

William A. Lewis'  
Improved Wrought-Metal Hollow Car-Wheel.  
No. 119,867.

2 Sheets  
Sheet 1.

Patented Oct. 10, 1871.

Fig. 3

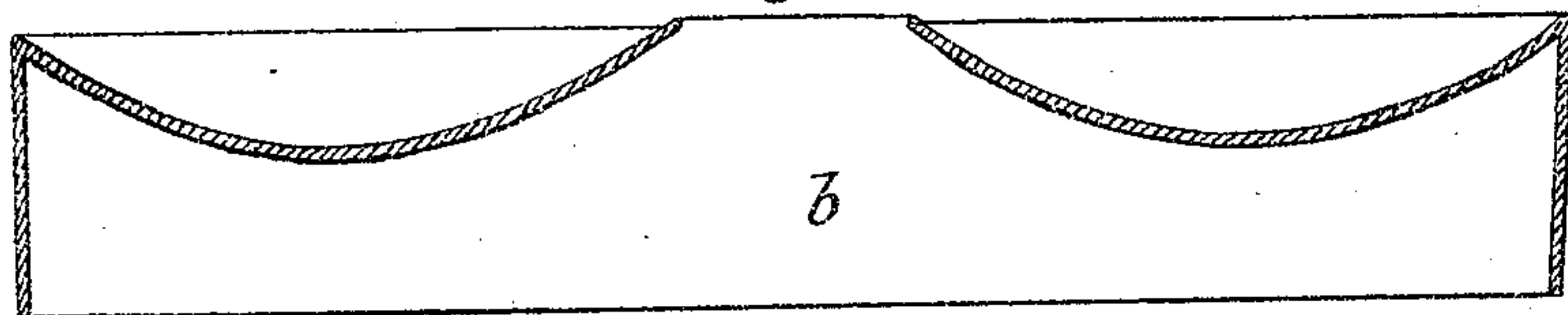


Fig. 2

