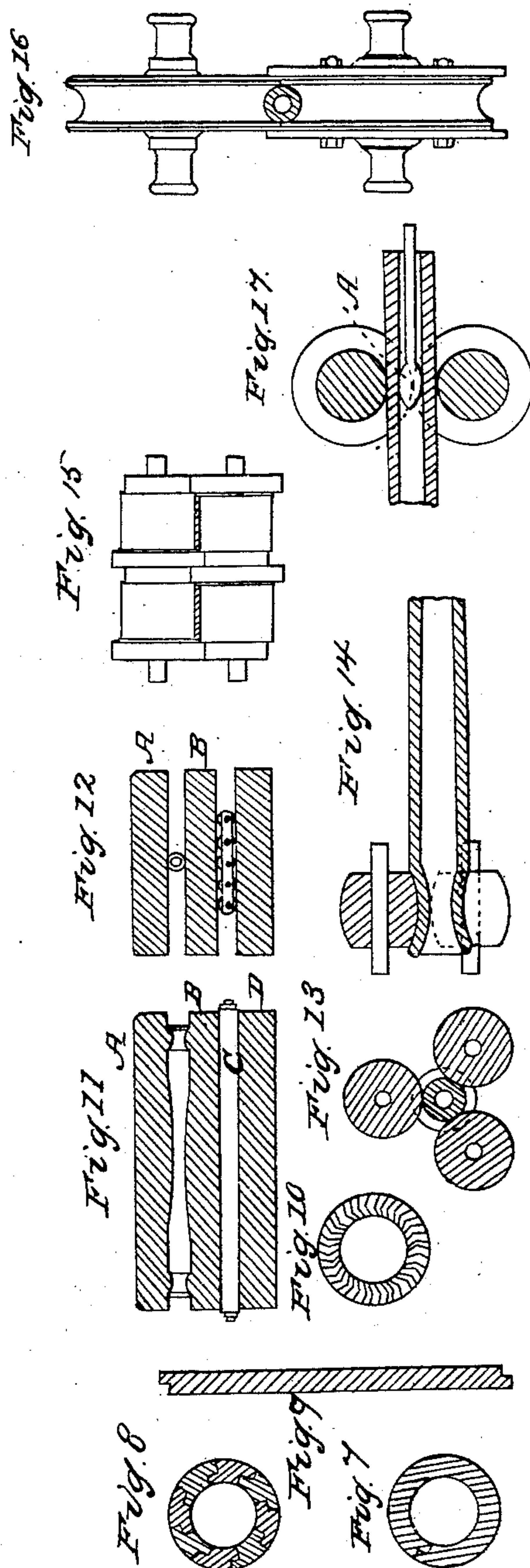
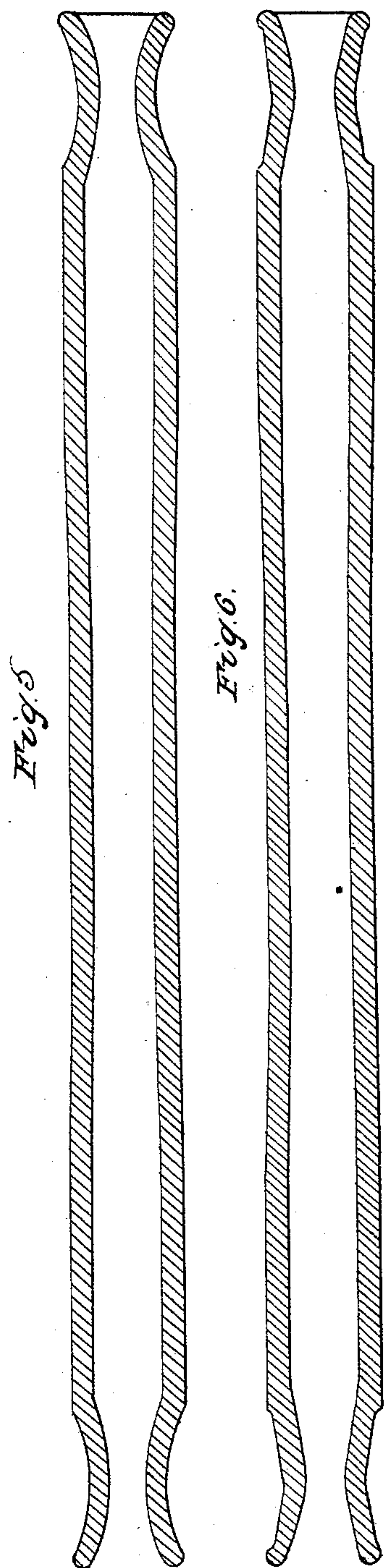


J. E. McCONNELL.

Car Axle.

No. 11,869.

Patented Oct. 31, 1854.



UNITED STATES PATENT OFFICE.

JAMES E. McCONNELL, OF WOLVERTON, ENGLAND.

RAILROAD-CAR AXLE.

Specification of Letters Patent No. 11,869, dated October 31, 1854.

