said crank being adjustable in slots to vary the throw of the crank and length of movement of the carriage, and the connections of the rod with the wrist and also with the carriage being made by ball and socket joints so as to allow the movements of the carriage to deviate from a direction at right angles to the shaft. The wrists *b*, *b*, and the crank G are so adjusted relatively to each other that the cutting table, J, and carriage K, commence their stroke together but always move in opposite directions.

The log carriage K, consists of a plate of cast iron, having a circular opening, around which is a rabbet, *e*, see Figs. 3 and 8, to form the seat for the adjustable turn table L. It is supported by four (or may be supported by any other suitable number of) sliding feet M, which are fitted to slide freely on a corresponding number of parallel ways, or slides N, firmly secured to the bed of the main framing A. The ways N, are adjustable in order to allow the diagonal or transverse movement of the log carriage relatively to the cutting table and knife, to be varied, and the feet M, also are adjustable for the same purpose. The ways are made adjustable by being pivoted to small circular beds, *d*, on the main frame (see Fig. 2) and furnished with proper means of securing them in any position; and the sliding feet are made adjustable in a substantially similar manner. The method of adjusting and securing such slides or ways, and the feet or sliding pieces which slide upon them, is well known to all skilled mechanics, as such devices are common in various kinds of machinery, and therefore no detailed description thereof is necessary; but it is sufficient to say, that it is desirable for the said ways and feet to be capable of being adjusted in any position, between one parallel with the ways *a*, *a*, on which the cutting table and knife travel, and one at right angles to the said ways. The ball and socket connections at the ends of the connecting rod I, will allow motion to be transmitted directly through the said connecting rod to the carriage at as great an angle at the line of movement of the knife as will be, in many, or most cases desirable, but if a movement at a right angle to the line of movement of the knife, or a movement at any less acute angle than is capable of being given by the rod, be desired, the said movement may be transmitted from the rod to the carriage by a bell crank or any other device for changing the direction of rectilinear motion.

The adjustable turntable L, consists of a circular plate of cast iron, properly fitted to turn freely in the rabbet *c*, (see Figs. 3 and 8,) in which it can be secured in any position by set screws, 39, (see Fig. 2) and having a quadrangular opening (see Figs. 4 and 6) to allow the log to pass through it. This opening is surrounded on the under side of the turn table by four sliding side pieces, O, O,

P, P, one on each side all of which are adjustable to form a quadrangular open box of any desired size, such size being always just large enough for the log to move through easily in the position in which it is cut, but to hold it steadily so as to prevent any longitudinal or transverse movement during the cutting operation. The side pieces may be attached to the box and made adjustable in various ways. I have attached them by screw bolts *f*, *f*, which pass through slots and therefore allow them to pass back and forth, to enlarge or contract the box; and I have adjusted the pieces, O, O, by means of racks *i*, *i*, and pinions *g*, *g*, and the pieces, P, P, by means of long screws *h*, *h*, extending through the pieces, O, O, and confining them to the piece P, P, by means of nuts. The pieces, P, P, which form the ends of the box will not require to be adjusted so frequently as the pieces, O, O, which form the front and back, as the log can, in most cases, be sawed to the proper length to suit the box, but the thickness of the logs will vary considerably; hence I have used the rack and pinion to adjust the pieces, O, O, as by turning the pinions *g*, *g*, whose journals are fitted in bearings in the turn table, the racks which are attached to the pieces, O, O, are made to adjust the said pieces very readily. The several pieces, O, O, and P, P, are mortised into or otherwise fitted to each other, to hold each other, so as to keep the box square at all times, as the log will be squared before being introduced to the machine. The turn table carries the whole of the apparatus and mechanism which clamps and holds the log suspended, and that which feeds it, to the cutting table; the turn table, two standards, Q, Q, and a box R, forming a framing for the whole of the said apparatus and mechanism. The clamping apparatus is all attached to, and supported by four strong deep heads, S, containing female screws fitting to four long upright male screws, T, of similar pitch, which have journals fitting to bearings in the turn table and in the box, R, above and which are all geared by a train of toothed gearing within the box (see dotted lines in Fig. 2,) with a large toothed wheel *k*, on a shaft *j*, which passes vertically through the center of the box, and receives motion by the feeding mechanism hereinafter described; the gearing being so arranged that all the screws turn together and in similar directions, so that they cause all the heads, S, S, to be raised or lowered simultaneously, and the same distance, and keep all at the same elevation at all times.

