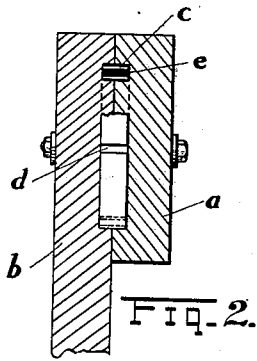
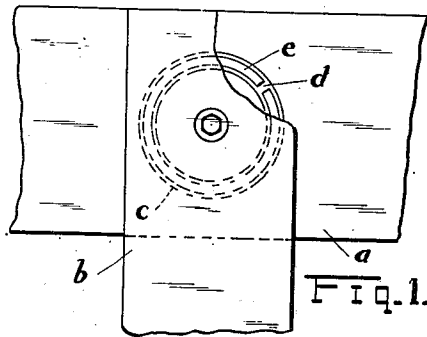
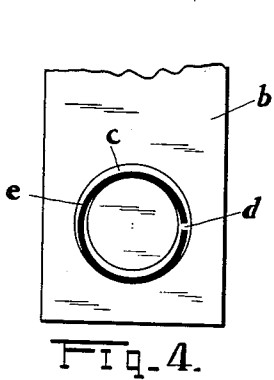
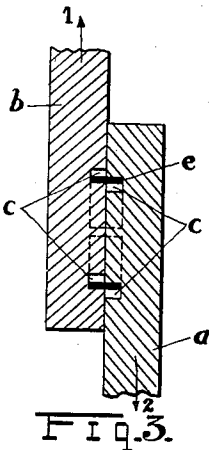
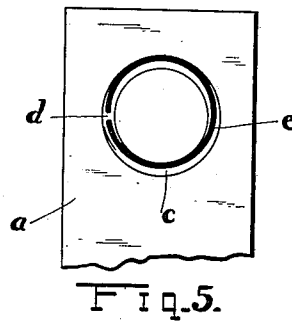
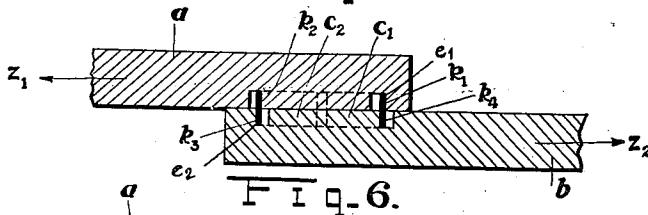
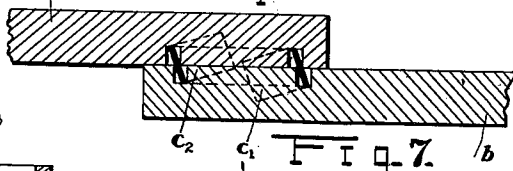
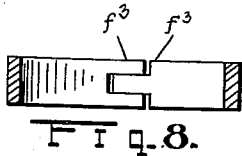
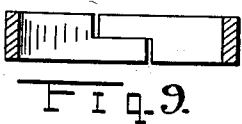
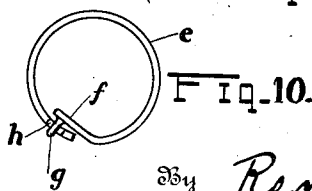


S. VOSS.
RING DOWEL FOR THE CONNECTION OF WOOD PIECES.
APPLICATION FILED JUNE 24, 1920.

1,409,320.

Patented Mar. 14, 1922.



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UNITED STATES PATENT OFFICE.

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RING DOWEL FOR THE CONNECTION OF WOOD PIECES.

1,409,320.

Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed June 24, 1920. Serial No. 391,528.

