(No Model.)

W. F. MORTON.

SPOKE TENON.

No. 381,270. Patented Apr. 17, 1888.

Fig. 1

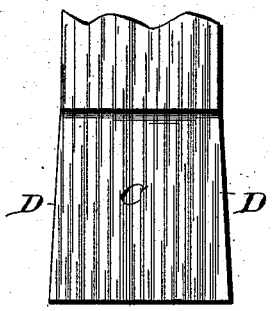


Fig. 2

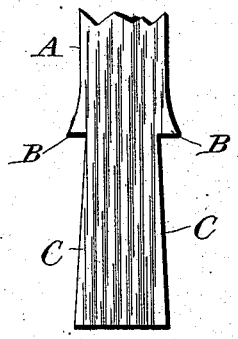


Fig. 3

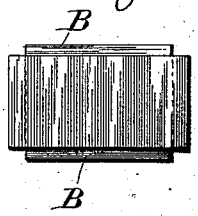


Fig. 4

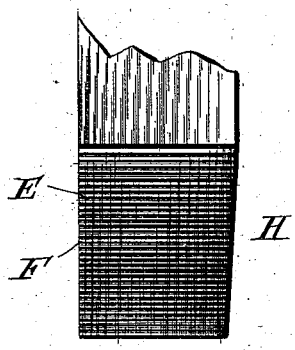


Fig. 5

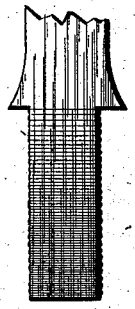
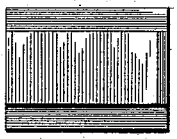


Fig. 6



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UNITED STATES PATENT OFFICE.

WILLIAM F. MORTON, OF NEW HAVEN, CONNECTICUT, ASSIGNOR OF ONE-HALF TO GEORGE F. HOLCOMB, H. SHERMAN HOLCOMB, AND HOBART B. BIGELOW, ALL OF SAME PLACE.

SPOKE-TENON.

SPECIFICATION forming part of Letters Patent No. 381,270, dated April 17, 1888.

Application filed April 23, 1887. Serial No. 235,836. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. MORTON, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Tenon and Mortise Joints; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

It has long been the aim of carriage-builders to compress spoke-tenons for the purpose of condensing their fibers, and hence making them stronger, reducing them in size and making them easier to drive and without injury to them or to the hubs into which they are driven, and of securing the locking action resulting from their expansion after they are in place in their mortises. With these general ends in view and heretofore, compressed spoke-tenons have been made by compressing a suitable blank edgewise or sidewise, or at different times both edgewise and sidewise. When compressed in one dimension, they will expand in the other dimension, and if then again compressed in the dimension in which expansion was previously allowed a second rearrangement of the fibers will ensue. Compressed tenons produced under any of these methods are frequently splintered and invariably weakened to a serious extent by the distorting rearrangement of their fibers, which are crushed, strained, and wrenched, so that the life of the wood is lost and the tenons permanently injured. Tenon-blanks have also been compressed by confining them in one dimension and compressing them in the opposite direction. This method involves the same derangement of the fibers as do the processes referred to above, although, perhaps, the fibers may not be forced so far from the lines of natural growth or so distorted and wrenched as in the said processes. This last-described method involves, however, under the appliances employed, the production of fins or burrs upon the corners of the tenons, caused by the pushing and crowding of the surface fibers through the openings necessarily left between the confining-blocks and the compressing mechanisms. These fibers must be removed from the tenons, which are therefore deprived of fibers which should have contributed to their strength. All other methods of compressing tenon-blanks have also involved the same objections of forcing the fibers out of their natural relative positions and away from the lines of their natural growth, and of producing burrs or fins, depriving the tenons of their full complement of fibers, and therefore making them weak. It has also been suggested to form a compressed tenon by compressing a blank without any attempt to shape it in the form of a tenon, and then to cut the compressed blank down to the required form. This process would not only involve the objections stated, of distorting and weakening the fibers, but also the further objection of removing some fibers and cutting others so as to greatly weaken the tenon.

The objections above recited to compressed tenons, and especially that of their impairment in strength, has justly resulted in a feeling of prejudice against them, and so strong has this feeling been that the makers of high-class carriages have looked upon the whole subject with extreme distrust.