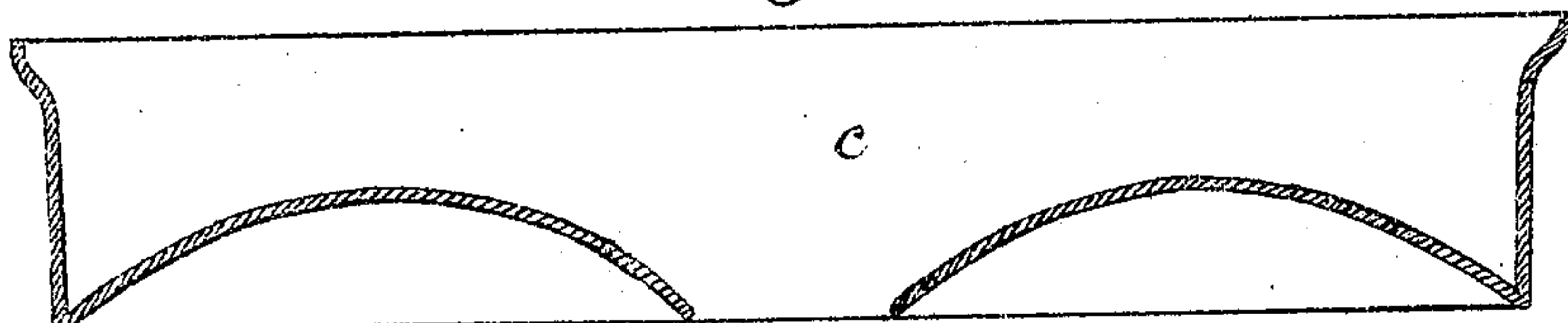


Fig. 1



Fig. 6

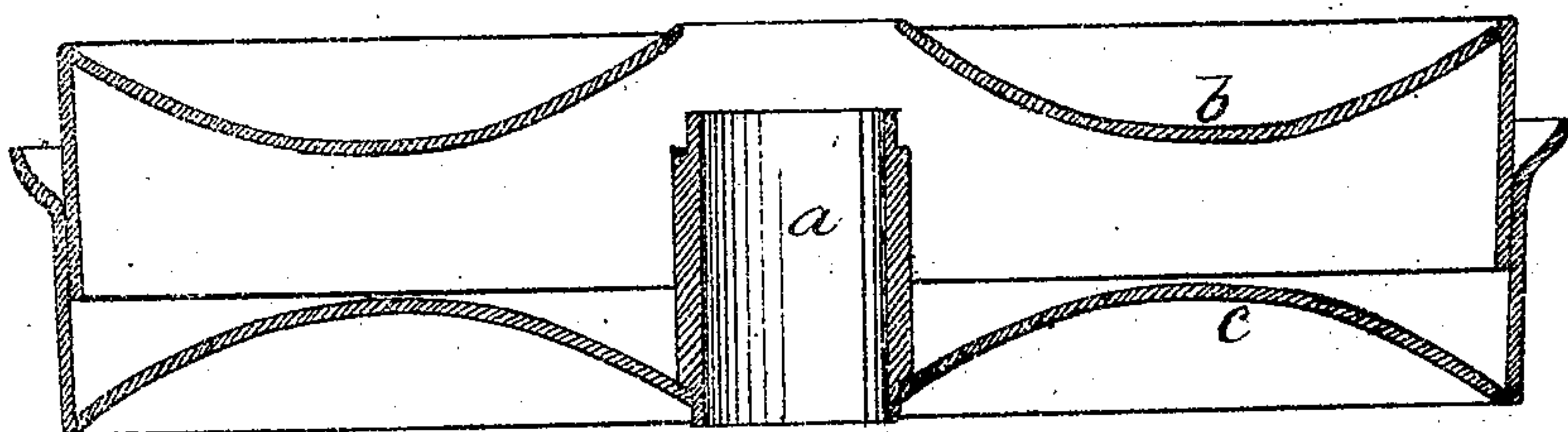


Fig. 5

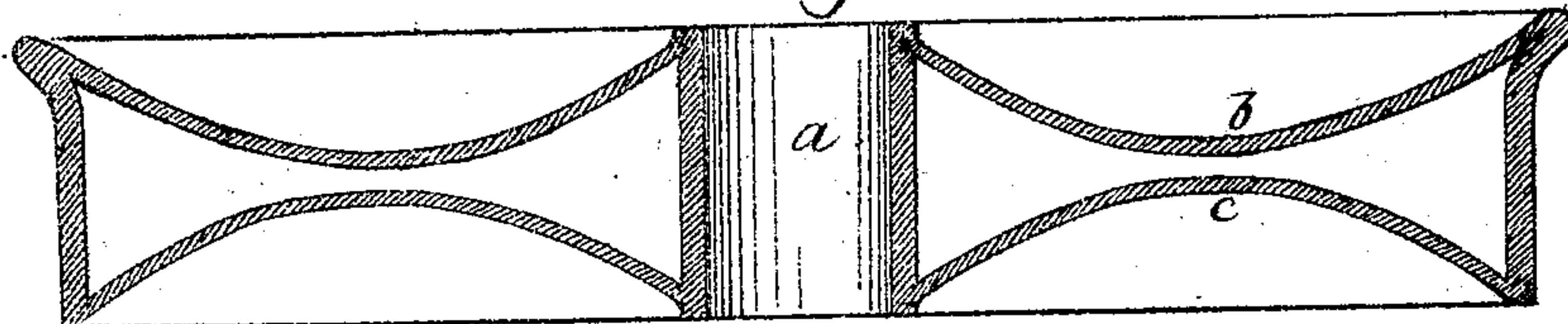
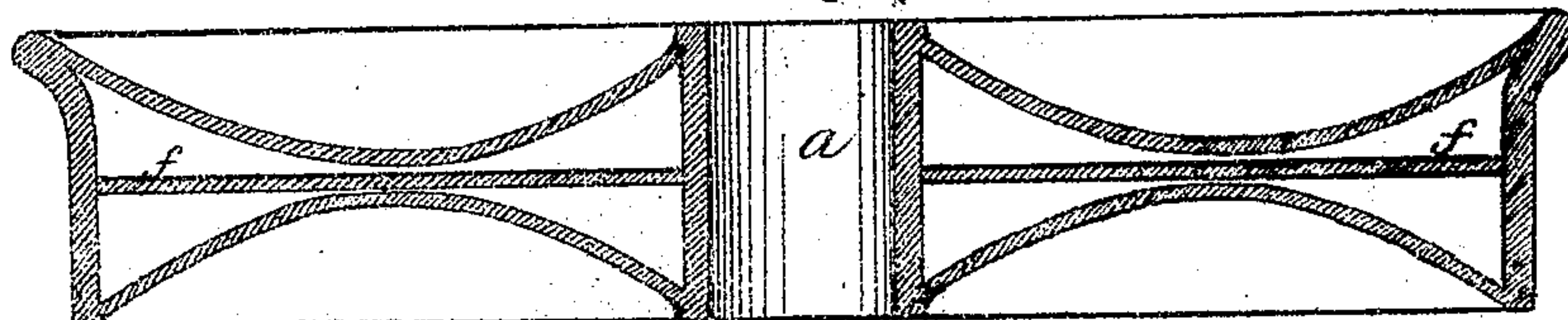


