No. 717,709. PATENTED JAN. 6, 1903.

C. F. NISSEN.

WHEEL HUB.

APPLICATION FILED SEPT. 8, 1902.

NO MODEL.

Fig. 1.

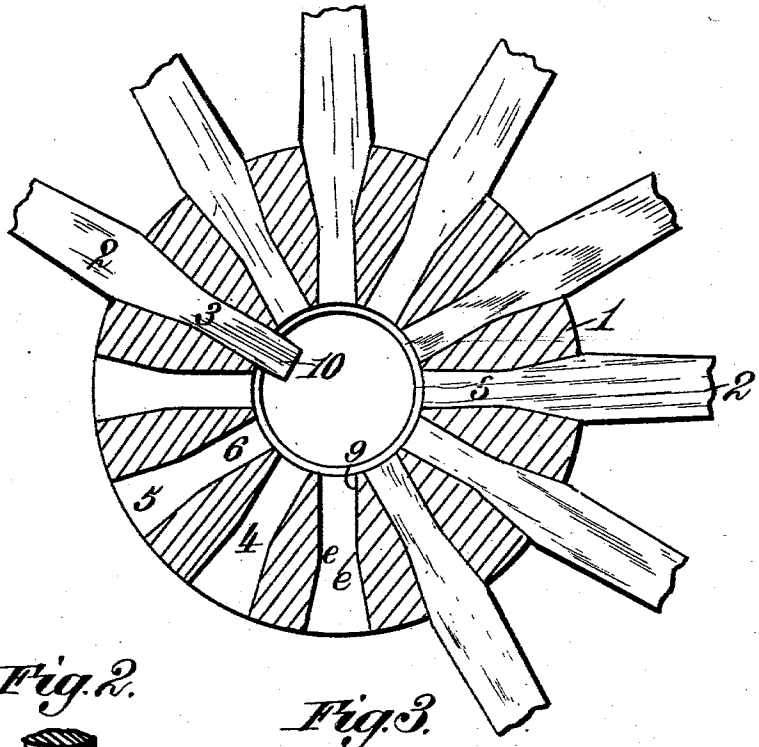


Fig. 2.

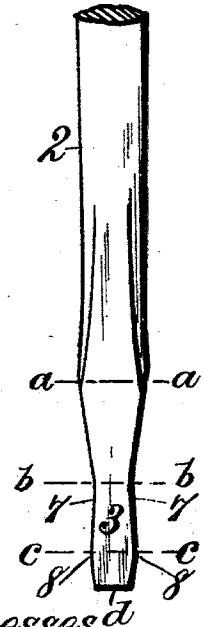


Fig. 3.

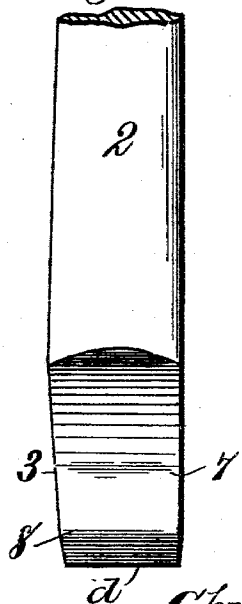
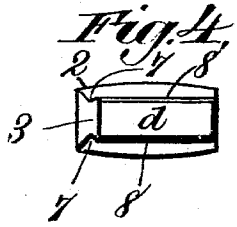


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHRISTIAN F. NISSEN, OF WINSTON-SALEM, NORTH CAROLINA.

WHEEL-HUB.

SPECIFICATION forming part of Letters Patent No. 717,709, dated January 6, 1903.

Application filed September 8, 1902. Serial No. 122,629. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN F. NISSEN, a citizen of the United States, residing at Winston-Salem, in the county of Forsyth and State of North Carolina, have invented new and useful Improvements in Wheel-Hubs, of which the following is a specification.

My invention relates to certain new and useful improvements in wheel-hubs made of wood, and has for its object to provide a novel manner of securing the spokes or spoke-tenons within the hub.

In order that the invention may be clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a cross-sectional view through a hub, showing several of the recesses unprovided with spoke-tenons adjacent thereto, one of the tenons in position and before its inner end is cut off and a number of tenons in position in the hub and having their inner ends cut off. Fig. 2 is an edge view of the inner end or tenon portion of the spoke. Fig. 3 is a side view of the same, and Fig. 4 is an end view of said spoke.

