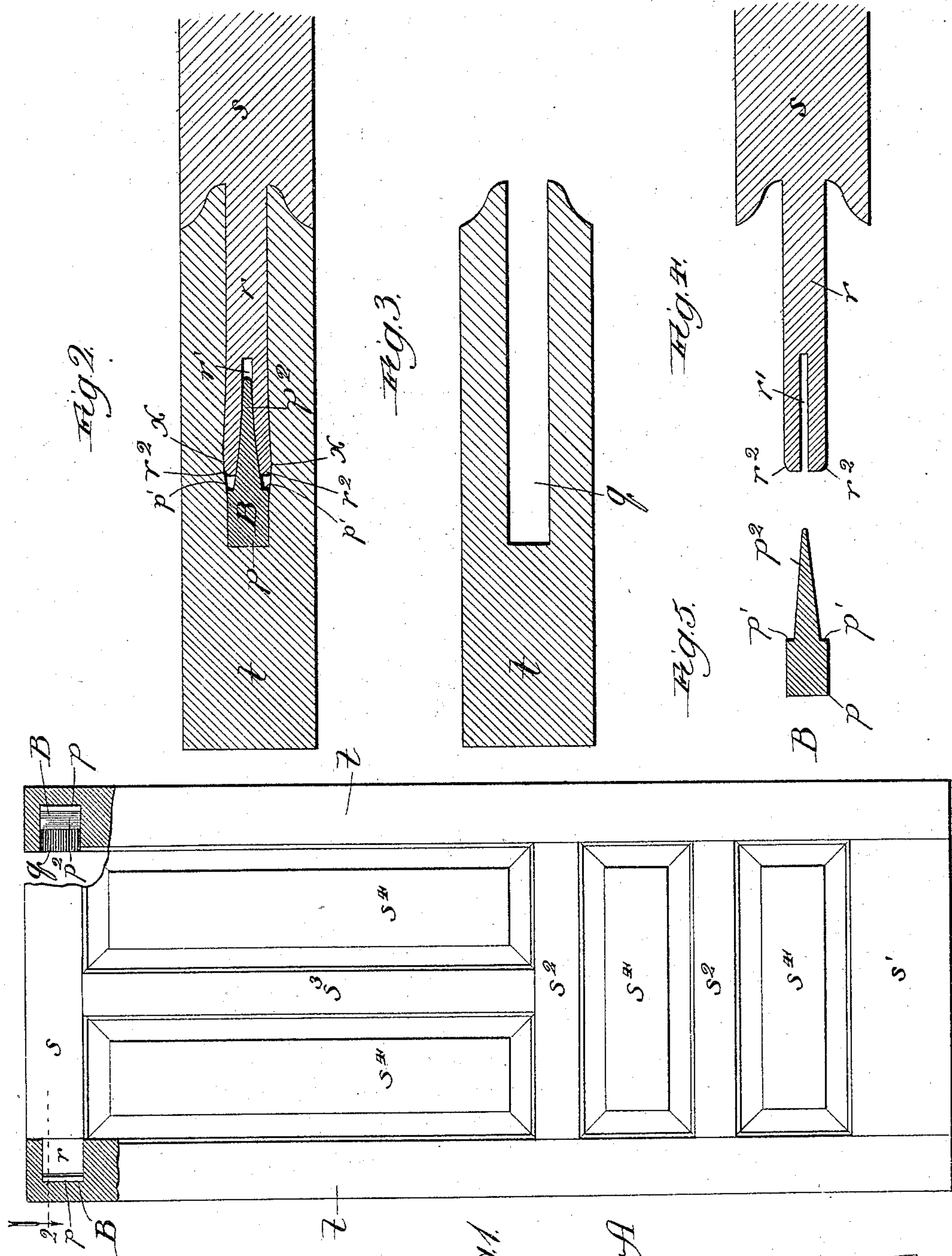


(No Model.)

A. H. STANGE.  
DOOR.

No. 533,203.

Patented Jan. 29, 1895.



Witnesses:  
*Chas. E. Gaylord,*  
*J. W. Dyrenforth,*

*Fig. 1.*

*A*

*Inventor:*  
*August H. Stange,*  
*By Dyrenforth & Dyrenforth*  
*Attys.*



# UNITED STATES PATENT OFFICE.

AUGUST H. STANGE, OF MERRILL, WISCONSIN.

## DOOR.

SPECIFICATION forming part of Letters Patent No. 533,203, dated January 29, 1895.

Application filed September 11, 1894. Serial No. 522,718. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST H. STANGE, a citizen of the United States, residing at Merrill, in the county of Lincoln and State of Wisconsin, have invented a new and useful Improvement in Doors, of which the following is a specification.

My invention relates to improvements in the construction of panel doors of the class in which the transverse rails and stiles are secured together by tenons entering blind mortises.

Doors of this class possess advantages over those in which the mortises extend entirely through the stiles, for the reason first that the strips from which the tenon-ended rails are formed may be shorter, thus effecting a saving in lumber quite material where the manufacture is carried on upon a large scale; and, second, the edges of the stiles present plane surfaces unbroken by the appearance of the ends of the tenons, thereby rendering the edges less difficult to dress down, in fitting the door to its casing, and enhancing the appearance of the door.

