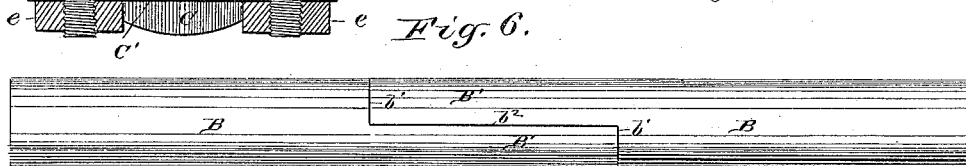
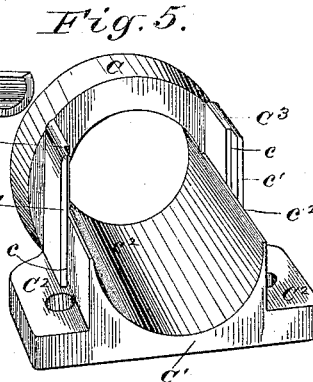
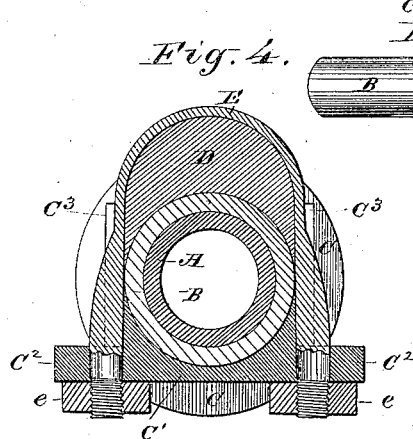
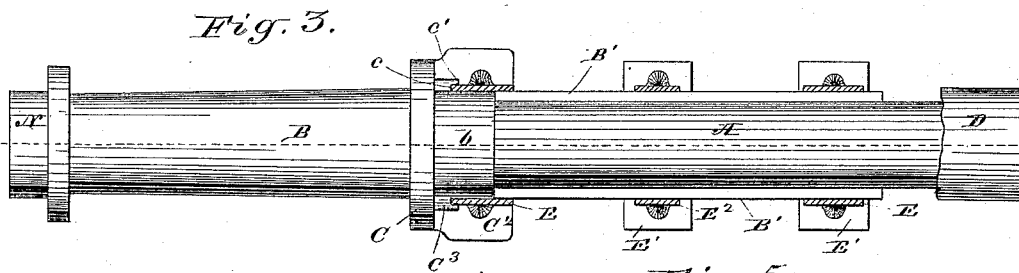
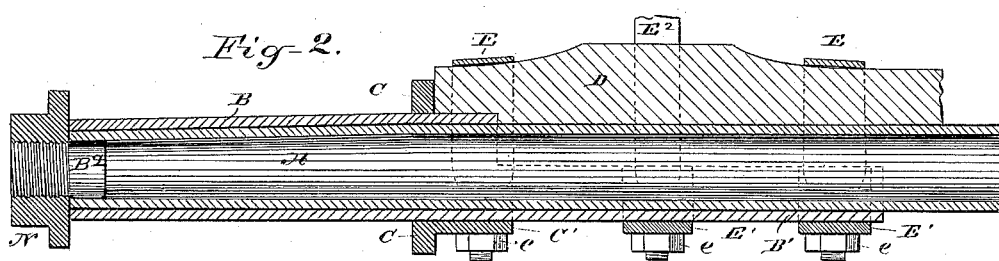
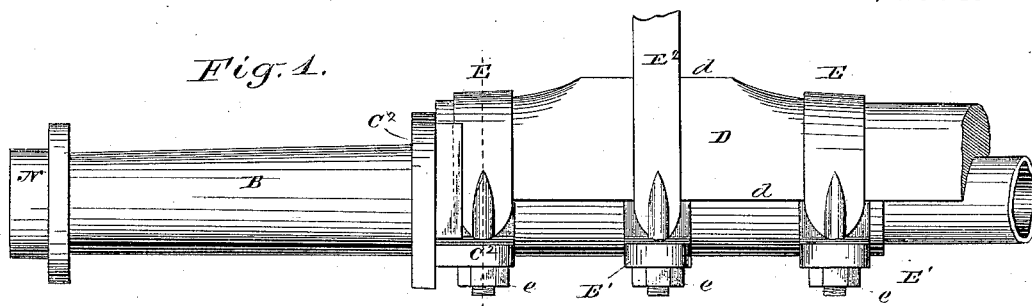


(No Model.)