Fig. 7



Witnesses,

J. C. Robbins  
H. A. Daniels

Wm A. Lewis, Inventor,

# William A. Lewis' Improved Wrought Metal Hollow Car Wheel.

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Fig. 4

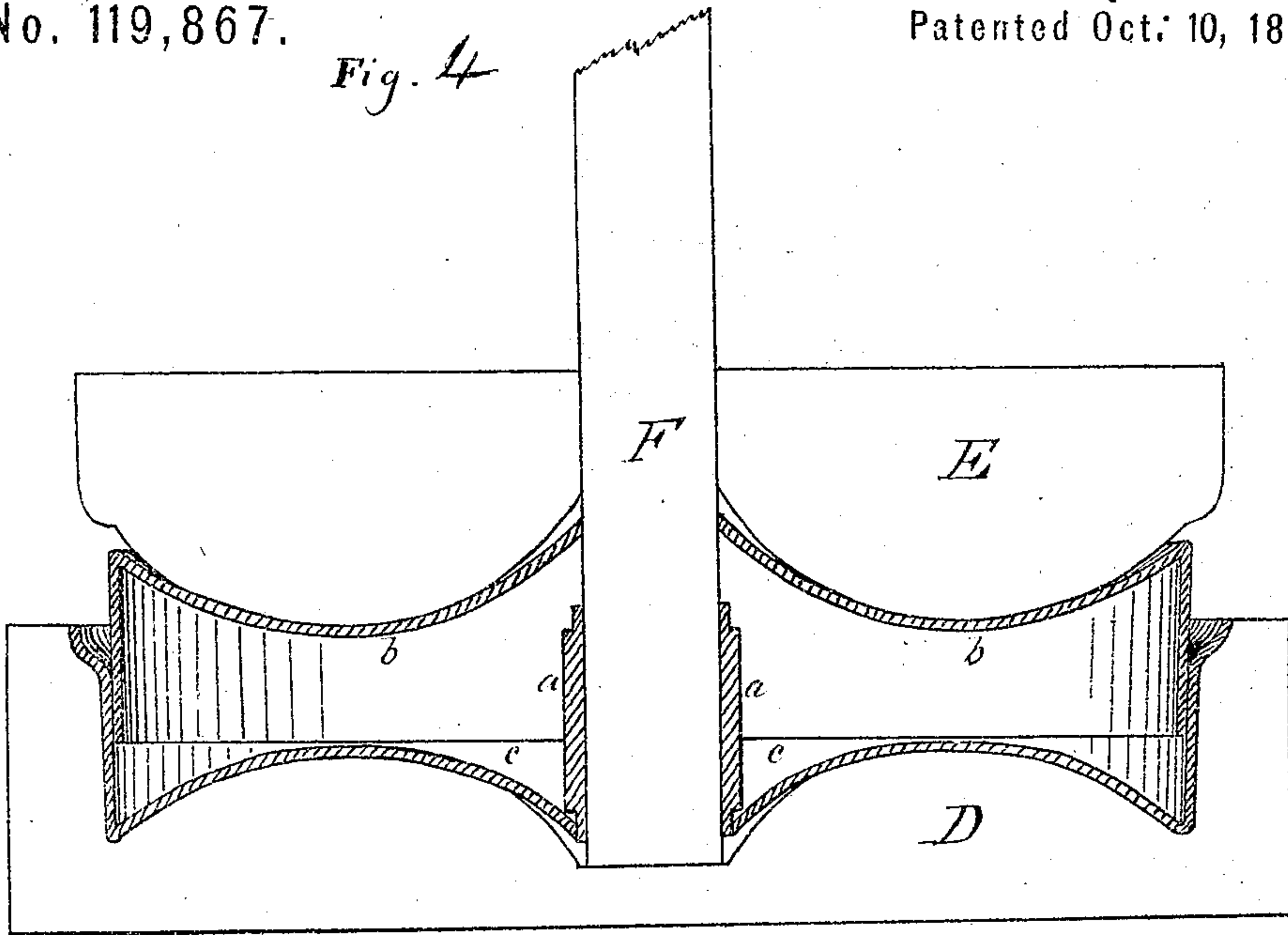


Fig. 8

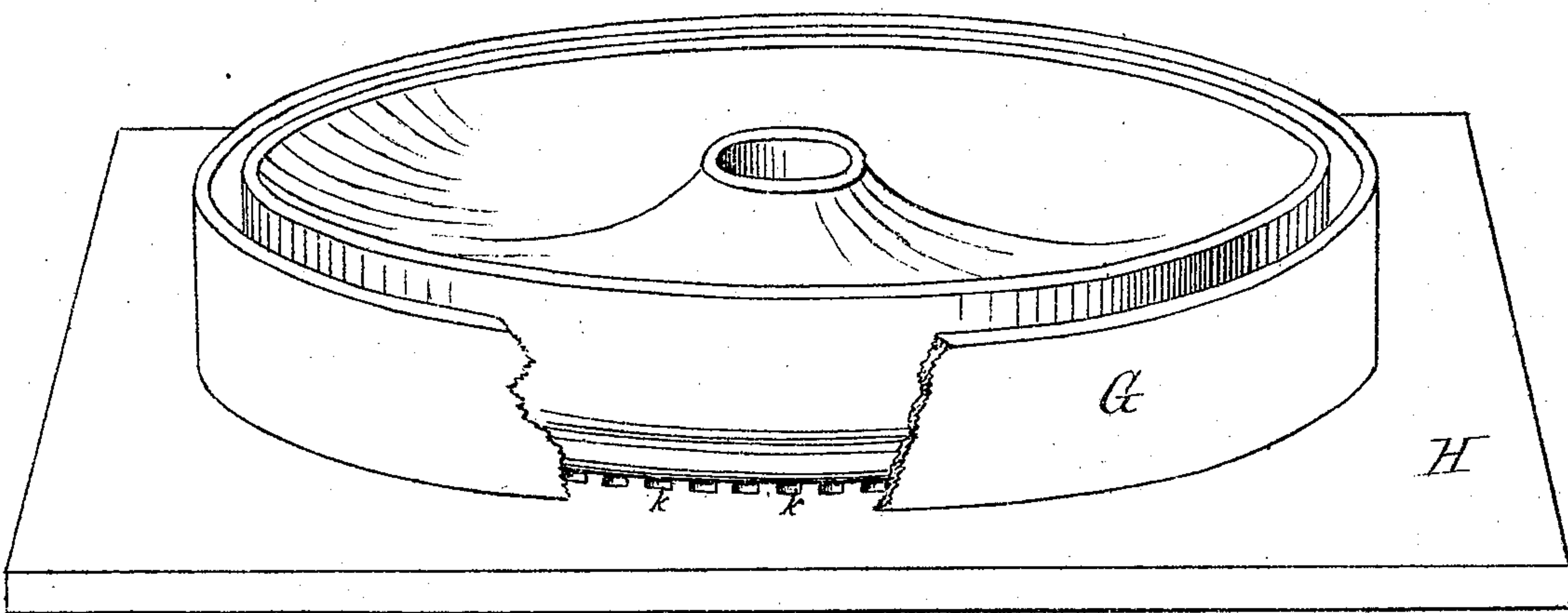
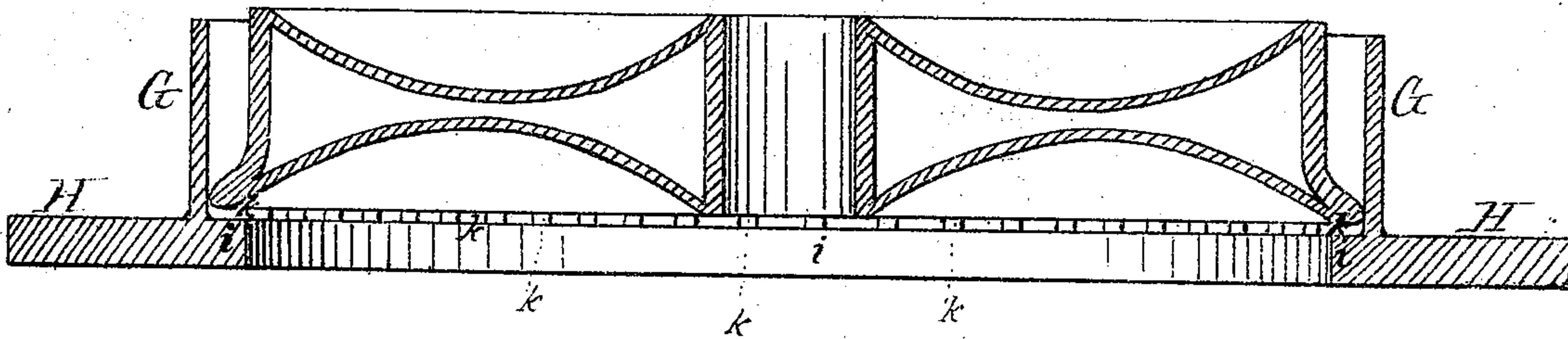


Fig. 9



Witnesses  
*J. C. Robbins*  
*H. A. Daniels*

*Wm. A. Lewis* - Inventor.



# UNITED STATES PATENT OFFICE.

WILLIAM A. LEWIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO HOLLOW-AXLE MANUFACTURING COMPANY, OF MISHAWAKA, INDIANA.

## IMPROVEMENT IN CAR-WHEELS.

Specification forming part of Letters Patent No. 119,867, dated October 10, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM A. LEWIS, of Chicago, in the county of Cook and the State of Illinois, have invented a new and Improved Jointless Wrought-Metal Hollow Car-Wheel; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing which forms a portion of this specification.

My invention consists in constructing a car-wheel of one piece of metal formed by welding together within suitably-formed dies separate sections, which sections are so shaped that one of them will form the central hub or bushing by which the wheel is attached to the axle, another the inner, and another the outer face of the wheel, while the tread and flange are formed of an approximately-cylindrical rim, which, in constructing the preliminary sections, is formed in one piece with that which is to constitute one face of the wheel. If desired, in order to produce an increased thickness in the tread, I form a similar cylindrical rim upon the other face-section, but of sufficiently-smaller diameter to adapt it to fit within the first. As a further modification, I propose in some cases to employ a central web or diaphragm, formed of a flat annular disk adapted to fit over the central box or bushing between the inner and outer face-plate of the wheel, the said face-plates being dished to any necessary extent.