It is usual to fasten the tenon-ended rails in the mortises of the stiles with glue. In factories where the doors are made in large numbers, and rapidity in turning them out is a matter essential to the profits, it is of serious consequence that the doors be handled at once after being put together and without waiting for the glue to set. Moreover, it would be a matter of more or less difficulty to fit the parts and glue them together, without their spreading apart in places, unless some fastening means were employed to hold the tenons in the mortises while the glue is becoming set.

My object is to provide fastening means of an improved construction for holding the rails and stiles of a door firmly together (whether or not the parts are also glued), which may be quickly and easily applied and be particularly economical and effective.

To these ends my invention consists in providing a longitudinally extending slit in the end of each tenon, and a wedge in the base of each mortise to enter and engage the slit, as the parts are squeezed together, and bind the free end of the tenon against the walls of the mortise.

In the drawings—Figure 1 is a door, the up-

per corner-portions of which are broken away to show the application of my improvement; Fig. 2, an enlarged broken section on line 2 of Fig. 1; Fig. 3, a cross section of a stile showing the mortise; Fig. 4, a broken cross-section of the end-portion of a rail showing the slitted tenon; and Fig. 5, a cross-section of the wedge as I prefer to provide it.

A is a door consisting of the stiles  $t$ , top-rail  $s$ , bottom-rail  $s'$ , intermediate rails  $s^2$ , muntin  $s^3$  and panels  $s^4$ .

The rails are all provided, at each end, with the usual tenon  $r$  and in the end of the tenons I provide longitudinally extending recesses or slits  $r'$ . The blind mortises  $q$  in the stiles I form of a depth somewhat in excess of that of the tenons, the preferred relative proportions being as indicated in the figures.

B is a wedge approximating in length the length of the mortise and tenon, and provided preferably with a head-portion  $p$ , shoulder  $p'$ , and tapering tongue  $p^2$ . The head portion  $p$  is of a size in cross-section approximately equal to that of the mortise in which it is placed.

In practice a wedge B is placed in each mortise, as shown in Figs. 1 and 2, the engagement of the head  $p$  with the walls of the mortise operating to position the point of the wedge at the center of the mortise, whereby when the tenon is passed into the mortise the point will enter the slit  $r'$  and not be upset by contact with the end of the tenon. As the parts are squeezed or driven together the bifurcated end of the tenon is expanded by the wedge to indent itself into the walls of the mortise, as indicated at  $x$  in Fig. 2.

By having the head  $p$  the full size of the mortise, especially when pine and other soft wood is employed, there is no danger of the wedge, at its large end, being pressed into the wood at the base of the mortise. The wedge should be placed in position before the tenon is caused to enter the mortise, and not passed in with the tenon, because should the wedge meet with any obstruction, as by binding against the walls of the mortise, it would expand the tenon prematurely and make it difficult, if not impossible, to bring the meeting edges of the rail and stile together.

To prevent splintering of the edges of the tenon, I prefer to bevel or round them off as



shown at  $r^2$ , and any dust forced along by the end of the tenon will lodge in the spaces left between the ends  $r^2$  and the shoulders  $p'$ .

In practice, I prefer to so form the mortise, 5 wedge and tenon, that when the parts are driven or squeezed home, the wedge will cause the bifurcated end of the tenon to indent itself say one-sixteenth of an inch at each side in the walls of the mortise. The indentations 10  $\alpha$  thus form shoulders, and any strain in the direction of drawing the tenon out of the mortise would tend only to bind the parts more firmly together. Thus even without the employment of glue my improvement affords a 15 secure fastening which will prevent spreading of the joints of the door.

In the manufacture of doors, tenons have been fastened in blind mortises by recessing the mortises at opposite ends, across the grain 20 of the wood, and expanding the tenons therein with wedges driven into and crosswise of the tenons. My improvement obviates the necessity of forming dovetail mortises in the stiles and, besides, forms a much more secure fastening. When dovetail mortises, formed as 25 described, are employed, only the opposite narrow edge-portions of the tenons are expanded, and as they extend across the grain of the wood they do not indent themselves in 30 the mortise ends. Thus they offer comparatively little frictional resistance against withdrawal of the tenons. In my improved con-

struction the side edges of the tenons are expanded in a line with the grain of the wood of the stile, whereby they indent themselves 35 in the latter along the full length of the tenon.

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

1. In a door, fastening means between a rail and stile thereof, comprising a blind mortise 40 in the stile, a tenon on the rail fitting said mortise and provided with a longitudinally extending recess  $r'$  in its end, and a wedge in the base of the mortise, and extending longitudinally thereof, to enter the said recess and 45 expand the end-portion of the tenon laterally to indent it at its opposite longitudinally extending sides in the mortise wall, in a line with the grain of the wood thereof substantially as described. 50

2. In a door, fastening means between a rail and stile thereof, comprising a blind-mortise in the stile, a tenon on the rail provided with a recess in its end, and a wedge having a beveled tongue and a head to fit the base of the 55 mortise and position the tongue, whereby as the tenon enters the mortise its recess receives the tongue of the wedge, and the tenon is expanded at its end-portion, substantially as and for the purpose set forth.

AUGUST H. STANGE.

In presence of—

WESLEY D. MARTIN,  
JOHN G. WENZEL.