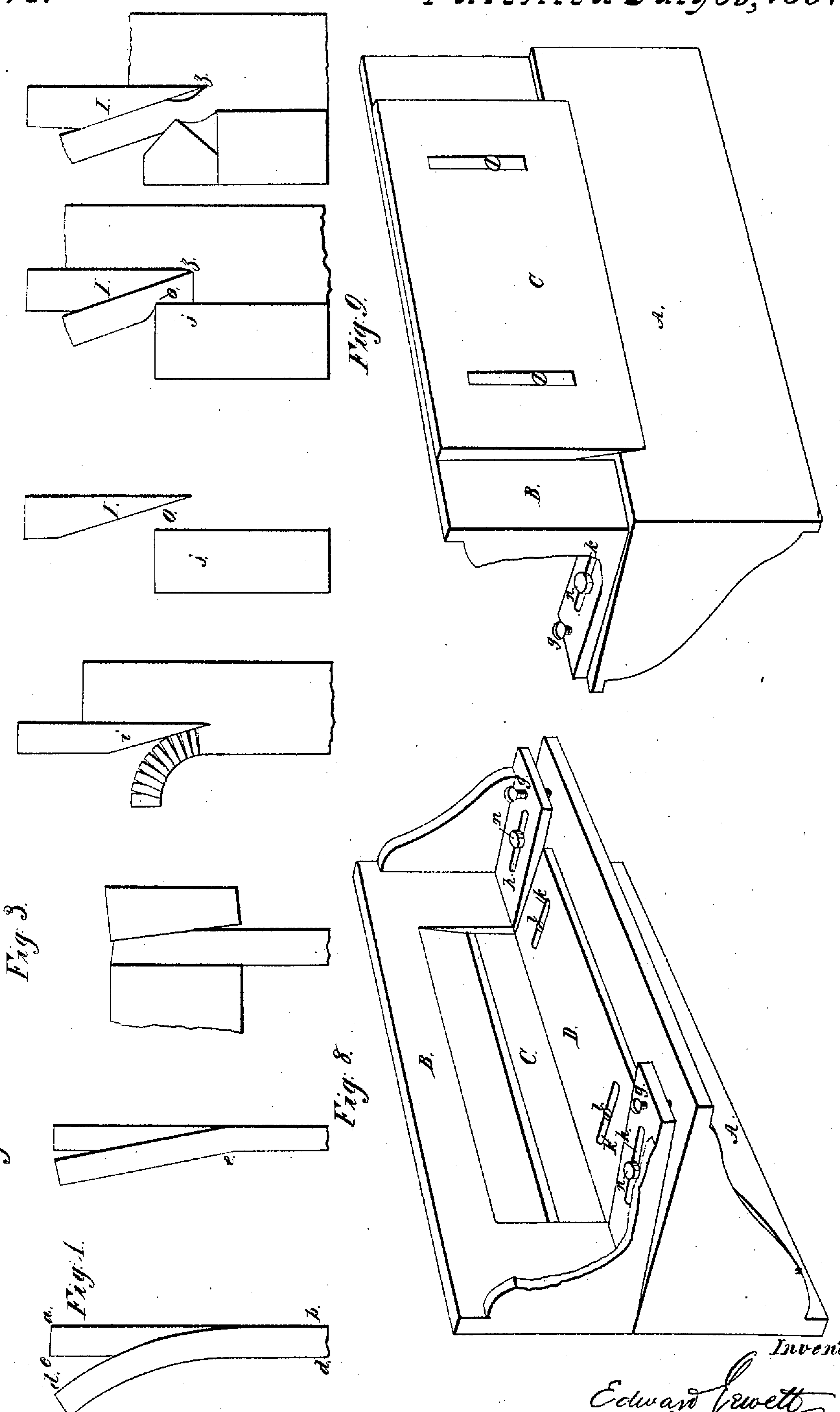
E. Jewett,

Cutting Veneers.

No. 67,312. Patented July 30, 1867.



Witnesses:

Chas. H. Poole.

D. B. Ventres.

Inventor:

Edward Jewett

By his Atty. R. D. O. Smith

United States Patent Office.

EDWARD JEWETT, OF RINDGE, NEW HAMPSHIRE.

Letters Patent No. 67,312, *dated July* 30, 1867.

IMPROVEMENT IN MODE OF MANUFACTURING VENEERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWARD JEWETT, of Rindge, in the county of Cheshire, and State of New Hampshire, have invented a new and useful improved Mode of Manufacturing Veneers, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figures 1, 2, 3, 4, 5, 6, and 7 are diagrams to illustrate my mode of cutting veneers.

