E. HALL.

Wheel for Vehicles.

No. 161,953. Patented April 13, 1875.

Fig. 1.

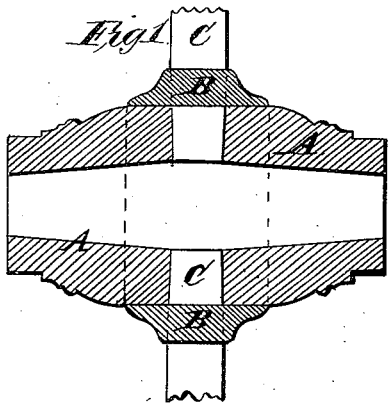



Fig. 2.

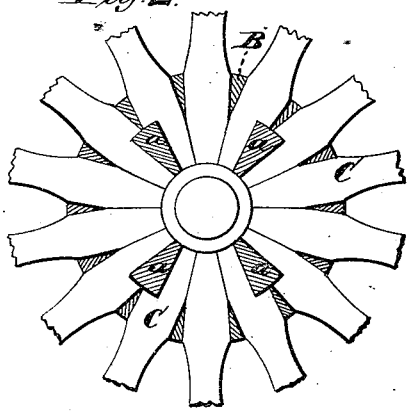
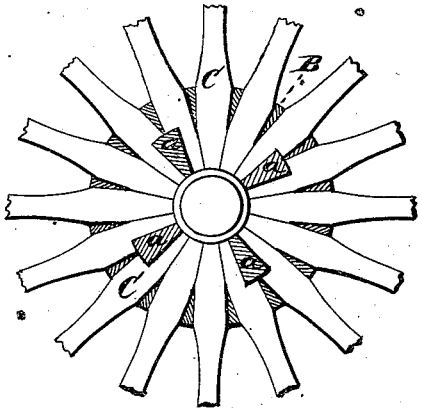



Fig. 3.




Witnesses

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# UNITED STATES PATENT OFFICE

ELIHU HALL, OF WALLINGFORD, CONNECTICUT.

## IMPROVEMENT IN WHEELS FOR VEHICLES.

Specification forming part of Letters Patent No. **161,953**, dated April 13, 1875; application filed February 19, 1875.

*To all whom it may concern:*

Be it known that I, ELIHU HALL, of Wallingford, in the county of New Haven and State of Connecticut, have invented certain Improvements in Carriage-Wheels, of which the following is a specification:

This invention relates to the construction of the wooden hub and spokes, and their combination with each other and with a metallic ring designed and adapted to support the spokes outside of the wooden hub, as hereinafter more fully set forth, the object being to secure a firm, strong, and reliable carriage-wheel at a reasonable cost.

Figure 1 is a vertical section through the axis of the hub of the central portion of a carriage-wheel constructed according to my invention. Fig. 2 is a section transverse to the axis of the hub, and nearly through the middle thereof, showing the construction of the central portion of a fourteen-spoke carriage-wheel according to my invention, the spokes not being shown in section. Fig. 3 is a similar section to Fig. 2, showing the construction according to my invention of the central portion of a carriage-wheel having sixteen spokes.

A is the wooden hub, which is constructed in the manner ordinarily practiced when the wooden hub is intended to be surrounded in the middle with an iron ring, which has mortises to receive the spokes, with the exception that, instead of being provided with mortises to receive the inner ends of the spokes, or provided with a groove in its periphery for that purpose, it is provided with angular notches or recesses to receive clusters of the spokes, the ends of the hub being connected by the web or portions *a*, which are regarded as of sufficient proportionate size to give the requisite strength. B is a metal ring, preferably made of malleable iron, which surrounds the middle of the wooden hub, and is provided with a mortise through it for each spoke.

To give the best results, these mortises should be tapered upon all sides, so as to slightly compress the spokes when they are driven into place. It is also, for the same reason and purpose, preferable that the recesses in the wooden hub to receive the spokes C shall be broader in the direction of the length of the hub at the outside, next to the metallic ring, than in the inner portion of the hub. The spokes should be tapered accordingly.

It will be observed that the inner portion of those spokes which are next to the web *a* is cut away upon the side next to the said web to give room for it; but on the other side they are simply tapered to fit against the other spokes, and in the same manner that the spokes not in contact with the webs *a* are tapered on both sides.

This invention has the advantage over the tenoned spoke and mortised hub used in combination with the mortised metallic ring above described, that the inner ends of most of the spokes are, by this construction, allowed to be more nearly their full size, thereby avoiding the tendency to break off at the shoulder to which tenoned spokes are exposed; and, also, that the clusters wedge upon each other as they are confined and held inward by the tire, and thus more effectually prevent each other from working loose; and it is found by experiment that the webs *a* are quite sufficient to give the requisite strength to that portion of the hub.

This construction also has the advantage over a mortised ring and grooved hub, that the spokes are allowed to extend farther inward in the hub, and, binding upon each other as they do, give a better resistance to a strain thrown upon any one spoke of the wheel; and, also, by so extending farther into the hub, give a better resistance to any strain laterally upon the wheel.

This mode of introducing the spokes into the hub in clusters, in combination with the webs *a*, instead of by mortise and tenon, as formerly practiced, may also, perhaps, be usefully employed where the mortised ring B is not used.

Two webs, *a*, placed opposite each other, instead of four on each hub, may be used with satisfactory results in most cases; but I prefer to use four of these webs in each hub, for the reason that when only two are used, the

very great lateral strain upon the wheel on the open sides of the hub has very great leverage on the webs.

I claim as my invention—

1. The combination of the wooden hub A, webs *a*, and clusters of spokes C, substantially as and for the purpose set forth.

2. The combination of the wooden hub A, webs *a*, clusters of spokes C, and mortise-ring B, substantially as and for the purpose set forth.

ELIHU HALL.

Witnesses:
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