Figure 1 is a longitudinal section of the hub or central tube. Fig. 2 is a longitudinal section of a dished plate, which is to form the outer face of the tread and the flange of the wheel. Fig. 3 is a similar section of a dished plate adapted to form the inner face-plate, and having, also, a rim which is to fit within that shown in Fig. 2. Fig. 4 is a longitudinal section of the parts of the wheel within the die-box in readiness for welding together. Fig. 5 is a longitudinal section of the finished wheel. Fig. 6 is a longitudinal section of the central web or diaphragm. Fig. 7 is a longitudinal section of the wheel with the parts of the wheel disconnected.

The hub-tube *a* may be produced from preliminary sections, in the manner set forth in the patent of even date herewith, issued to me as assignor to the Hollow-Axle Manufacturing Company for an improved hollow metallic axle for wagons, carriages, &c. The sections *b c* may be struck from highly-heated sheets of iron or steel,

by means of stationary and movable dies, in any well-known or usual manner. In the process of uniting said sections *a b c* into a car-wheel, I employ a stationary die, D, and a movable die, E, of the respective shapes shown in Fig. 4, in connection with a guiding-rod, F, a heating-furnace, and some suitable power or machinery for imparting the requisite upward-and-downward movements to the said movable die E and the central guiding-rod F. The stationary die D must be firmly located in such close proximity to a heating-furnace that the flame can be blown from an opening in the side of the said furnace directly over and upon the wheel-sections *a b c*, when they are placed in the positions upon the stationary die D, shown in Fig. 4. The movable die E and the guiding-rod F having been independently elevated by suitable machinery to the proper height, the sections *a b c* are withdrawn from the furnace while at a welding heat, and placed in the position upon the die D represented in Fig. 4, and instantly after being so located the flame from the furnace is blown therefrom; then the guiding-rod F is lowered down to the position shown in said drawing, and instantly thereafter the movable die E descends with sufficient power to force together and weld the said wheel-sections into the solid and jointless shape represented by Fig. 5 of the drawing.

Fig. 7 represents a modified form of my improved wrought-metal car-wheel. The only difference between this car-wheel and the one before described consists in the addition thereto of the central plate *f*.

Having produced my improved wrought-metal car-wheel by the afore-described process, I may case-harden the tread and flange portions thereof by a process which requires an apparatus substantially like that represented by Figs. 8 and 9, in which H is a centrally-perforated metallic plate; G, a metallic curb rising from said plate; *i*, a ledge immediately within the curb G; and *k* are slight protuberances on the upper face of said ledge for the rim of the car-wheel to rest upon during the case-hardening process. The curb G is of such a diameter as to allow the car-wheel to pass, flange downward, freely into the same; and it is of such a height as to rise a few inches above the rim of the car-wheel to be placed therein. This apparatus is placed over a tank situated conveniently to a heating-furnace, and



it is also connected by suitable conducting apparatus with a reservoir containing a suitable solution to be used in the case-hardening process. Then, all things being ready, a car-wheel that has been raised to the proper temperature is placed within the curb G, and immediately thereafter the space between the curb and the rim of said wheel is filled with the case-hardening solution, and then the inflow of said solution to said space is so regulated as to supply the waste caused by the outflow of the same through the spaces below the rim of the wheel, caused by the upward protuberances *k k* from the ledge *i*; and this outflow and inflow of the said case-hardening solution is continued until the temperature of the tread and the flange of the car-wheel is sufficiently reduced to produce the desired case-hardening effect upon those portions of the surface of said wheel, and without pro-

ducing any hardening effect upon any other portion of said wheel.

It is manifest that wheels of various styles and forms can be made of wrought-iron or steel from sections constructed and combined substantially as above set forth.

I claim as my invention—

1. As a new manufacture, a jointless sheet-metal hollow car-wheel, of substantially the shape herein set forth.

2. Jointly, the three sections hereinbefore described, and which are represented in Figs. 1, 2, and 3 of the drawing, of which to construct a car-wheel.

WM. A. LEWIS.

Witnesses:

Z. C. ROBBINS,

H. A. DANIELS.

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