To all whom it may concern:

Be it known that I, SAMUEL VOSS, a citizen of the German Republic, residing at Breslau, in the German Republic, have invented certain new and useful Improvements in a Ring-Dowel for the Connection of Wood Pieces, (for which I have filed applications in Germany Mar. 10, 1918, Belgium Feb. 20, 1919, Denmark Aug. 14, 1918, Holland Nov. 26, 1918, Norway Aug. 17, 1918, Austria Aug. 3, 1918, Sweden Aug. 16, 1918, and Switzerland Aug. 2, 1918,) of which the following is a specification.

If in wood connections considerable tensile force has to be transmitted, not only the compressive strain (pressure from friction) but also the shearing strain becomes very considerable at the joints so that the wood parts must be able to take up the force of compression as well as the shearing force. Such connections, in which a ring-dowel engages with co-axial borings of the wood parts to be connected in which a separate wooden core, independent of the wood parts, is inserted, are not well adapted for the transmission of considerable forces. In such case the wooden core is well adapted to sustain the shearing strain, but the shearing force is not directly transmitted upon the wood parts to be connected. The ring-dowel-connection must therefore be arranged in such a manner, that the ring-dowel is inserted in co-axial circular grooves of the wood parts to be connected, as in such case the wooden core in the ring-dowel forms part of the wood pieces, the shearing strain to which it is submitted being transmitted to the wood parts.

The connections of the last named type through ring-dowels inserted in circular grooves of the wood parts are nevertheless not adapted to transmit considerable tensile forces because the ring-dowel is closed. In order to obtain the large surface of friction required for the transmission of considerable forces, large and thick rings must be used (of a diameter up to the thickest woods, e. g., up to about 30 cm.). It is, however, impossible to produce upon the builder's yard, with the aid of usual tools, circular grooves of exactly the dimensions required so that the ring-dowel fits well into the same. One is therefore forced to make the grooves wider than the ring is thick. Even with

ring-dowels of smaller diameter it will happen—in consequence of inaccurate work—that the ring-dowel has lateral play in the grooves. Closed rings are further not very elastic so that they cannot sufficiently alter their shape under the influence of the various strains to closely bear all round against the wall of the grooves. If, therefore, a closed ring-dowel is in contact with the wooden core at its inner surface, but not in contact with the wall of the groove, only the wooden core inside the ring-dowel will be utilized for transmitting the forces but not the outside of the core. If, however, the ring is in contact with the wall of the groove but not with the wooden core, only the wood outside the ring, but not the core will assist in the transmission of forces.

The present invention has for its object, to avoid these inconveniences through using a split ring-dowel which, under the strains to which it is submitted, will expand or contract until it is in contact in both grooves not only with the outer wall of the grooves but also with the outer wall of the wooden core, said core as well as the wood of the parts connected being simultaneously utilized for the transmission of forces.

The split ring-dowel possesses further the advantage that it is easy to insert it into the grooves as it is neither necessary to drive the ring-dowel into the groove of the one part nor to drive the groove of the other part upon the ring-dowel. The connection of said parts is thus greatly simplified.

In the accompanying drawing the improved connection of wood parts is shown by way of example.

Figure 1 is a face view of timbers having the ring-dowel of my invention interposed between them, one of the timbers being broken away to show the ring-dowel and groove in full lines, the width of the groove relative to the thickness of the ring being exaggerated.

Figure 2 is a cross sectional view of the construction shown in Figure 1, taken in the plane of the axis of the ring-dowel.

Figures 3, 4 and 5 are views illustrating in cross section and in plan views, possible changes in position of the ring-dowel relative to the grooves in which it is received, due to relative movement of the juxtaposed timbers, the width of the grooves relative to

the thickness of the ring-dowel being, in this view as in Figures 1 and 2, exaggerated for the sake of clearness.

Figures 6 and 7 are cross sectional views illustrating the possible distortion of a split ring-dowel not having engaging ends, by relative movement of the timbers, and

Figures 8, 9 and 10 show constructions at the ends of the split ring-dowel by which they are caused to so engage as to avoid the distortion indicated in Figures 6 and 7.

