D. Reeves.

Rolling Metals.

No. 38,869. Patented Jun. 9, 1863.

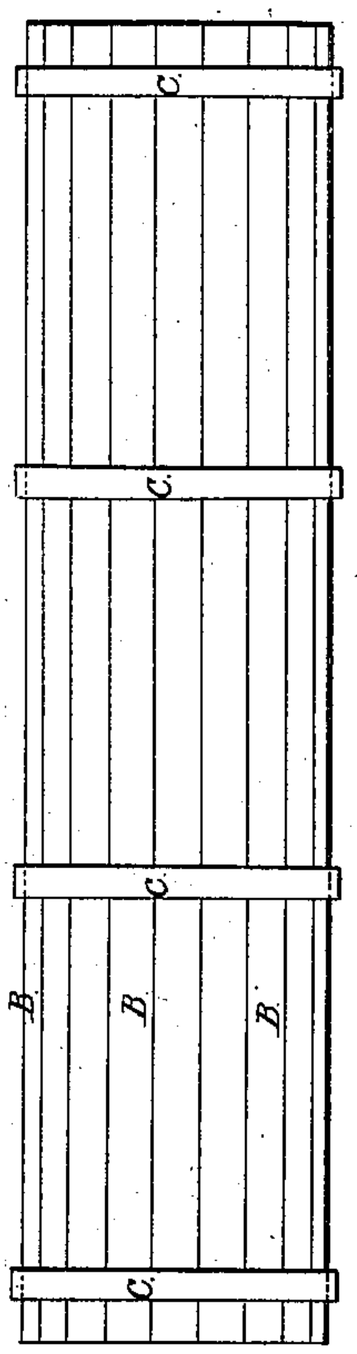


Fig. 2.

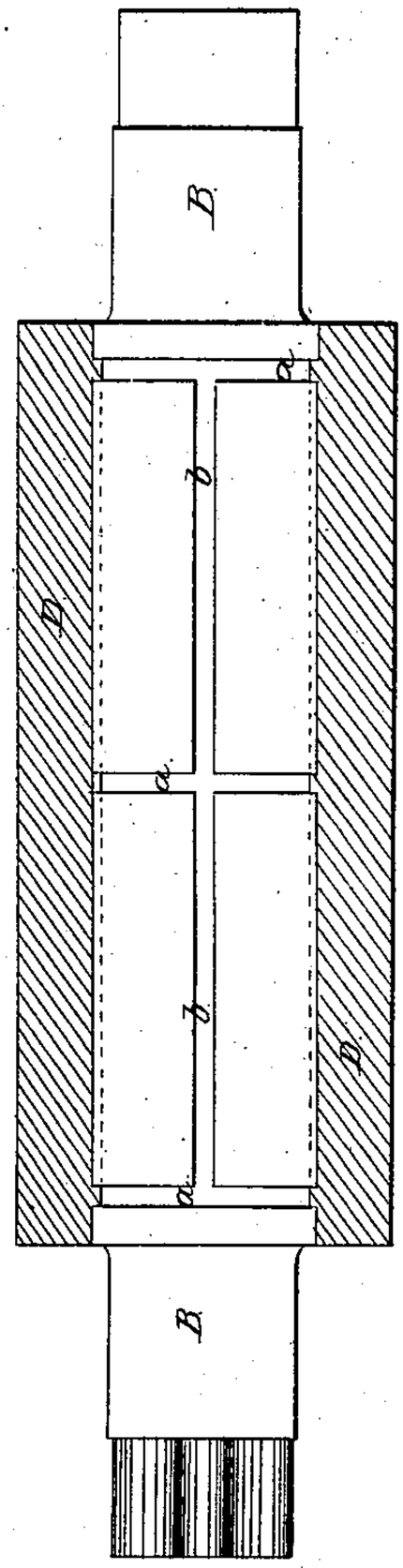


Fig. 3.

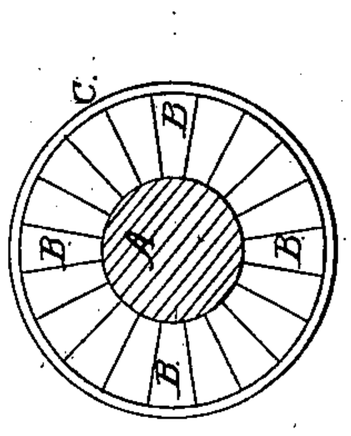


Fig. 1.

