(No Model.)

C. W. COTTON.

ART OF PREPARING SPOKES.

No. 441,286. Patented Nov. 25, 1890.

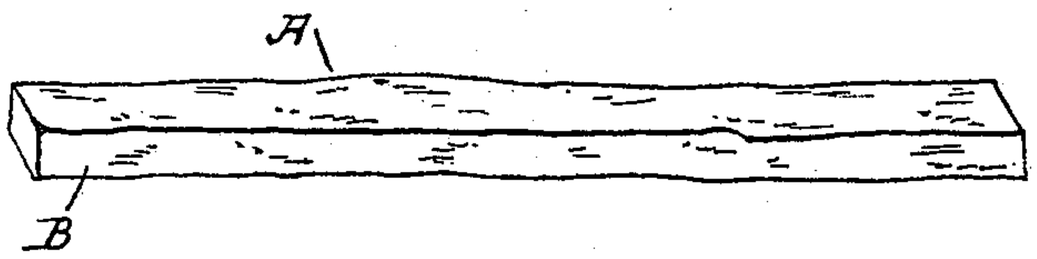

Fig. 1.

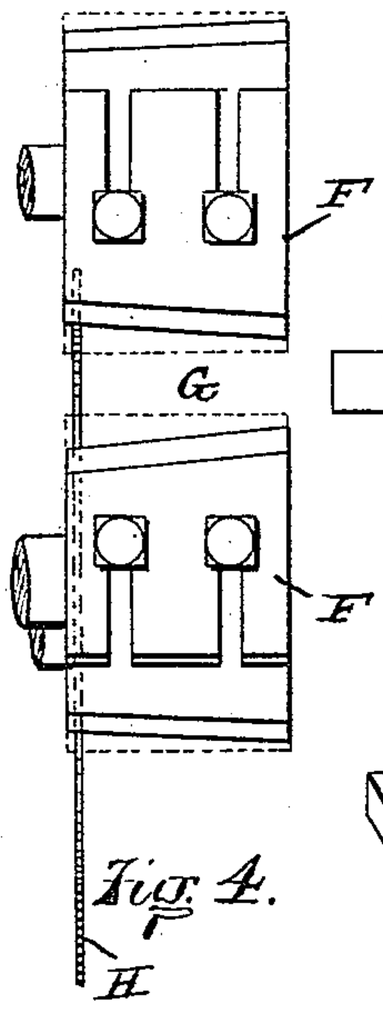

Fig. 4.

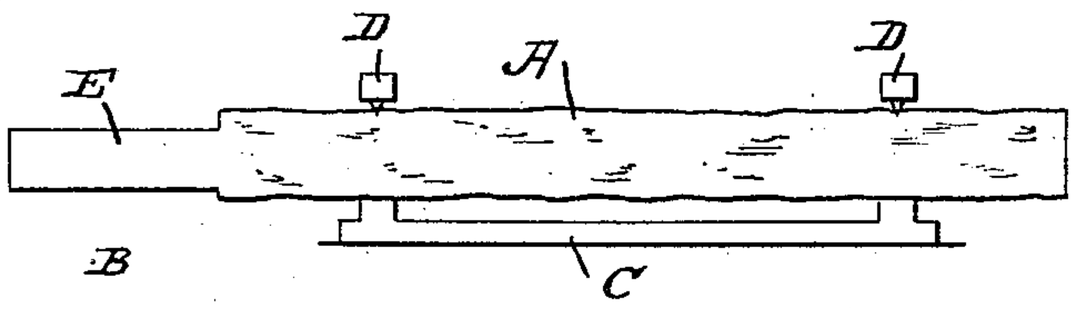

Fig. 2.

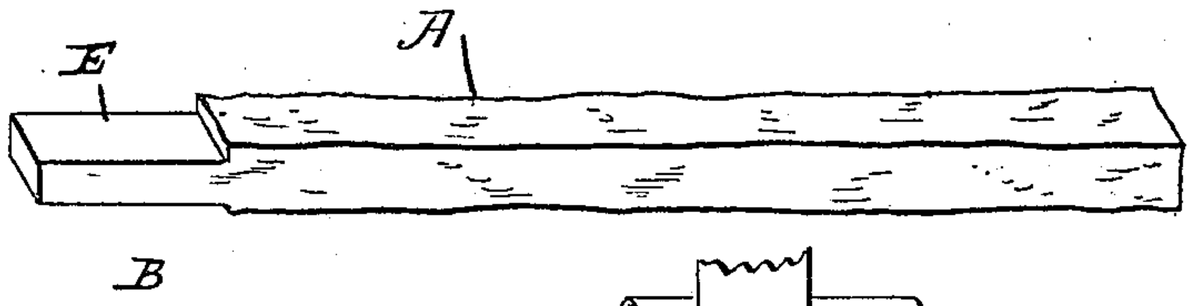

Fig. 3.