Figures 8 and 9 are perspective views of front and rear of the cutter of my machine.

For convenience, whenever in this specification reference is made to the sheet severed in accordance with the principles of my machine, it will be called veneer, though said sheet may be many times thicker than that which is commonly known as veneer.

My invention relates to an improvement in the art of cutting veneers and the like, and consists in the application of pressure to the sheet, while being severed, in such a manner as to produce compression of the wood cells on the side of the sheet next the cutting-tool, from the cutting-edge backwards, to prevent elongation of the veneer on that side next the cutting-tool, and to afford a firm support to the sheet from the point of greatest pressure behind the cutting-edge, to a point as far forward as said edge, producing veneers or the like without rupture of the wood cells, and in all respects as perfect as though sawed from the block. These results are new to the art, and are produced by the application of philosophical principles not hitherto recognized. I deem it proper briefly to illustrate these principles and their operation, that the nature and scope of my invention may be perfectly understood.

Fig. 1 represents a thin tablet or veneer, say of wood; the sides *a b c d* are of equal length. If this tablet be flexed so that the end *c a* shall be brought to the points *a' c'*, then the two sides *a b* and *c d* will be of unequal length, and the inequality will be greater or less, in accordance with the thickness of the sheet, and this difference will be in consequence either of elongation of *a b*, compression of *c d*, or both combined. Suppose this to represent the flexure necessary to the passage of the knife, and that a sound veneer may be flexed this much, in the manner represented in fig. 1, without injury to the wood cells, but while being severed by a cutting-tool, the flexure is necessarily produced suddenly, and at the point of severance, so that the actual flexure is represented in fig. 2 at *e*. It is evident that the entire amount of elongation or compression exhibited in the flexure in fig. 1 is condensed at the point *e*, in fig. 2, and that an amount of flexure which will, as in fig. 1, be perfectly harmless to the wood cells, will, in the case represented in fig. 2, utterly destroy them. By the application of compression after severance, and of support both before and after the same, I am enabled to prevent the rupture of the wood cells while the veneer is being severed from the block.

If a body be moving between converging walls, but in a direction parallel with one of them, said movement will be affected less by that wall which lies parallel, than by the opposite wall, which lies oblique, to its line of motion. Whenever the term "line of motion" is hereinafter employed, it is to be understood as referring to the line of motion of that portion only of the moving body which is passing between the converging walls.

This effect is illustrated in fig. 3, in which the transverse lines were originally all parallel, and at right angles to the line of motion, but have been rendered otherwise by the unequal resistance of the sides or walls between which it is moving. It is well known that the tissue of wood is considerably elastic, and that its cells may be forcibly compressed to a considerable extent, and again recover their original size and form, but that they are not capable of much extension without rupture, and that this power of recovery after compression is much greater when the gummy contents of the wood cells are in a fluid state, and especially when heated also. The elasticity of wood is due to this susceptibility of compression and power of recovery. I will now proceed to describe the effects of compression, if applied in different ways, in a machine for cutting veneers.

If a veneer be severed by a cutting-tool, as in fig. 4, the sheet will curve away from the cutting-tool, and the severed surface will be elongated as it is carried around, for, being pressed aside by the cutting-tool, it is compelled to take the angle of the tool at the cutting point, and rupture of the wood cells will be the result, as illustrated in fig. 4, the radial transverse lines indicating the elongation and rupture of the convex sides. A veneer so cut will be of inferior quality, because one side will be filled with a great number of minute fractures, which will render it much more difficult to "work" satisfactorily, and for many purposes, where considerable strength is required, it is nearly worthless. To prevent this fracture is the object of my invention, and I accomplish it by the application of pressure to the sheet at a point behind the cutting-edge of the tool, as shown in fig. 6, so as to produce a compression of the wood cells at and behind said edge, to prevent the natural elongation of the severed side of the sheet. To produce the best effect, the greatest resistance should be offered to the passage of that side of the sheet which would otherwise be elongated, and in such a manner as to operate at the point of severance or greatest elongation, and thus prevent the rupture of the wood cells, which would otherwise take place, as they will expand, from their compression, to their original size and form without suffering any loss of integrity.

