(No Model.)

J. R. LITTLE.

METAL WHEEL.

No. 409,475. Patented Aug. 20, 1889.

Fig. 1.

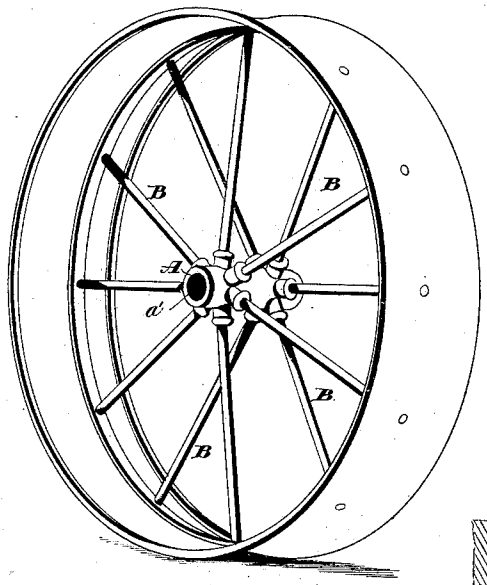


Fig. 2.

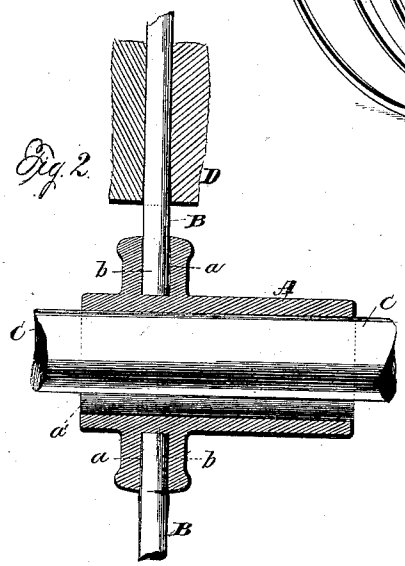


Fig. 3.

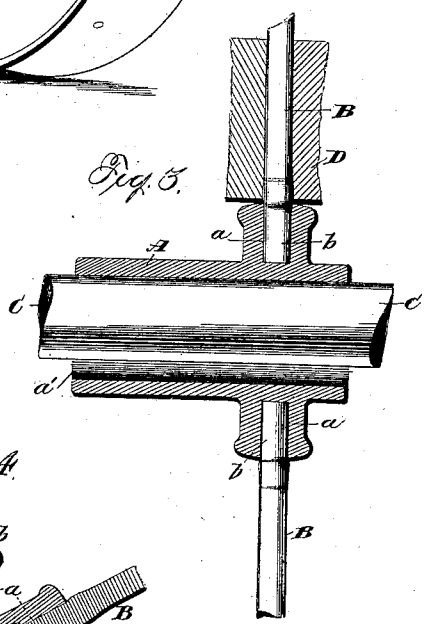
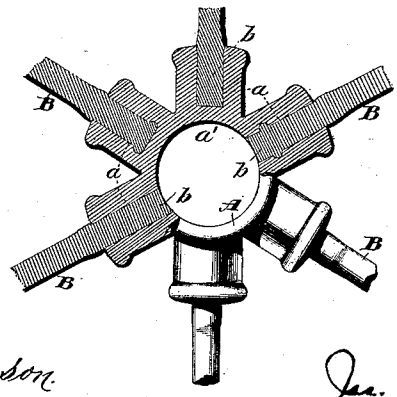


Fig. 4.



Witnesses
Chas. J. Williamson.
Henry C. Hazard.

Inventor.
Jas. R. Little, by
Dindle & Russell, his Attys.

UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS, ASSIGNOR TO THE QUINCY METAL WHEEL COMPANY, OF SAME PLACE.

METAL WHEEL.

SPECIFICATION forming part of Letters Patent No. 409,475, dated August 20, 1889.

Application filed April 24, 1889. Serial No. 308,378. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. LITTLE, of Quincy, in the county of Adams, and in the State of Illinois, have invented certain new and useful Improvements in Metal Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my wheel as constructed. Fig. 2 is an enlarged central longitudinal section of the hub, showing in side elevation a spoke cast therein and the dies and mandrel employed for enlarging said spoke within its mortise, said parts being shown in their respective positions before the action of said dies. Fig. 3 is a like view of the same after the spoke has been operated upon; and Fig. 4 is a cross-section of the hub, and shows in longitudinal section the form of tenon preferably used and modifications in the form of such tenon.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to produce a metal wheel in which the hub and spokes are firmly and durably united; and to such end my said invention consists, broadly, in a metal wheel in which the hub is cast upon and around the inner ends or tenons of the spokes, and such ends or tenons are afterward expanded laterally within the hub, substantially as and for the purpose hereinafter specified.

In the production of my improved wheel the hub A, which has any desired form or proportions, is cast upon or around the inner ends or tenons *b* and *b* of wrought or malleable metal spokes B and B by any usual mechanism or method. The spokes B and B thus cast into the hub A have their inner ends or tenons *b* and *b* expanded laterally until each of the same is caused to firmly and solidly fill its mortise *a*, and preferably to be enlarged immediately outside of the same. Such result is preferably produced by means of a mandrel C, which passes into or through the axial opening *a'* of said hub, a pair of jaws D and D that grasp the spoke at a point near its entrance to said hub, and mechanism whereby said mandrel and jaws are relatively moved toward each other, so as to compress longitudinally the intervening portion of said spoke. The spokes B and B preferably have plain straight tenons and do not extend into the axial opening *a'* of the hub A; but, if desired, said tenons may be provided with circumferential enlargements or may extend into said axial opening, or both of such modifications may be employed, as shown in Fig. 4. The parts of a wheel thus described are strongly, permanently, and cheaply united, and the completed wheel is capable of the most severe practical use without injury.

Having thus described my invention, what I claim is—

1. A metal wheel in which the hub is cast upon the spokes and said spokes expanded within their mortises, substantially as and for the purpose specified.

2. A metal wheel in which the hub and spokes are united by casting and the portions of the spokes within and immediately outside of the hub are expanded laterally, substantially as and for the purpose shown.

3. A metal wheel in which the spokes and hub are united by casting and each spoke within and immediately outside of the hub is compressed longitudinally, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of April, 1889.

JAMES R. LITTLE.

Witnesses:
P. B. WILLIAMS,
J. O. GLENN.