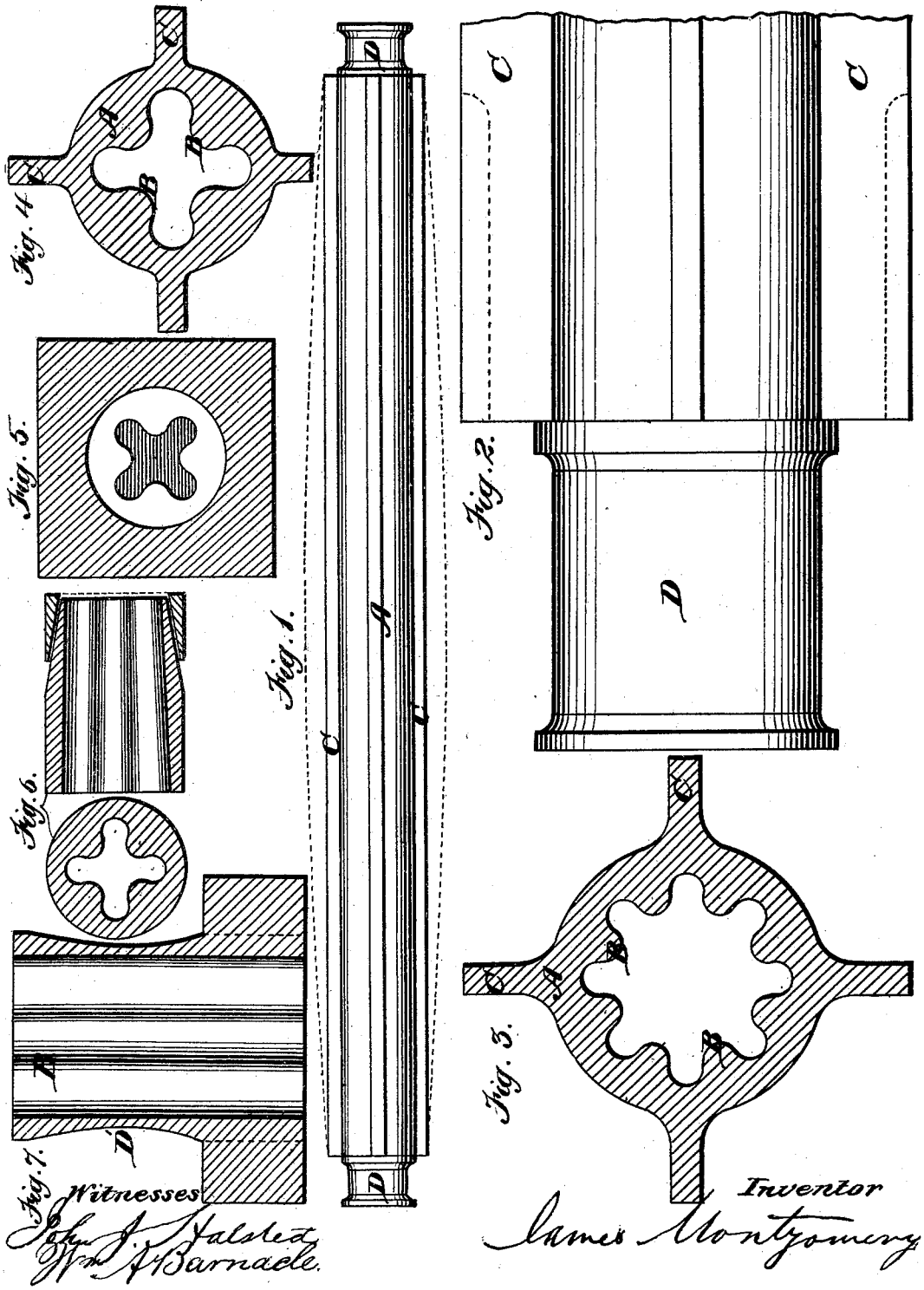
J. Montgomery.