Fig. 3 illustrates the desired effect upon the wood cells. The surface of the side of this cutting-tool *i*, in fig. 6, is oblique to the line of motion, which is parallel with the surface of the plate *j*, and, as explained in relation to fig. 3, the wood fibres are caused to assume the position shown in fig 6, and that surface, which otherwise would cause the imperfection spoken of, is compelled to prevent those imperfections, by preventing that elongation of one side of the sheet which would occasion them. If the point of greatest compression be not behind the cutting-edge of the tool, the described result will not follow, and if the sheet being severed be not supported against a tendency to move laterally away from the surface *i*, the sheet will "buckle," as shown in fig. 7, and the fibres, moving upon each other, will rupture the surface on both sides. I therefore construct my machine so as to give a firm support to the sheet from a point as far forward as the cutting-edges, backward as far as the point of greatest compression, and the effect is the production of a cut veneer, perfectly sound and unruptured, as complete in every respect as though sawed from the block—a result hitherto unattained and unknown to the art. The mechanical devices which I employ to produce the result are simple and easily understood. I will now particularly describe them.

A represents the face of the machine, against which the block to be severed rests and moves. B is an adjustable "cutter-bar," to which the cutting-tool C is secured by screw-bolts properly disposed. In order to compensate for the wear incident to use, and repeated sharpenings, the holding-screws are inserted through slots, so that the tool may be set forward, to bring its edge to the proper point, as required. The bar B is made adjustable forward and backward, so that the cutting-edge may be set closer to or farther from the face A, to cut a thin or thick sheet as may be required, and it may also be inclined forward, more or less, to adjust the angle of the cutting-tool to the face A, so that it will sever different qualities of wood in the most satisfactory manner. These adjustments are made by means of the binding-screws *n n* and stop-screws *g g*, the former passing through the slots *h h*. The block to be cut is held and moved by some suitable and convenient mechanism. The cutting-tool is set, as shown in fig. 6, with its edge projecting beyond the edge of the face A, so as to form the converging throat or compression-chamber O, between the walls of which the sheet or veneer is forced, and its wood cells compressed most upon the side next the cutting-tool, in a direction opposite to its forward motion, in the manner and with the result above illustrated and described. The outer side of the edge of the cutting-tool is ground with a face-bevel, *z*, which has the effect to equalize or balance the pressure of the compressed sheet upon the tool, and render it much less liable to spring, while in operation. The friction upon the face A, within the throat O, is very great, and the edge of the face at the point of greatest contraction is rapidly worn away. I therefore make that portion of the face separate, in the form of an adjustable plate, D, which may be removed as often as necessary, for the purpose of "truing" up that edge which is exposed to the friction of the passing veneer. This plate is only required to be adjustable so that its edge may be set up flush with the surface of the face A—the only position in which it is ever to be used. This plate is secured by the screws *l l*, passing through the slots *k k*. The same beneficial results will follow whether the cutting-edge be diagonal or at right angles to the line of motion, and whether the block be moving in the direction of or transverse to its fibre.

Veneers cut by a machine operating in accordance with the principles herein set forth, and by mechanical means substantially the same as those shown and described, are not only perfectly sound and unfractured, but the surface is smooth, and one side is highly burnished. Veneers of different thicknesses may be cut by similar means, it being only required that the strength and power of the machine should be in proportion to the thickness of the sheet to be cut, and the density of the material to be divided. The thicker the sheet, the greater the required pressure and deflexion of the wood cells upon the convex side, because, on account of the greater thickness, the same amount of flexure necessarily requires a greater inequality in the length of the two sides. In the foregoing description reference has only been made to what is considered as the best arrangement to produce the required compression.

The applications of my mode of cutting veneers are very numerous, and the thickness of the stuff to be so cut is only limited by the possible strength of the machine. It is peculiarly applicable to the cutting of all thin stuff for sounding-boards for musical instruments, berry-baskets, picture-backs, cigar-boxes, &c. It is evident that the construction of the apparatus may be greatly varied without changing the relations between the cutting-edge and the face A, over which the block moves, and it is equally evident that the same principle will apply whether the block moves in a right or curved line, the only essential condition being that the sheet shall be compressed back of the cutting-edge, and on that side of the sheet which is toward the cutting-tool, sufficiently to prevent the absolute elongation and rupture of the wood cells, and this result being attained, the compression of the opposite side of the sheet, more or less, will be immaterial, provided the wood fibres are not crushed.

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

I claim the mode of manufacturing veneers herein set forth by compressing the veneer continuously from the point where it is severed from the bolt to a distance in the rear of the edge of the cutter, substantially as set forth.

EDWARD JEWETT.

Witnesses:

R. D. O. SMITH,

CHAS. H. POOLE.