The heads, S, S, are furnished, each, with a lug, *l*, which is best shown in Fig. 4. This lug is slotted to receive one end of one of the two horizontal bars, *m*, *m*, which are partly hidden in Fig. 4, but are shown in section in Fig. 8, and of which one is shown in Figs. 1 and 3. These bars are held by the heads, S, S, always at right angles to the sides of the log, at a short distance above which they stand, and support a strong cross head U, which is firmly bolted to them. Above the bars, *m*, *m*, and parallel with them, there are two long screws, *n*, *n*, which pass through the lugs *l*, *l*, and through ears at the sides of the cross head without screwing into any of them. These screws are secured rigidly to the lugs by set nuts *o*, *o*, which are made to bind against the lugs; and the cross head is capable of being adjusted upon the said screws, and secured at any part of them by nuts, *p*, *p*, one on each side of the ears, the bars, *m*, *m*, sliding freely in the lugs, *l*, *l*, to allow such adjustment.

The cross head will always require to be adjusted to a position as nearly as possible over the center of the box formed by the adjustable pieces O, O, and P, P, under the turn table already described. The clamps Y, Y, of which there are intended to be two on each side of the log, making two pairs, consist of plates of iron or steel, whose form will be understood by reference to Figs. 3 and 11, the former of which figures exhibits their sides, and the latter a face view. Each bar, *m*, receives two clamps or one pair, upright slots being made in the clamps to fit easily to the bars and move thereon. Each clamp has another upright slot above the slot which receives the bar *m*, to allow the screw *n*, to pass through it. These slots are both of such length as to allow the clamp to move a considerable distance upward and downward for a purpose which is hereinafter described. The clamps are adjusted at the proper part of the screws, *n*, and bars, *m*, by means of nuts *q*, *q*, one on each side, which are so set that the clamps are free to vibrate to a limited extent but not to move very far bodily upon the bar and screw. Between the clamps a follower V, is attached to the cross head U, in a rigid manner; this follower consists of a flat wooden board attached to a suitable frame of iron, its underface being parallel with the face of the cutting table, and the plane in which the cutting edge moves. The follower is of a length and width somewhat less than the smallest sized log that the machine will ever be required to cut, in order that it may pass freely through the adjustable box under the turn table. It is intended to follow the log as the latter descends upon the turn table, and to prevent it rising during the cutting operation, and thus cutting the veneer unevenly. The clamps when hanging free have the bars, *m*, and screws, *n*, in the upper part of their respective slots as shown in Fig. 11, and their lower parts or jaws then hang far enough below the bottom face of the fol-

lower to take a firm hold of the log as shown in Figs. 1 and 3, where a log is represented in the machine. The clamps are made to grip and fasten upon the log by means of two cords or chains *r*, *r*, which are connected to their lower parts; each of the said cords being attached to one clamp of one pair and to that clamp of the other pair, which is on the opposite side of the log, and passing partly round one of the pairs of pulleys S, S′, S, S′, which turn loosely on the posts *t*, *t*, which connect the follower to the cross head, and passing through a hole in a boss, or drum, *u*, or round an eccentric at the lower end of a vertical shaft, *v*, which works in the center of the cross head. The drawing of the clamps together being effected by turning the said shaft partly round and thus winding up or drawing tight, both the cords or chains at one time.

The shaft, *v*, is turned by means of a wheel X, firmly secured by its upper end above the cross head and a lever handle *x*, (see Figs. 4 and 8) the said wheel having a raised rim with notches, *y*, *y*, to receive the handle which also fits to the upper end of the shaft. This handle can readily be unshipped and inserted in another notch when it is in danger of coming in contact with one of the screws T, in winding up the cords or chains. The tightness of the cords or chains and the grip of the clamps is preserved by means of a tooth *z*, see Figs. 1 and 8, which engages in any one of a series of notches in the upper edge of a bar, 12, which is secured to two of the heads, S, S. When the clamps are in operation, the screws, *n*, are in the upper part of the slots, as the weight of the clamps before they are made to grip the log carries them to this position. The heads, S, S, and all the mechanism which they support may be termed the suspending head.