N. L. HOLMES.
TUBULAR WAGON AXLE.

No. 307,650.

Patented Nov. 4, 1884.



Witnesses.
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UNITED STATES PATENT OFFICE.

NATHAN L. HOLMES, OF RACINE, WISCONSIN.

TUBULAR WAGON-AXLE.

SPECIFICATION forming part of Letters Patent No. 307,650, dated November 4, 1884.

Application filed October 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, NATHAN L. HOLMES, of Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Tubular Wagon-Axles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to tubular wagon-axles, and more particularly to the enlarging of the arms or spindles and the strengthening of the axle at and adjacent to the arms.

The object of the invention is to provide a simple and serviceable construction in tubular axles having the spindles enlarged and the adjacent parts of the axles strengthened; and it consists, primarily, in the combination, with the tube which extends from end to end of the axle, of a thimble and an extension thereof formed in one piece from another tube of proper size to embrace the main tube.

It also consists in certain features of construction in a combined collar and clip support employed to confine the metal and wood portions.

It further consists in certain other features of construction, that will hereinafter further appear, and that will be pointed out in the appended claims.

In the accompanying drawings, which illustrate my invention, Figure 1 is a fragmentary side elevation of an axle and its arm constructed in accordance with my invention. Fig. 2 is a central longitudinal section of the same; Fig. 3, a top plan view showing a part of the wood portion of the axle removed. Fig. 4 is a vertical cross-section upon the line *x x* of Fig. 1. Fig. 5 is a perspective view of the hurter-band detached. Fig. 6 shows the manner of cutting two thimbles from a single piece of tube, and Fig. 7 is a perspective view of a thimble-blank after being cut from a tube.

In the drawings, A represents a tube, which extends from the end of the axle. B is a thimble having an extension, B', applied to the extremities of the tube A for the enlarging of its arms or spindles, and to give the necessary strength to the axle at points adja-

cent to the spindles or wheels. C is a collar or hurter-band secured to the axle in proper position to form the inner shoulder for the wheel. D is the wood portion of the axle, having a rounded groove in its under face fitted to the tube A. E E are clips which bind the extension B' of the thimble B, the wood portion D, and the inclosed tube A together.

In the manufacture of tubular iron axles for wagons as heretofore constructed it was found that a tube of sufficient size to give the required strength in the hub near the arms was objectionably and unnecessarily large and heavy at other points. As a remedy for this objection it has been customary to upset the tube at and near its ends to make it of the desired size; but by reason of the peculiar effect of this operation upon the metal it is found that strength is not proportionately or sufficiently increased.

As a means for securing at the same time the proper dimensions and strength of the axle at its several points, I have devised a construction wherein a thimble is applied to the arm, and a suitable extension of said thimble reaches inwardly upon the axle and strengthens the adjacent parts thereof upon which falls the excessive strain.

The general features of this improvement, together with a particular form thereof, are more fully set forth in another application for patent filed of even date herewith, and this present specification deals more directly with the particular form of the improvement herein shown.

In this form of the invention the thimble B, with its extension B', if present, is cut from a tube instead of being made from sheet metal and bent to shape. For this purpose a tube of steel or iron is selected having its interior diameter equal to the external diameter of the axle-tube. This will usually and preferably be cut into lengths represented in Fig. 6, each equal in length to twice the length of the tubular part of the required spindle plus once the length of the proposed parti-tubular extension thereof. A tube of this length may be made to form two thimbles, together with their extensions, by sawing it by means of a saw or other proper tools in the intersecting planes indicated by the lines *b' b'*, so as to leave up-

on each tubular part B a semi-cylindric part, B', as shown in Fig. 7.

