

R. B. CANTRELL.

DOVETAIL TENON AND MORTISE JOINTS FOR JOINERY.

No. 187,962.

Patented March 6, 1877.

Fig. 1.

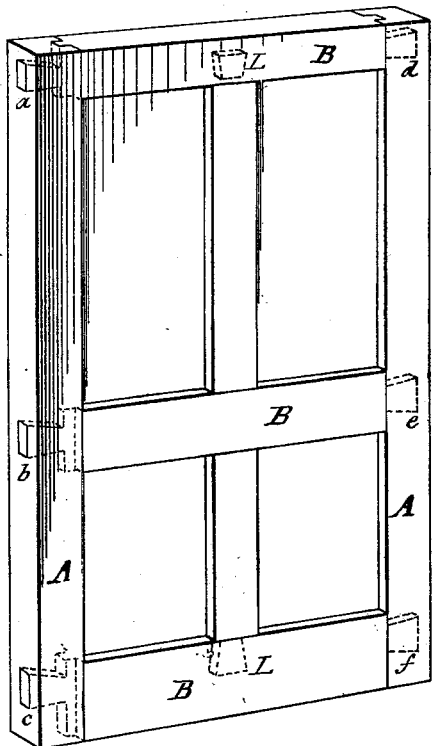


Fig. 2.

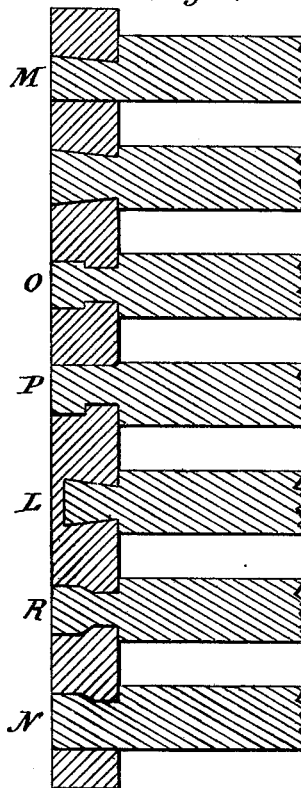


Fig. 3.

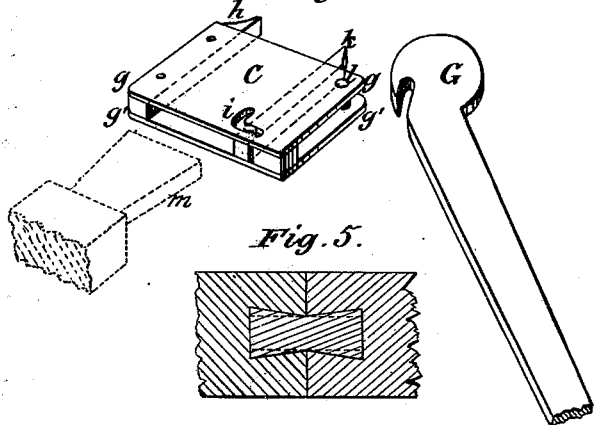


Fig. 4.

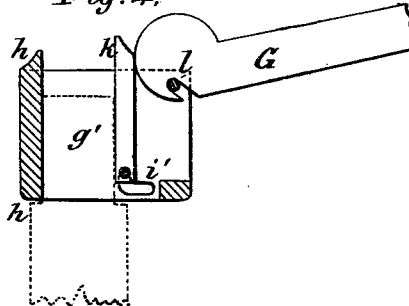
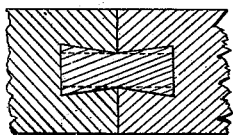


Fig. 5.



Attest:  
Eveland Dick  
D. P. Cole

Inventor:  
Robert B. Cantrell  
by Pollock & Bailey his attys

# UNITED STATES PATENT OFFICE

ROBERT B. CANTRELL, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN DOVETAIL TENON AND MORTISE JOINTS FOR JOINERY.

Specification forming part of Letters Patent No. **187,962**, dated March 6, 1877; application filed December 27, 1876.

*To all whom it may concern:*

Be it known that I, ROBERT B. CANTRELL, of Brooklyn, New York, have invented certain new and useful Improvements in Dovetail Tenon and Mortise Joints for Joinery, of which the following is a specification:

The dovetail joint so extensively used in carpentry and joinery on account of its solidity and durability is in woodworking one of the most difficult things to make, for unless its adjustment and fit are perfect, or nearly so, it will not answer its purpose. Its application also is necessarily limited to pieces which, to be joined, have the dovetail tenon and mortise on their ends, and show the same when united on the face of the work, for it is obvious, a dovetail tenon being larger on the outer end than the opening of the mortise, it is impossible to introduce the tenon into the mortise in the manner as ordinary tenons are, *i. e.*, lengthwise, but must be introduced into the mortise sidewise, and thus always must show the joint.

The object of this invention is twofold:—first, the formation of a dovetail-tenon joint in which the tenon and the mortise shall more tightly and accurately fit than this can be done by the ordinary mode of construction; secondly, the application of dovetail-tenon joints to work to which heretofore it could not be applied—that is to say, in places where the tenon is inclosed on all sides by its corresponding mortise. These objects I have attained and accomplished by simply compressing the tenon, previous to insertion into the mortise, and by subsequently expanding the same to its natural size, or to the dimensions to which it has been designed and cut.