The mechanism by which the necessary intermittent movements are given to the toothed wheel, *k*, for the purpose of transmitting the proper movements to the screws T, T, to move downward the heads S, S, the clamping apparatus, and the log after each successive operation of shaving off a veneer does not essentially differ from the feed motions of many other machines. The shaft, *j*, is furnished above the box R, with a toothed wheel, 13, secured firmly to it, and above this wheel a disk, 14, is fitted loosely to it, the said disk carrying on its under side a spring pawl, 15, (see Fig. 2,) which engages with the wheel when the disk is turned the proper way for the shaft to turn to work down the heads S, S, (indicated by the arrows 36, in Fig. 2) but passes over the teeth in turning the other way. Above the disk is a forked arm 16, of which the forked part is secured to the disk; one end of the fork being turned up to come in contact with a stop piece, 17, which is secured to the top of the box R, and controls the movement of the disk in one direction. A circular frame 18, is supported by standards 19, upon the bed of the main framing A, this frame surrounds the box R, and upon one side of it is fixed a block, 20, of wood or metal which is bored to allow a rod, 21, which is connected with the arm 16, to pass through it freely. The rod 21, is screwed for some distance from its end to receive two nuts, 22, which are made to jam and secure each other in a fixed position on the screw outside the block, 20, and serve as stops to prevent the rod being drawn through the block, by a spiral, or india rubber spring, 23, which connects the arm with the opposite side of the frame 18. The movement of the carriage, K, in the direction of the arrow, 37, shown upon it in Fig. 2, which is the return stroke after the shaving operation, brings the nuts 22, in contact with the block 20, and arrests its motion and causes it to hold back the end of the arm, 16. The continued motion of the carriage after the rod is arrested causes the arm to turn the disk 14, in the proper direction for the pawl to engage with and act upon the wheel 13, which it continues to do till the direction of the motion of the carriage is changed, when the spring acting on the arm draws the pawl back over the teeth until the end of the fork comes in contact with the stop piece 17. The feed is lengthened or shortened by placing the nuts, 22, farther from or nearer to, the end of the rod. The feeding can be performed by hand, by a handle 38, provided for that purpose on the top of the shaft, *j*. This handle serves to draw back the feeding mechanism after the operation of cutting up a log is terminated.

The arrangement for stopping the feed when the log is all cut up consists of a curved bar, 24, (see Fig. 2,) which is secured by screws, 25, to the top of the box R, but slotted where the said screws pass through it to allow it to slide upon the box. This bar 24, carries an upright pin 26, and has a spring 27, applied to one end in such a way as to have a tendency to push the bar to such a position as to make the said pin come in contact with the handle of the spring pawl 15, protruding from under the disk 14, as soon as the nuts 22, come in contact with the block, 20, and commence moving the arm 16. The strength of the spring, 27, is greater than that of the spring which holds the pawl in gear, and consequently the pin 26, when in contact with the pawl, throws it out of gear, and prevents it operating on the wheel 13.

During such time as it is desirable that the feed motion shall be operative, the bar 24, is held in the position shown in Fig. 2, where the pin is out of contact with the

pawl, by means of a rod 28, which connects it with a short arm 29, at the top of a vertical shaft 30 which protrudes through the box R. The part of the shaft 30, which is below the box R, is furnished with a feather 31, (see Figs. 1, 3, and 4,) which is caught by an angle piece 32, (see Fig. 4,) attached to one of the heads S. This angle piece 32, holds the bar back in opposition to the spring, by preventing the turning of the shaft 30, which the spring has a tendency to effect. The feather extends downward on the shaft to such a point that when the log is all cut up, and the follower arrives in contact or nearly in contact with the edge of the knife, the angle piece passes below the said feather, and sets it free, thus allowing the spring 27, free action, and preventing the feed.

The clamps Y, Y, are set free to release the log some time before the feed motion stops, by means of a bar 33, (see Figs. 1, 2, and 8,) which is attached to the lugs of two of the heads S, S, by bolts or pins, 34, which pass through inclined slots in the ends of the said bar. When the feed motion is in operation this bar falls of its own weight, or is pushed down by hand so that the top parts of the slots rest upon the bolts, and when it is in this position, as shown in Figs. 1 and 8, its upper edge is immediately below or touching the lever handle *x*, by which the clamps are made to grip the log. One end of this bar is brought at a proper time, by the descent of the heads, S, S, in contact with the inclined face of a small metal block 35, (see Fig. 1,) which is secured to one of the standards Q, Q, and forces it upward against the lever handle, *x*, until the tooth, *z*, under the said handle is raised from the notch which it occupied in the bar 12, and the clamps are thereby set free.

Immediately after the setting free of the clamps, it is desirable that their descent should be stopped. This stoppage is effected by the clamps coming in contact with the side pieces O, O, but offers no impediment to the continuation of the feed as the slots in the clamps through which the bar *m*, and screw, *n*, pass, allow the said bar and screw to descend freely as far as is desired. The releasing of the clamps, and stoppage of their descent are not required to take place so soon as the bottom of the clamps arrive on a level with the top of the side pieces O, O, and therefore recesses, 40, see Figs. 2, 4, and 8, are made in the said side pieces for the clamps to work in freely, and the clamps are not released till their points or bottom edges arrive nearly at the bottoms of the recesses. The stoppage is caused by their coming in contact with the bottoms of the recesses which may therefore be considered as stop pieces.

