

No. 749,902.

PATENTED JAN. 19, 1904.

F. R. A. MacKINNON.  
VEHICLE AXLE.

APPLICATION FILED MAY 18, 1903.

NO MODEL.

Fig. 1.

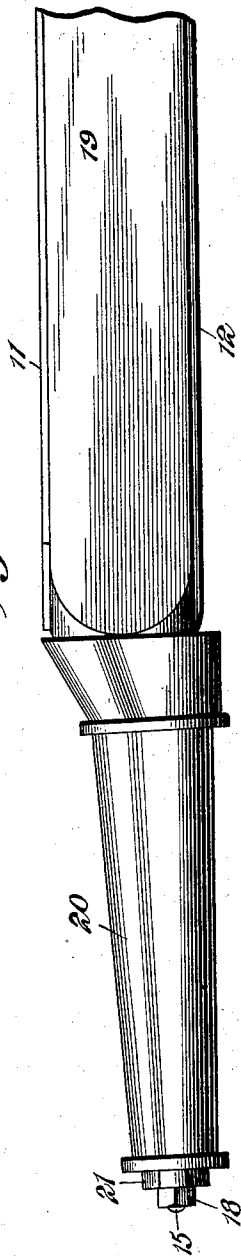


Fig. 2.

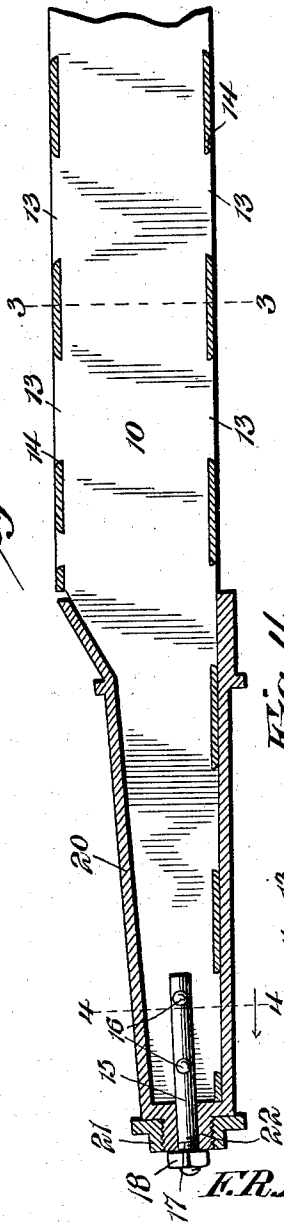


Fig. 3.

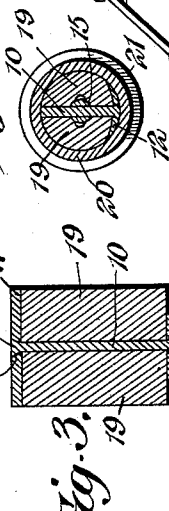


Fig. 4.

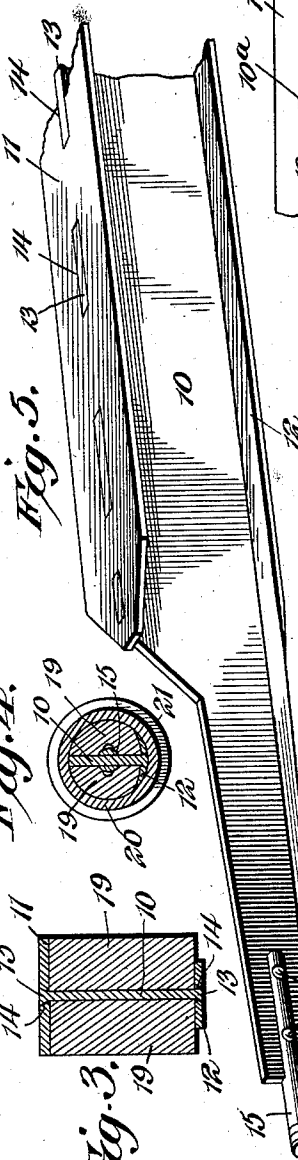


Fig. 5.

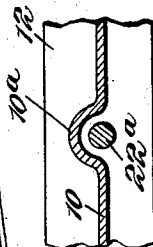


Fig. 6.

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Witnesses

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# UNITED STATES PATENT OFFICE.

FALKLAND R. A. MacKINNON, OF GRAND RAPIDS, WISCONSIN.

## VEHICLE-AXLE.

SPECIFICATION forming part of Letters Patent No. 749,902, dated January 19, 1904.

Application filed May 18, 1903. Serial No. 157,652. (No model.)

*To all whom it may concern:*

Be it known that I, FALKLAND R. A. MacKINNON, a subject of the King of Great Britain, residing at Grand Rapids, in the county of Wood and State of Wisconsin, have invented a new and useful Vehicle-Axle, of which the following is a specification.

This invention relates to composite vehicle-axles.

The primary object is to provide a structure that will withstand great strain and at the same time employ a simple combination of parts which coact in a peculiar manner to obtain the said result. The parts, moreover, are rudimentary *per se*, so that they may be manufactured and assembled at small cost, comparing very favorably with the ordinary trussed axles so far as expense of manufacture is concerned and being capable of withstanding much greater weight and transverse strain.

The embodiment which at present is considered preferable is shown in the accompanying drawings and described in the following specification.

An inspection of the claims hereto appended will show that the invention is not limited to the specific construction herein set forth.