My invention is designed to avoid the above objections, to place the matter of condensing spoke-tenons on a practical basis, and to condense a tenon without cracking or splintering it, without twisting, distorting, or wrenching its fibers, and without the production of any burrs or fins upon its corners to be removed before it is driven. In other words, the object of my invention is to produce a compressed spoke-tenon preserving the life of the wood unimpaired, retaining its full complement of fibers, and being superior in strength to an ordinary tenon, easier and safer to drive than such a tenon, and maintained rigidly in its mortise by its power of expansion thereinto.

With these ends in view my invention consists in a compressed tenon having its fibers uniformly compacted by simultaneous sidewise and edgewise compressions.

My invention further consists in a tenon-blank having both of its sides and both of its edges beveled, so as to gradully widen it both

sidewise and edgewise from its inner to its outer end.

My invention further consists in certain other details and features, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a broken view, in side elevation, of a spoke having a tenon-blank formed in accordance with my invention. Fig. 2 is a similar edge view of the spoke and blank. Fig. 3 is an end view showing the blank and the shoulders of the spoke. Fig. 4 is a view in side elevation showing the tenon produced by simultaneously subjecting such a blank to edgewise and flatwise compression. Fig. 5 is an edge view showing the tapering back of the tenon; and Fig. 6 is an end view of the tenon, showing also the shoulders of the spoke.

Under my invention a spoke, A, having shoulders B B, is provided with a tenon-blank having its sides C C and its edges D D beveled, so as to gradually widen it both flatwise and edgewise from its inner to its outer end. This blank is simultaneously subjected to edgewise and flatwise pressure to form, without any subsequent dressing operation involving the removal of some of its fiber, a compressed tenon having flat sides E E, indented to increase their capacity for retaining glue, a flat forward edge, F, constituting its face, and a tapering rear edge, H, constituting its back, the blank being compressed more at its outer than at its inner end. The blank is also compressed more edgewise than flatwise, because the hub will bear without splitting more longitudinal than transverse strain. Before the tenon so compressed has had an opportunity of recovering its original or blank shape it is introduced into a mortise of ordinary form, which it expands into and fills, and in which it is held under a strong pressure outward and especially from its edges. The expansion of the tenon being proportional to its compression, it swells most at its outer end, which occupies the bottom of the mortise, where it is virtually locked, and where the greatest strain occurs, the leverage of the spoke being the greatest at that point.

By subjecting the blank to edgewise and flatwise compression simultaneously its fibers are preserved in their original relative arrangement, being simply brought closer together in the lines of their natural growth without breaking the bonds of natural process. If in beveling the back of the tenon the fibers at such point are deflected from the lines of natural growth, the deviation will be too slight to be of practical importance. The wood is condensed, and therefore made stronger, without in any way impairing the life of the fibers, which are neither wrenched, twisted, cut, nor pushed off in the form of burrs or fins, as incident to the old processes; nor are the tenons cracked or splintered or otherwise weakened, as they have been formerly. Moreover, by compressing the blank so as to form a tenon all ready for driving, and so avoiding preparing the tenon for driving by removing burrs or fins, or without other dressing operation involving removing a portion of its fiber, the full strength of the wood is not only preserved, but an economy of time and labor is effected. Furthermore, by forming the tenons by simultaneous sidewise and edgewise compression, the pores of the wood are drawn together and completely closed, whereby the tenon is prevented, when in its mortise, from taking up any of the oil which may reach it from the box, as often happens, whereas a splintered tenon or one having its pores broken or imperfectly closed will readily absorb such oil and work loose, and can never be made to hold again, but will always play in its mortise.

It is obviously not necessary to simultaneous flatwise and edgewise compression that the tenon-blank be beveled on both sides and both edges, as described, although that form is preferred.

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

1. A burrless compressed tenon having its fibers uniformly compacted and the bonds of natural process between them preserved unbroken by simultaneous edgewise and sidewise compression, substantially as set forth.

2. A burrless compressed tenon having straight sides, a straight face, a beveled back, and its fibers uniformly compacted, and the bonds of natural process between them preserved unbroken by simultaneous edgewise and sidewise compression, substantially as set forth.

3. A tenon-blank having both of its sides and both of its edges beveled, so as to gradually widen it both sidewise and edgewise from its inner to its outer end, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM F. MORTON.

Witnesses:

GEO. F. HOLCOMB,

CHAS. B. SHUMWAY.