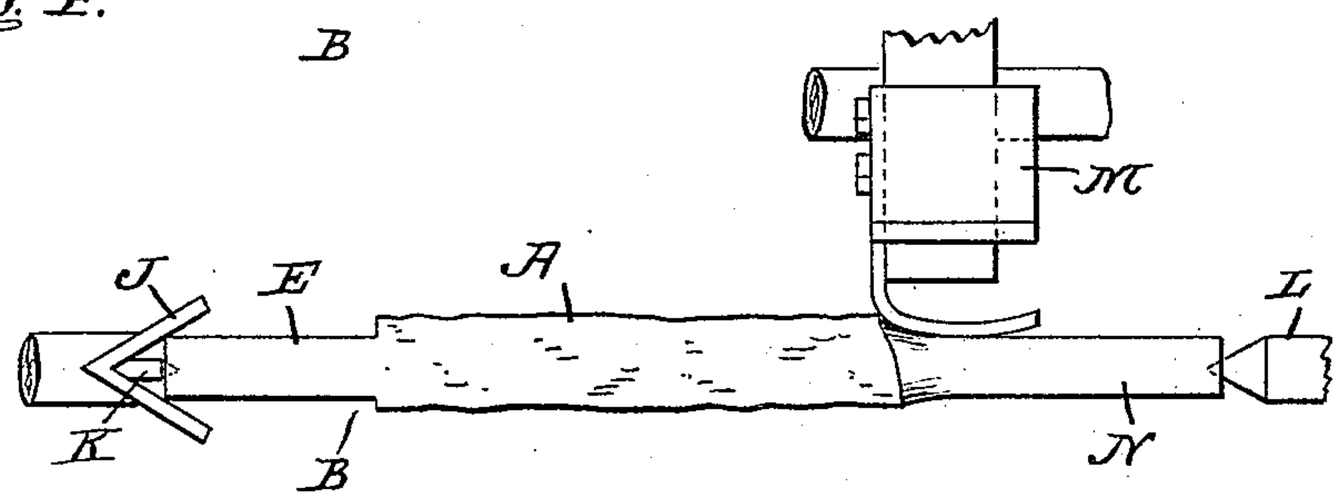

Fig. 5.

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UNITED STATES PATENT OFFICE.

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ART OF PREPARING SPOKES.

SPECIFICATION forming part of Letters Patent No. 441,286, dated November 25, 1890.

Application filed April 24, 1890. Serial No. 349,263. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WARD COTTON, of Indianapolis, Marion county, Indiana, have invented certain new and useful Improvements in the Art of Preparing Spokes, of which the following is a specification.

This invention pertains to improvements in the art of preparing spokes for vehicle-wheels, and relates to improvements designed to secure truth of form in the finished spoke.

The bodies of ordinary spokes are elliptical, the ellipse flattening toward the hub end or head of the spoke. The head of the spoke is tenoned and mitered, and the edges of the tenon are made tapering to give the proper drive in the hub-mortises and the body just before the tenon is throated. The billets of which the spokes are made are rough and irregular. It is usual to center the spoke and operate on it in a lathe of the Blanchard type, this operation producing the elliptical body of the spoke. Subsequently the spoke is tenoned, mitered, faced, and throated. The result has never, so far as I know, been a spoke of true form. In no case has there been any assurance that the sides of the tenon, the sides of the miter, and the sides of the throat would be parallel with the major axis of the ellipse of the body. Furthermore, in centering the spoke for the Blanchard lathe an extraordinary amount of stock would be required to guard against the possibility of inaccurate centering, accurate centering under the method employed being of greater cost than the extra stock thus wasted.

By means of my improvements I utilize the stock to best advantage and so prepare the spoke that the finishing operations produce a spoke of practically true form.

My improvements will be readily understood from the following description, taken in connection with the accompanying drawings, which will serve in exemplifying my improvements.

In the drawings, Figure 1 is a perspective view of a rough billet of which a spoke is to be made; Fig. 2, a side elevation or edge view of the billet held in a clamp and showing it as having been subjected to a shanking operation; Fig. 3, a perspective view of this billet removed from the clamp after the shanking operation; Fig. 4, an elevation of an exemplifying cutting apparatus for performing the shanking operation; and Fig. 5, an edge view of the shanked billet exhibited as in and being operated upon by parts of a Blanchard lathe, a portion of the body of the spoke appearing as turned.

In the drawings, A indicates the rough billet produced by sawing or splitting, as usual; B, the end of the billet which is to form the head of the spoke, consisting of the tenon, miter, and throat; C, a bed-clamp, presenting two separate rests to receive the billet which is to be laid upon these rests; D, clamps engaging the billet over the rests and serving to hold the spoke firmly to the rests, it being understood, of course, that these elements D are merely typifying elements; E, a shank produced upon the head end of the billet, this shank having two parallel faces parallel with the plane of the rests C, the faces of this shank having a length equal to the length of the intended tenon plus the length of the intended miter plus a portion of the length of the intended throat; F, a pair of typifying cutter-heads such as are used on ordinary tenoning-machines; G, a space produced between these cutter-heads, the height of this space corresponding with the thickness of the desired shank E; H, a circular saw beyond the cutter-heads, the office of this saw being to square off the end of the shank either before or after the billet has passed between the cutter-heads; J, the carrier of a Blanchard lathe, this carrier having the form of a V-chuck whose interior angular faces are truly symmetrical to the axis of revolution of the arbor of the lathe; K, a lathe-center arranged at the center of revolution of the carrier and adapted to engage the end of the shank when the shank is engaged by the carrier; L, the dead-center of the lathe; M, the cutter-head of the lathe; and N, a portion of the spoke of elliptic cross-section as resulting from the operation of the Blanchard lathe.