Corrugated Axle.

No. 111,862. Patented Feb. 14, 1871.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES MONTGOMERY, OF CROTON LANDING, NEW YORK.

IMPROVEMENT IN THE CONSTRUCTION OF CAR-AXLES AND SHAFTS.

Specification forming part of Letters Patent No. **111,862**, dated February 14, 1871.

To all whom it may concern:

Be it known that I, JAMES MONTGOMERY, of Croton Landing, county of Westchester, and State of New York, have invented certain Improvements in Railway-Car Axles, &c.; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The object of my invention is to diminish materially the dangers incident to railway travel by furnishing an axle of essentially different structure and character from any heretofore known to me, and which, as compared with them, has far greater strength, less liability to bend under the pressure of the load, less frictional wear upon its journals and boxes, is less subject to damage from torsion, and which will also require many times the usual time to heat up when running at high speed, and consequently require less lubricating matter.

It consists in making the axle tubular throughout, the bore of the tube being ribbed lengthwise, and the periphery of the axle having longitudinal strengthening ribs or wings throughout its whole length, or except at or near its journals.

In the drawing accompanying and making *part of the specification*, Figure 1 represents an axle made in accordance with my present invention; Fig. 2, one end of the same of full size; and Figs. 3 and 4, a cross-section, exhibiting more closely the form and character of the inner ribs or wings and of the outer wings or ribs. Fig. 5 represents one of the modes of making wrought-iron axles direct from puddle-balls or wrought-iron fagots or piles.

A is the axle; B B, its internal corrugations; C C, its outer strengthening ribs or wings, and D its journal.

I make my axles of ingot-steel, cast-steel, scrap-steel, or other suitable material, and in the following manner: I first provide a mandrel, corrugated lengthwise upon its surface, its size and the number and form of its corrugations corresponding with those which I wish to produce within the hollow axle. The body of metal to be rolled into an axle I first form into an ingot or hollow fagot. This ingot of steel or fagot of iron is taken from the reheating-furnace or from the ingot-mold, as the case may be, and introduced between the rolls of the rolling-mill, and as the revolutions of the rolls carry it through to the opposite side of the rolls its forward end passes to and upon the end of the mandrel above mentioned, the end of the mandrel being so situated as to receive it with certainty; and for this purpose it may be located at the bite of the rollers or project through the grooves of the rolls, it being understood that in all cases the mandrel is stationary when in action, and securely fixed in position in any known manner, so as to be able to resist the pressure without disturbing its position.

The grooves of the rolls are to have such a configuration as will give to the exterior of the axle the wings or flanges desired, and of the requisite number, the figures of the drawing indicating the character of these wings.

The rolls may have, say, one or more grooves, of proper graduated sizes, in order to reduce the exterior of the axle to the size required.

A mandrel as above described is placed in each of these grooves, and these mandrels should all be substantially alike, so far as their diameter and their ribs or wings are concerned, inasmuch as the size of the corrugated bore of the axle is not to be reduced during the process of rolling, lengthening, and reducing the metal of which it is composed. By this mode of treatment a flanged or winged tube is formed having the desired corrugated surfaces.

I prefer always to have the cavities between the internal ribs come opposite the wings, so that a line passing transversely through the center of the axle shall also pass through the crest of the cavity between two adjacent internal ribs, and the better way is to have the same number of inner elevated ribs as there are outer ribs, thus bringing each inner as well as each outer rib opposite a cavity, so that the inner ribs and the outer ones alternate in position, and are not in line with each other. The consequence of this arrangement is, that each outer rib is braced or supported by adjacent inner ones, and each inner one by two adjacent outer ones.