In the drawings, Figure 1 is a side elevation of a portion of the improved axle. Fig. 2 is a longitudinal sectional view through the same. Fig. 3 is a cross-sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a similar view taken on the line 4 4 of Fig. 2. Fig. 5 is a detail perspective view of the core, and Fig. 6 is a horizontal sectional view showing the arrangement of parts to permit the passage of the king-bolt through the axle.

Similar reference-numerals indicate corresponding parts in all the figures of the drawings.

In the embodiment illustrated the axle comprises a metallic core combined with wooden reinforcements. This core consists of a longitudinally-disposed plate 10, having upper and lower flanges 11 and 12, extending from its edges and on opposite sides thereof. The flange-pieces are riveted to the core, and for this purpose said core is provided with pro-

jections 13, which are upset in longitudinally-disposed sockets 14, formed in the flange-plates. As a result an I-beam is obtained which is made up of metal sheets or plates. The upper flange-plate is preferably, though not necessarily, broader than the lower one, as shown in Fig. 3. The end of the core-plate is preferably reduced, so that it will conform in longitudinal section to the longitudinal section of the axle-spindle, the upper flange-plate terminating at the reduced portion, while the lower plate 12 extends to the end of the core and has its outer surface rounded, as illustrated in Figs. 4 and 5. A shank 15 is attached to the end of the core-plate, being bifurcated to embrace the same and fastened by rivets 16. The outer end of the shank is threaded, as shown at 17, to receive a skein-holding nut 18. The reinforcements are in the form of wooden strips or bars 19, which are fitted against the opposite faces of the core-plate 10 and between the flanges. The ends of these reinforcements are reduced and convexed, so that the ends of the axle will be circular in cross-section. The elements of the axle are held together by the skein 20, fitted upon the reduced end of said axle and held in place by the nut 18, screwed upon the shank. The exterior conformation of the skein is that ordinarily employed and is designed to receive the usual hub, which hub is held in place by a nut 21, screwed upon the reduced terminal 22 of the skein.

It will be apparent from the accompanying illustrations that this structure can be manufactured at small cost, and the parts are so related that the axle will withstand great strains. This is due to the fitting of the reinforcements between the flanges, for said reinforcements not only prevent the core-plate buckling, but are themselves reinforced by said flanges. Moreover, the parts are held together entirely by the axle-skeins, and no transverse bolts need be employed, so that the axle need not be weakened by bolt-holes.

While the core and flanges have been shown as constructed in separate pieces, and this is considered preferable, partly for the reason that the metallic skeleton can thus be formed

of sheet metal and partly for the reason that a better fit can be obtained upon the wooden reinforcements, still the metallic member may be constructed in the form of an integral I-beam, if desired.

In Fig. 6 is shown a slight modification of the structure, which modification is employed on the front axle. The change consists in bending or curving the flange 10, as shown at 10<sup>a</sup>, to permit the passage of the king-bolt, (illustrated at 22<sup>a</sup>.)

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a vehicle-axle, the combination with an I-beam, of reinforcements fitted in the channels of the beam, the ends of said beam and reinforcements being rounded and tapered and an axle-skein surrounding the rounded and tapered ends of the beam and reinforcements to secure the same together.

2. In a vehicle-axle, the combination with a metallic core comprising a vertical longitudinally-disposed plate, and flanges riveted to the upper and lower edges thereof, of longitudinal reinforcing-bars fitted between the flanges on opposite sides of the plate.

3. In a vehicle-axle, a metallic I-beam having hub-receiving terminals and comprising a longitudinal plate provided with projections on its edges, and angularly-disposed longitudinal flanges arranged on the opposite edges of said plate and having openings in which the projections are riveted.

4. In a vehicle-axle, the combination with an I-beam having its upper end portion reduced, of reinforcements extending longitudinally between the flanges and having their ends reduced and rounded, so that the terminals of the axle are substantially circular in

cross-section, and an axle-skein fitted upon the reduced ends.

5. In a vehicle-axle, the combination with an I-beam core having its upper end portion reduced, the upper flange of said beam terminating at the reduced portion, of wooden reinforcing-bars fitted between the flanges and having reduced ends that extend to the reduced end of the core, a shank riveted to the core and projecting beyond the end thereof, an axle-skein fitted upon the reduced ends, and a nut threaded on the shank and holding the axle-skein against displacement.

6. In a vehicle-axle, the combination with an I-beam core having one end portion reduced and constituting a portion of the axle-spindle, the upper flange of said beam terminating at the reduced portion, of reinforcing-bars fitted between the flanges and having corresponding reduced ends which constitute the remaining portions of the axle-spindle, and means for securing the bars and core together.

7. In a vehicle-axle, the combination with an I-beam having the upper portions of its ends cut away and the upper flange terminating at the cut-away portion, the lower flange extending substantially to the ends of the beam and having its terminal portions rounded, of reinforcements fitted in the opposite channels of the beam and having the outer faces of their terminals convexed, and skeins fitted upon the ends of the beam and reinforcements.

8. In a vehicle-axle, the combination with a core comprising a vertical longitudinally-disposed plate, and separate flanges riveted to the upper and lower edges thereof, one of said flanges being of less width but greater in length than the other, and reinforcing-bars applied to opposite sides of the plate, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FALKLAND R. A. MACKINNON.

Witnesses:

C. F. KELLOGG,

I. E. PHILLEO.