The construction and individual operation of the several parts of my invention having been described, I will proceed to describe the manner in which the operation of cutting veneers by it is conducted. The shafts are turned to bring the box or opening in the turn-table through which the log descends, over the highest part of the cutting table or that part which is level with the edge of the knife, and the log is then placed on the said part of the table in the position in which it is to be cut. The side pieces O, O, and P, P, are then adjusted to bring them close to the log but to allow it to descend between them freely. The feeding gear is next worked down by hand until the follower is in contact with the top of the log, and the clamps are then tightened by the lever handle *x*, and secured by bringing the tooth, *z*, under the said handle into a notch in the bar 12. The feed motion is supposed to have been adjusted before the putting in of the log, the adjustable portion of the cutting table in front of the edge of the knife being also adjusted at that time, when adjustment is necessary. The machine may be now set in operation by giving revolution to the driving shaft D, which will cause E, to revolve also, and giving reciprocating motion to the cutting table and the log carriage causing the log and the knife to meet and pass each other during every stroke. The log is suspended in the clamps so that its weight does not bear upon the cutting table or the knife as they pass, and is caused by the feed motion, every time it is brought over the lower part of the table during the backward motion of the knife and forward motion of the carriage, to descend upon the said lower part. Every forward motion of the knife shaves off that portion which is below the edge of the knife, and the said shaving passes under the knife as shown in Fig. 3, and falls into a suitable receptacle below. As the weight of the log is all borne by the clamps, it does not drag upon and thereby injure the edge of the knife during the backward movement made by the latter and forward motion made by the carriage preparatory to each new cut, but cannot descend until the clamps are caused to descend by the operation of the feed motion which does not take place until the log has passed the edge. The liberation of the log from the clamps does not take place until so little of the log remains, that it is not heavy enough to injure the knife in passing over its edge, and when liberated the log continues to be fed by falling over the edge of the knife to the lower part of the cutting table, and being followed by the follower until it is reduced to such a thickness as to slip between the carriage and the cutting table, after which the stoppage of the feed takes place.

My improved machine may be employed either in the manner represented and described, both the knife and the log being driven directly from the shafts D, and E, or by retaining the knife in the same position, and giving it the same motion, but driving the log across at, or nearly at, a right angle, as mentioned in the early part of the specification, to the movement of the knife. Or, the knife may be arranged parallel or nearly so with the ways, and both it, and the log, be driven directly from the shafts as described; or the log may be driven across at, or nearly at right angles to the knife while its edge retains its last named position relatively to the ways. If however it may for any purpose be desirable all the movement may be given to the log while the knife is stationary, or to the knife while the log is stationary, and in cutting in either of these ways the position of the knife and direction of the motion of the log may be varied in the same manner as when motion is given to both.

This machine is adapted to the cutting of all kinds of thin stuff, and may be used for cutting shingles by feeding the two ends or two sides of the log alternately, or by giving each side or end alternately a greater amount of feed than the other.

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

1. Cutting veneers or other thin stuff by giving to the shaving knife a rectilinear movement toward and through the log at the same time that a rectilinear movement is given to the log either transversely or diagonally to the movement of the knife so as to produce a long continuous drawing cut as described whether the said movements of the knife and log are produced by the precise arrangement of mechanical means described or any other substantially the same.

2. Making the ways N, N, upon which the log carriage moves adjustable as described relatively to the ways in which the knife and cutting table move, for the purpose of giving more or less of a drawing action to the cut, as the nature of the stuff to be operated upon may require.

3. Attaching all the necessary appendages for holding the log and feeding it to the knife, to a turn table L, capable of being adjusted circularly within the main frame or part K, of the log carriage as described, for the purpose of presenting the grain of the stuff at any desired angle to the edge of the knife or direction of the cut.

4. Suspending the log or block above the knife by gripping it with clamps Y, Y, which form part of a suspending head which supports the weight of said log or block and prevents it dragging over the edge of the knife during the backward movement of the latter and only allows it to be lowered under the control of suitable feeding mechanism.

5. Setting the lever handle *x*, which holds the clamps upon the log, free from the notched bar 12, by which it is secured for that purpose by means of the bar 32, and the inclined block 35, of which the former is attached to the suspending head, and the latter to some fixed point on the turn table of the log carriage, and the former is made to slide, by coming at a proper time in contact with the latter, in such a way as to raise the lever handle, as herein described.

6. Making the slots in the clamps which receive the bar, *m*, and screw, *n*, of such length that after the clamps are arrested by coming in contact with the proper part of the log carriage or turn table, the motion of the follower and the other parts of the feed motion may continue till it is desirable to stop them, as herein described.

7. The mechanism herein described for rendering the pawl of the feed motion inoperative and thereby stopping the descent of the suspending head and the feed of the log at the proper time, to wit: the bar 24, pin 26, spring 27, rod 28, arm 29, shaft 30, feather 31, and angle piece 32, the whole being combined and applied substantially as herein set forth.

CARMI HART

Witnesses:
S. H. WALES,
JNO. W. HAMILTON.