The rests C may be on the carriage of a tenoning-machine, the object of the rests and

the clamps D being to properly support the spoke as it is presented to the action of the cutter-heads. It is to be understood, of course, that as the billet indicated in Fig. 2 is passed between the cutter-heads it will occupy a position such that the shoulder of the shank will correspond with the end faces of the cutter-heads. The height of the rests is to be permanently such as to insure a sufficient amount of stock on the lower face of the billet when the axis of the spoke-body is assumed as coincident with the axis of the shank which will be produced by the cutter-heads. The rests deal with separate points along the length of the billet, ignoring entirely the extreme ends of the billet, which extreme ends may always be relied upon as containing stock enough to produce the reduced dimensions needed at the ends of the spoke. The billet being clamped upon the rests and subjected to the action of the cutters, it becomes provided with the shank E, having two parallel faces which will be parallel with the general body of the billet, as determined by the rest-point. The end of the shank will be sawed off at right angles to the faces of the shank. The shank must have a thickness equal at least to the desired dimension of spoke thickness at shoulder, and the length of the shank must equal the length of the intended tenon plus the length of the intended miter, plus a portion of a length of the intended throat. Sufficient of the length of the intended throating must be included in the shanking to provide for the grasping of some portion of the shank when the spoke-tenon is being produced. By "spoke-tenon" is meant the tenon formed upon the completed spoke. The billet thus shanked is now put into the Blanchard lathe and engaged by the carrier and dead-center and operated on in the usual manner by the cutter-head. The engagement of the facets of the carrier with the true corners of the shank insure a sidewise centering of the spoke in the lathe. The object of the center K is to retain the shank edgewise in the carrier, and any other device in connection with the carrier which will perform that office may be employed—as, for instance, corrugations upon the facets of the carrier. The carrier will be so disposed in the arbor of the lathe with reference to the ellipse of the controlling pattern that as the billet and pattern revolve in the lathe the faces of the shank as held by the carrier will be in a plane parallel with the major axis of the cross-sectional ellipse of the pattern. In other words, when the carrier occupies the position shown in Fig. 5 the lathe pattern must be in such position of revolution that the major axis of its ellipse is horizontal, it being understood that Fig. 5 is an elevation and not a plan. The Blanchard lathe operates as usual and produces the elliptical body of the spoke, and it will be obvious that the major axis of the elliptical cross-section of the spoke will be parallel with the faces of the shank. The spoke thus prepared is now ready for the subsequent operations of tenoning, mitering, throating, and facing. The grasping devices of the tenoning and mitering machine may grasp the flat faces of the shank at that portion of the shank farthest from the end of the shank. The result will be that the tenoning and mitering will be true with the shank-faces and also true with the elliptical body of the spoke. The grasping devices of the throating-machine will take hold of the true tenon, and the result will be that the throating, which will remove the previously-retained portion of the shank-faces, will be true with the tenon and miter and with the spoke-body. The spoke is then ready for the facing operation and for such subsequent finishing operations as may be needed.

The improved method not only results in a true preparation of the spoke, but it also results in increased economy of operation. Heretofore when the billet has been, as the first step, placed directly in the Blanchard lathe, such lathe would do its work rapidly until, in proceeding toward the head of the spoke, it reached the throat portion or the portion near the head. Here the stock must be removed under a greater disadvantage, owing to the flattening of the ellipse, requiring much stock to be cut from the sides of the spoke. It has therefore been found requisite to greatly slow down the feed of the lathe as the cutter reached this portion of the work. By the improved method of preparing the spoke the cutter-head, when it reaches the shoulder of the shank, finds much of the stock already removed from the sides of the billet. In operating on spokes prepared in accordance with my improvement I make no change in the rate of feed of the Blanchard lathe during the entire travel. This results in a very material reduction in the cost of producing the spokes.

I claim as my invention—

That improvement in the art of preparing spokes which consists in providing a billet of size to form the spoke, forming upon that end of the billet which is to be the head of the spoke a shank having two faces parallel with each other and with the axis of the intended spoke and having a length equal to the length of the intended tenon of the spoke plus the length of the intended miter of the spoke plus a portion of the length of the intended throat of the spoke, revolving said billet by a carrier engaging a face or the faces of said shank, and having its axis of revolution equidistant between the faces of the shank, and producing the turned body of the spoke while the billet is so engaged and revolved.

CHARLES WARD COTTON.

Witnesses:
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A. C. ROGERS.