The wood parts *a* and *b* have circular grooves *c* in the surfaces which have to be brought into contact and a ring-dowel *e*, split at *d* is inserted in said grooves *c*. The wood parts *a* and *b* are fixed upon one another by a screw-bolt. If in the wood two equal tensile strains Z^1 , Z^2 act in opposite directions (Fig. 3), the ring-dowel *e* is— with its outer surface in contact with the upper outer wall of said groove, the inner surface of the ring-dowel being in contact with the lower part of the circumference of the wood core. In the wood part *b* (Fig. 4) the outer surface of the ring-dowel is in contact with the lower part of the wall of the groove, its inner surface being in contact with the upper part of the circumference of the wood core.

If the ring-dowel is constructed in the manner described there will sometimes result from the action in the woods of the tensile forces Z^1 and Z^2 which are of equal value, undesired modifications of the form of the ring-dowel. The tensile forces call forth at the points indicated in Fig. 6 the inner forces k^1 , k^2 , k^3 and k^4 . The forces k^1 and k^4 on the one hand act upon one half e^1 of the ring in form of a torsion moment which tends to bring this half of the ring from the position shown in Fig. 6 to the position shown in Fig. 7. The forces k^2 and k^3 combine similarly to a torsion moment acting upon the other half e^2 of the ring which under the influence of this torsion moment tries to adopt the position in Fig. 7. Owing to these torsion moments the free ends of the ring dowel will partly be pressed into the wood *a* and partly into the wood *b*.

This objectionable effect will be avoided if, according to the present invention, the free ends of the ring are secured from displacement, the one with regard to the other, the facility of the ring-dowel for expanding and contracting being preserved.

Figs. 8 to 10 show means for preventing this undesired modification of the form of the ring-dowel.

One of these means consists, e. g., in joining the ring ends f^3 after the manner of a tongue-and-groove (Fig. 8) or after the manner of half a tongue-and-groove (Fig. 9) or in steps. In the latter case it is essen-

tial that the ring-dowel be accurately placed in the circular grooves of the two woods as, if e. g., the ring-dowel should not be placed in the woods *a*, *b* in the position shown in Fig. 8 but in a position turned through an angle of 180° around an axis standing perpendicular to the plane of the drawing and if in this position the forces Z^1 , Z^2 should act upon the ring in the direction indicated in Fig. 6, the spreading asunder of the end of the ring under the action of the inner forces could not be prevented.

Another means consists, e. g., in joining the ends according to Fig. 10 by means of a stud *g* of an extension *f* at one end engaging with a longitudinal slot *h* of the other end of the ring.

As above pointed out, the width of the grooves relative to the thickness of the split ring-dowel is exaggerated in the drawings for the purpose of clearness. In practice it is necessary only that the grooves be enough wider than the thickness of the split ring-dowel to permit the ring to be inserted in them without the use of force.

I claim:—

1. A joint comprising two juxtaposed timbers having co-axial annular grooves in their contacting faces, and a split ring-dowel disposed in said grooves, the width of the grooves being greater than the thickness of the dowel.

2. A joint comprising two juxtaposed timbers having co-axial annular grooves in their contacting faces, and a split ring-dowel disposed in said grooves, the width of the grooves being sufficiently greater than the thickness of the dowel-ring to permit it to enter them freely and the ends of the dowel-ring being provided with means for so engaging one with the other as to prevent relative movement of said ends in the direction of the axis of the ring without preventing variation of the diameter of the ring.

3. A joint comprising two juxtaposed timbers having co-axial annular grooves in their contacting faces, and a split ring-dowel disposed in said grooves, the width of the grooves being sufficiently greater than the thickness of the dowel-ring to permit it to enter them freely and the ends of the dowel-ring having a tongue and groove connection one with the other whereby relative movement of the ends in the direction of the axis of the ring is prevented without preventing variation of the diameter of the ring.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL VOSS.

Witnesses:

FERD UNSCH,
EMIL WEINERT.