After forming the thimbles in the above-described or other preferred manner said thimbles are applied and secured upon the ends of the tube A, with the extensions B' on the same side thereof, that they may occupy the position shown in Figs. 1, 2, and 3 at the under side of said tube when the axle is completed. Either before or after the thimbles are applied to the tubes A both the thimbles and the ends of the tube A will be drawn, swaged, or otherwise operated upon to give the desired taper to the axle-arms, and the plug B' is welded into the end of the inner tube to afford a screw for the nut N in the usual manner. The taper will preferably not extend the entire length of the tubular part of the thimble B, but only to the outer shoulder of the collar C, having a cylindric part, b, of said thimble running a few inches back of the collar upon the tube A. Generally the parts A and B will be welded together, and this will always be the case when they are joined before being tapered. If, however, it is desired to provide for the removal and renewal of the thimbles when they shall have become worn, the latter should be shrunk upon the tube, in which case the tube and thimbles will of course be separately tapered. The collar C will be shrunk to its place in the usual manner. In the other specification before mentioned the collar C is described as being provided with inwardly-extended parts, including a clip-tie and side flanges, which latter are covered or confined by the clip-band E, and also as having a flange at the rear or upon the inner face of the collar, over or upon which the end of the wood rests. The appurtenances of the collar, as herein shown, differ somewhat from those just referred to, as will more fully appear from the following description of the present construction. In said present form of the collar device, C' is a rearward extension upon the lower side of the collar, formed to fit the curved surface of the spindle-extension B', and terminating at the sides in the thin edges c'. Said extension C' is preferably provided with the lateral apertured lugs C'', which serve to admit the ends of the clip-band and to permit a separate clip-tie to be dispensed with. The rearward extension, C', is somewhat longer than the width of the clip-band E, and adjacent to the collar proper rise therefrom the side flanges, C'', in position to stand between the clip-band and said collar C. In order to prevent the unsightly appearance of inaccurate joints between the clip-band and said flanges C'', the latter are formed to overlap the edge of the former. Preferably, the edge of the flange will be external to the edge of the clip-band, and for this purpose said flanges are formed with vertical insets or recesses c, to admit the adjacent edges of the clip-band, which in that case will be covered by the outstanding vertical edges c' of said flanges. The collar device will usually be made of malle-

ble iron, permitting the thin edges c', if necessary, to be hammered closely against the band. As before stated, the inner cylindric part, b, of the thimble B extends beyond the collar C. Preferably it terminates beneath the clip, as indicated in Figs. 2 and 3, so that the wood part D is covered where it is recessed, as shown in Fig. 2, to fit the part b, and is supported to its full depth by the rear edge of the clip. The lower edges, d, of the wood portion D of the axle are preferably of the same thickness as the upper edges of the thimble-extension B', so that they give a flush surface at the sides of the axle opposite these extensions. Beyond said extensions, or in the central part of the axle, these edges of the wood may be beveled inward for a part of their thickness, if preferred. The clip-ties E' are similar in sectional form to the collar-extension C' C'', being constructed to conform with the curved surface of the spindle-extension B'. By means of the several clips E E at opposite ends of the thimble-extension the several parts of the axle embraced thereby are closely bound together, and the full strength of said thimble-extension is made to operate for the support of the axle throughout the distance covered thereby. An intermediate clip-band, E'', for holding the bolster or hounds, will, of course, impart additional support and strength. The thimble-extension may, of course, be cylindric throughout its entire length, if preferred; but, as its full diameter is not required for strength, the construction shown is preferable as being very much lighter and more economical of material.

In the construction above set forth it will be observed that the thimble B, as well as the axle A, may be directly from merchant tubing, and without the cost that attends the shaping and welding of such thimble from sheet metal.

The section of tubing Fig. 6 may obviously have its transverse cuts inclined instead of directly transverse, or in planes at right angles with the tube, as shown by the lines b'.

I claim as my invention—

1. The combination, with the tubular axle A, of a fixed thimble, B, provided with a part-cylindrical extension and formed from tubing of proper diameter to fit the tube A, substantially as described.

2. The combination, with the tubular axle A and a collar, of a fixed thimble, B, having a lower part-cylindrical extension, B', and an upper extension, b, at the rear of the collar, said thimble and its extensions being formed from tubing of interior diameter fitted to closely embrace the tube A, substantially as described.

3. The pair of extension-thimbles B B', Fig. 6, formed by cutting a tube of proper length transversely and longitudinally in its middle portion, substantially as indicated and described.

4. In combination with wood and metal parts of a wagon-axle, a collar, C, provided with vertical flanges C'', an extension, C', projecting inwardly beyond the flanges C'', and a

clip-band, E, secured to the extension C' beyond or in continuation of the said flanges C³, substantially as described.

5 5. In combination with the clip-band and the parts of the axle to be confined thereby, a collar provided with vertical flanges C³, constructed to lap the adjacent edges of the clip-band, substantially as described.

10 6. The collar or hurter-band C, provided with the extension C', apertured lugs C², and ver-

tical flanges C³, having insets c, in combination with the clip-band and the parts of the axle confined thereby, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence 15 of two witnesses.

NATHAN L. HOLMES.

Witnesses:

M. E. DAYTON,

W. C. ADAMS.