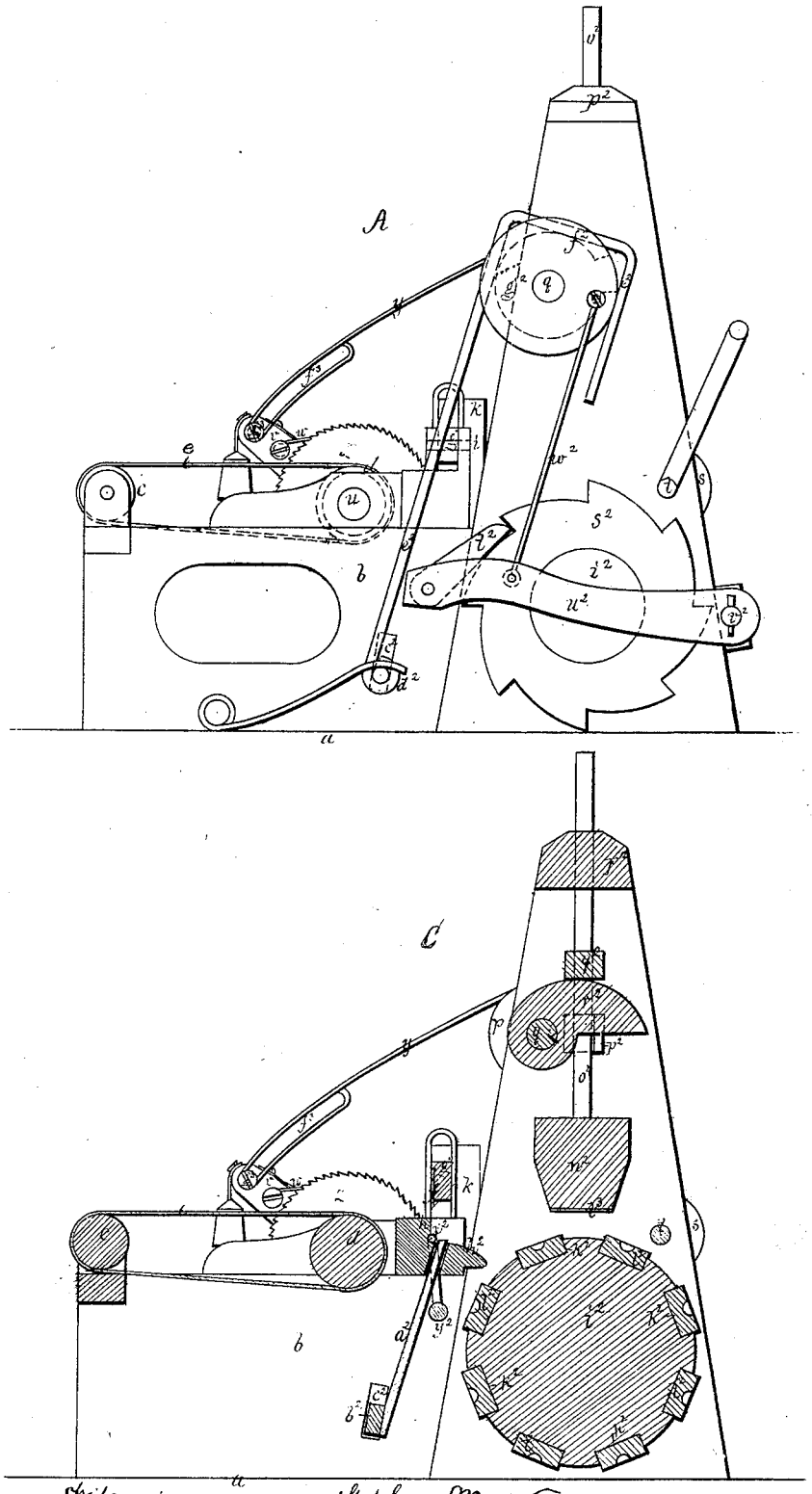
Journals are formed upon the axle by means of a power-hammer, thereby refining the metal, a mandrel in such case being used to prevent crushing in the hollow interior.

2 Sheets—Sheet. 1.

S. MOORE.

MANUFACTURE OF SHOE SHANKS.

No. 111,863. Patented Feb. 14, 1871.



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