To enable others to make and use my said invention I shall now proceed to describe the same with reference to the accompanying drawing, in which—

Figure 1 represents an isometrical perspective view of a door or sash made in accordance with my said invention. Fig. 2 shows, in section, various examples or forms of dovetail-tenon joints, formed on the end of cross-pieces, and inserted into an upright piece having corresponding mortises. Figs. 3 and 4 represent, respectively, in perspective and vertical section, an apparatus which is or may be used

for the compression of the dovetail tenous, as hereinafter shown and described.

To practically explain my invention I shall describe it as applied to the manufacture of doors or sashes, or other like frame. As heretofore made, the several pieces composing the frame were united by common tenon and mortise joint. To prevent their parting, care is taken to drive in from the outside, and between the outer end of the tenon and the mortise, small wedges or pegs.

In the course of time, as the wood becomes more seasoned and shrinks, these wedges or pegs are apt to become loose and work out, and thus eventually open the joints of the door and allow for the settling on one side or the other, or, as the term is, to get out of square. By my method of making such frames I cut into the uprights A dovetail-shaped mortises—that is, recesses, which are larger in the bottom than at the entrance, as shown at *a*, *b*, *c*, *d*, *e*, and *f*. Upon the ends of the cross-pieces B, in lieu of the ordinary tenons, I cut dovetail tenons—that is, a tenon which is deeper on the outside than on the inner end, but of the same width or thickness as the mortise. To introduce these tenons into their respective mortises I compress them in an apparatus suitable for the purpose, which will allow for the condensation of the fiber across the depth of the tenon, without, however, allowing it to expand sidewise. Such an apparatus is shown in Figs. 3 and 4, which consists of a quadrangular box, C, composed of two side plates, *g g* and *g' g'*, united at their opposite ends by an end piece, *h*. In the side plates are formed two rectangular slots, *i i'*, which contain the pivotal axis of a compression-lever, *k*. A fulcrum-pin, *l*, is provided at the upper angle, opposite the end piece *h*. The two side plates are a distance apart equal to the width or thickness of the tenon, and the slot is of such dimension that when the pivotal axis is in the most distant corner from the end plate, the space between the compression-lever and the said end plate will be such as to admit of the insertion of the tenon into the box, while, when the pivotal axis is at the other extreme corner of the slot, the distance between the pivotal end of the compression-lever and the end plate will be equal

to the reduced or inner end of the dovetail. In connection with this box I use a cam-lever, G, of the construction as shown in the drawing. In order to compress the tenon I insert it into the box, the lever *k* occupying the position indicated in Fig. 3. The compression-lever is now set to adapt itself to the face *m* of the tenon, by shoving the pivotal end toward the tenon and upward, lodging it into the upper corner of the slot. The hooked end of the cam is now brought to bear on the fulcrum-pin *l*, and by raising the lever (or by depressing it if the hook be upward) the compression-lever will be moved, and the tenon compressed until the sides of the tenon become parallel, or, for convenience to introduce it into the mortise, slightly tapering. The compression having been thus effected, the dovetail-tenoned piece is inserted into the corresponding mortise, where it is made to expand again to its original shape by the application of moisture or steam. A very perfect joint is thus made, even if the dovetail is not cut with the usual accuracy, and I deem it preferable to make the tenon in depth slightly exceeding that of the mortise, so that when expanded it will completely fill and more tightly fit the mortise than could be done by ordinary dovetail joints, however accurately cut.

It will be observed that this mode of joining two pieces of wood together need not necessarily show on the outside of the work any part of the joint. The mortise may be cut in one of the pieces, as shown at L, in the depth of the wood, and the tenon, when inserted, will be surrounded on all sides by unbroken texture of the wood. This mode admits also of different forms of dovetail tenons and mortises, as shown in Fig. 2, M representing a semi-dovetail—that is, an inclined face being cut on one side, leaving the other flush with the piece itself. N shows an inclined plane between two portions of an ordinary tenon, having different depths. O is a double-shouldered, and P a single-shouldered,

tenon. R shows a combined ordinary tenon and dovetail tenon.

In Fig. 5 I show another application of my invention, whereby a mortise may be cut in each of two pieces to be united, and a double dovetail piece, compressed to the shape indicated in dotted lines, inserted and swelled as above, constituting a perfect anchor, and rendering the pieces inseparable short of rupture.

It may be preferable, in some cases, to take off the extreme outer corners of the dovetail tenon to allow the tenons to be entered more easily into the mortise, and to obviate the danger of chipping off the edges of the tenon when being forced into the mortise. This may be particularly desirable when several tenons are to be introduced simultaneously into corresponding mortises, as I have found by practical observation that with some woods, and at certain seasons, when the atmosphere is damp, the tenons are apt to spring back, or swell so quickly that before the last tenon was compressed the first had already swelled and become too large to be introduced into the mortise.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The employment and use in joinery of compressed dovetailed-tenon joints, substantially as herein shown and described.

2. The method herein described of compressing dovetailed tenons for subsequent expansion in corresponding mortises.

3. Doors, sashes, and other analogous work of joinery or carpentry, the several pieces of which are united or joined together by means of compressed dovetail tenon joints, substantially as herein shown and described.

In testimony whereof I have hereunto signed my name this 5th day of December, A. D. 1876.

Witnesses: ROBT. B. CANTRELL,  
T. LLOYD DALTON,  
D. VAN WART.