To all whom it may concern:

Be it known that I, JAMES EDWARD McCONNELL, of Wolverton, in the county of Buckingham, England, civil engineer, have
5 invented certain Improvements in the Construction of the Hollow Railroad-Axles, and the following is a full and exact description thereof and of the manner of making and using the same, reference being had
10 to the accompanying drawings and to the letters and figures thereon.

My invention consists of the construction of hollow or tubular wrought iron axles for railroad locomotives and carriages which
15 are made of strips or bars of wrought iron as hereinafter described.

Figure 5, is a longitudinal section of one of my improved hollow axles having the journals formed ready for finishing in the lathe.
20 Fig. 6, is a longitudinal section of another axle having a differently formed bearing or journal. Fig. 7, is a corresponding transverse section through the middle of the same. Fig. 8, is a transverse section of an
25 axle having another mode of construction. Fig. 9, is a transverse section of a plate out of which my improved axles are formed by suitable rollers and other appliances. Fig. 10, is a transverse section of an axle
30 showing another method of forming the axles. Fig. 11, is a longitudinal section of a set of shaping-tables and rollers. Fig. 12, is a transverse section of the same showing an axle undergoing the process of shaping.
35 Fig. 13, is a transverse section of a set of rollers for shaping the journals of axles. Fig. 14, is a corresponding longitudinal section of the same with an axle in the process of having its journals formed. Fig. 15, is
40 a pair of rollers by which means the plates, as shown at Fig. 9, are made of the requisite section for forming the joint where the axle is welded. Fig. 16, represents a pair of rollers through which the plate is first passed
45 and at the same time welded. Fig. 17, is a pair of rollers by which means the fagoted axles are passed over a fixed mandrel.

When I make the axle out of a flat strip of metal of the section shown at Fig. 9.
50 This strip is produced by a pair of rollers shown at Fig. 15. The iron having been rolled into the shape as represented it is turned up by the ordinary process used in the making of lap-welded tubes. It is then
55 heated to a welding heat and passed between a pair of rollers as shown at Fig. 16, and

welded in a straight tubular form as shown in transverse section at Fig. 7. The axle is then passed (during the same heat) to the shaping plates or tables Figs. 11 and 12, 60 which consist of two blocks A, and B, having their faces corrugated or formed to the shape necessary to the rolling out of the journals of the axles as well as tapering them toward the center from each end. The 65 lower block B, rests upon the carriage C, which runs upon the fixed block D, and the two blocks or tables are traversed backward and forward over the axle between them. By the mode of manufacture above described 70 the defects of the hollow axles manufactured by swaging or hammering are avoided and axles may be produced having a perfect lap-weld of a uniform thickness and density 75 of metal throughout each transverse section of the axle while its longitudinal shape will correspond in thickness to the variable diameters as is fully represented in the longitudinal sections Figs. 5 and 6. I also propose making axles by another process which 80 consists in piling or fagoting a number of bars (previously rolled into the sections shown in Figs. 8 or 10,) around a fixed mandrel and heating thereon to a welding heat:— 85 They are then passed in a welding state between the circular grooved rollers shown at Fig. 17, the mandrel being previously removed. But in order that the metal may be 90 of uniform thickness throughout I draw the axle over a fixed mandrel A, having a rounded or oval shaped head. This mandrel is kept fixed and steady between the rollers by being connected in any suitable 95 manner with the framework of the rolling machine. By this means the metal is wire-drawn, as it were, between the drawing rollers and the fixed head of the mandrel whereby a regular and even thickness of metal is produced as well as an efficient weld 100 effected. In this state the axle may be removed (during the same heat) to the shaping plates hereinbefore described which complete the process of manufacture or the finished tube may be shaped and have its end 105 journals formed upon it by arranging three shaping rollers triangularly to nip it as in Figs. 13 and 14. The axle may have both its journals formed at the same time by arranging a frame with two sets of rollers at the required horizontal distance asunder. 110 Each set of three rollers are geared together to revolve in concert whilst each roller is

capable of being traversed toward the center-line of the tube in order to give any necessary amount of compression. In this way as the rollers revolve they bear down 5 the tubular metal to the intended shape whilst they thicken the metal at this part where it is required and the circle of the inside will be decreased in the same proportion as the diameter of the outside is decreased, 10 and the iron being thoroughly welded and compressed the axle produced will be lighter and stronger than any heretofore known.

Having now described and particularly ascertained the nature of the said invention 15 and the manner in which the same is or may be used or carried into effect I would observe in conclusion that I do not confine or restrict myself to the precise details or arrangements which I have had occasion to 20 describe or refer to as many variations may be made therefrom without deviating from

the principles or main features of my invention but

What I consider to be novel and original and therefore claim as the invention to be 25 secured to me by Letters Patent for the United States, is:

The constructing of hollow axles of bars of wrought iron running lengthwise, the edges lapping into each other by joints substantially such as are shown by Figs. 8 and 10 and which are welded and worked into form as herein set forth. 30

In witness whereof I the said JAMES EDWARD McCONNELL have hereunto set my 35 hand and seal the fourth day of April one thousand eight hundred and fifty-four.

J. E. McCONNELL. [L.s.]

Signed and sealed by the said James Edward McConnell in the presence of—

JOHN M. JOHNSON,
BRISTOW HUNT.