Referring now to the drawings, 1 indicates the hub, which, as usual, is formed as an integral structure; 2, the spokes; 3, the tenons of the spokes, and 4 the recesses into which said tenons are designed to be inserted. These recesses, as shown, are each provided with an outwardly-flaring portion 5, extending from about the center of the recess to the outer surface of the hub, and with a portion 6, extending from the center to the inside of the hub, and the side walls of which are substantially parallel. Each spoke 2 has its tenon 3 commencing at a point indicated by the dotted line *a a* in Fig. 2, which indicates the thickest part of the tenon. From this point the two sides of the tenon are cut away on converging lines to about the center of the tenon, as indicated by the line *b b*, which also indicates the thinnest part of the tenon. From the point indicated by the line *b b* the sides of the tenon diverge to a point indicated by the line *c c*, where the tenon, though slightly thicker than at the point *b b*, is of considerably less thickness than at the point *a a*. From the point *c c* the sides of the tenon converge to the inner end *d* of the spoke. It will thus be seen that from the point indicated by the line *b b* the tenon flares inward to the point *c c* and outward to the point *a a*, thus presenting an angular recess 7 on each side of the tenon and between the two points indicated. At the point *c c* the sides of the tenon are rounded or curved, as indicated by the numeral 8, to avoid presenting sharp edges, which would have a tendency to tear the walls of the recesses 4 when the spokes were driven in.

In order to insert a spoke, the tenon is first dipped in hot glue and then inserted in a recess 4 and driven home. In this operation there will be a mutual compression of the wood of the hub and spoke beginning in the spoke at the enlarged portion *c c* and in the hub at the point indicated by *e e*, where the flaring portion of the recess 4 ends and the straight portion 6 begins. As the enlarged portion *c c* enters farther and farther in the portion 6 of the recess, however, the resistance of the wood of the hub will gradually become less and less, owing to the constantly-diminishing thickness of the walls 9 between the recesses, and hence the wood of the hub will be compressed to conform to the shape of the tenon. When driven home, the end portion of the tenon between *d* and *c c* will project within the hub, as indicated by 10 in Fig. 1, the widened portion *c c* will lie flush with the inner wall of the hub, and the enlarged portion *a a* will lie flush with the outer wall or surface of the hub. The projecting portion 10 of the spoke is now cut off or chamfered, so that the inner end of the tenon shall conform to the curvature of the inner wall of the hub. This cut will extend through the enlarged portion *c c* of the tenon.

In order to prevent the withdrawal of the spokes from a wooden hub, it has been customary to insert a wedge in their inner ends to widen such ends. It will be seen, however, that by my construction I secure a widened inner end to the tenon without the necessity of using a wedge. This feature, aside from its simplicity and consequent economy, is important, for the reason that it permits the ends of the tenons to be readily chamfered away without any danger of impairing the security of their engagement with the hub, whereas when wedges are employed

there is always danger that the chamfering-tool will loosen or pull out some of the wedges. Furthermore, it will be seen that the tenon gradually widens from the center *b b* to the inner end *c c*, so that the spoke cannot be withdrawn after having once been inserted in the hub. It will also be seen that the tenon widens gradually from the center *b b* to the line *a a*, which latter coincides with the outer surface of the hub, thus rendering it impossible in use for the spoke to be driven farther into the hub and be loosened from the felly of the wheel.

Heretofore the usual means employed for preventing the spokes from being pressed farther into the hub consisted in forming shoulders on the spokes which would rest on the outer surface of the hub. The outer surface of the hub soon becomes softened from the effects of exposure to rain, and these shoulders will press farther and farther into the hub, so that the spokes will in a comparatively short time become loose. It will be seen that with my construction the points of greatest resistance to the inward movement of the spokes are in the line *e e* at the center of the recesses 4, and these points are well within the hub and protected from the action of the atmosphere. By dispensing with the use of the shoulders I am enabled to employ the greatest thickness of the tenon at the point where it is most needed—that is, at the surface of the hub, where the greatest strain on the spoke occurs. This construction of tenon affords the necessary resistance to the inward movement of the spoke and avoids the possibility of "creaking" in the wheel, which is an objection incident to all wheels employing shouldered spokes after they have been in use for any considerable length of time.

Having thus fully described my invention, what I claim as new is—

1. A wooden wheel-hub formed as an integral structure and having a series of radially-disposed recesses, each of which is larger at its outer end than at the center, and a series of spokes having tenons inserted endwise in said recesses, said tenons being out of contact with each other and larger at their inner ends than at the center.

2. A wooden wheel-hub formed as an integral structure and having a series of radially-disposed recesses formed therein, said recesses having two side walls converging from their outer ends to about the center, and from the center extending substantially parallel to the inner ends of the recesses, and a series of spokes having their tenons inserted endwise in said recesses, said tenons gradually increasing in thickness from the center to the inner and outer surfaces of the hub, and having their thickest points at said outer surface of the hub.

3. A wooden wheel-hub formed as an integral structure and having a series of radially-disposed recesses formed therein, said recesses having two side walls converging from their outer ends to about the center, and from the center extending substantially parallel to the inner ends of the recesses, and a series of spokes having tenons inserted in said recesses, said tenons being out of contact with each other and larger at their inner ends and at the surface of the hub than at the center.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHRISTIAN F. NISSEN.

Witnesses:
HY. F. SHAFFNER,
W. A. WILKINSON.