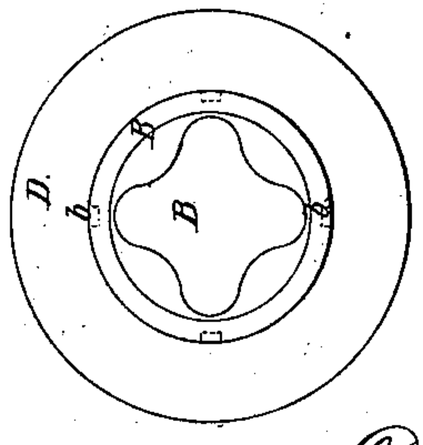


Fig. 4.

Witnesses:
A. Moore
M Schram

Inventor:
David Reeves
By atty. A.B. Stoughton

# UNITED STATES PATENT OFFICE.

DAVID REEVES, OF PHŒNIXVILLE, ASSIGNOR TO PHŒNIX IRON COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN THE CONSTRUCTION OF ROLLS FOR ROLLING METAL.

Specification forming part of Letters Patent No. **38,869**, dated June 9, 1863.

*To all whom it may concern:*

Be it known that I, DAVID REEVES, of Phœnixville, in the county of Chester and State of Pennsylvania, have invented a new and Improved Manner of Making a Compound Roll of Wrought and Cast Iron; and I do hereby declare the following to be a full, clear, and exact description of the manner of making the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an end view of a fagot or pile of wrought-iron, which, when welded, becomes the central portion of the roll. Fig. 2 represents a longitudinal view of the pile. Fig. 3 represents a longitudinal section through a roll made after my plan, and Fig. 4 represents an end view of the finished roll.

Much difficulty has heretofore existed in rolls used in the manufacture of iron, owing to the want of sufficient transverse strength in the rolls. The object and purpose of my invention is to overcome this difficulty, and I have effected it by adopting the mode hereinafter described of constructing such rolls.

I first take a round shaft, A, of wrought-iron, of suitable diameter—say six or seven inches—and surround it by other beveled shaped pieces of wrought-iron, B, of a segmental form, as shown in Figs. 1 and 2. These pieces are held in place by the bands C C C, as shown in Fig. 2. The pile thus formed is charged into a heating-furnace and brought up to a welding-heat. It is then withdrawn from the furnace and passed between rollers, by which process the pieces are welded into one solid mass, the pile being reduced somewhat in diameter, and correspondingly increased in length, while the grain of the iron lies in the direction which gives the greatest power to resist torsion or transverse strains.

After welding and rolling, I place the shaft in a lathe, for the purpose of reducing its surface to a true circle, and afterward make several circular and longitudinal channels *a b* on the perimeter of the piece, as shown in Fig. 3.

When the shaft or center of the roll is thus prepared, I make a mold in a flask of the size and form required for the roller, as I would were I about to make a solid cast-iron roller. The flask is then placed in an upright position, having one end open sufficient to admit the wrought-iron shaft. Having thus prepared the flask, the wrought-iron shaft is placed on bearings and a coal or wood fire is built around it, and it is heated up to a bright cherry-red. At this stage of the process the metal intended for casting around the shaft is in a molten state. When the shaft is hot enough, it is hoisted from the fire, and is let down into the center of the mold and secured in place, and thus prepared the molten metal D is poured into the mold around the shaft until the mold is filled. The molten metal enters into and fills the circular and longitudinal channels of the wrought-iron shaft, as also the vacant space around it. When cooled the roller is taken out of the flask, and the cast-iron envelope is found to be thoroughly fastened upon the wrought-iron center. The roller is then ready for being turned up in a lathe, and for receiving its grooves in the usual manner practiced in roll-turning. The cast-iron may be sufficiently thick to permit the grooves being made in it without reaching to the depth of the wrought-iron, while the wrought-iron shaft may be sufficiently thick to make the full diameter required for the journals where its superior strength over cast-iron prevents the great strain upon the rollers in the process of rolling from breaking at their necks, as is frequently the case with rollers made entirely of cast-iron. A compound roller of wrought and cast iron is thus perfectly made; the wrought-iron, having been heated to the limit of its expansion, contracts with the cast metal, thus relieving the enormous strain that the cast metal would be otherwise subjected to.

If desirable for any special purpose, the wrought-iron center may be hollow, as a hollow instead of a solid center piece, A, may be used.

Having thus fully described my method of making rolls for rolling iron and other metals, I would state that I am aware that a fagot or pile of wrought-iron, such as I propose for the center of the roll has been made, and this I do not claim; but

What I do claim as of my invention, and desire to secure by Letters Patent, is—

A compound roller made of wrought and cast iron, in the manner and for the purpose substantially as herein described.

DAVID REEVES.

Witnesses:

GEO. WALTERS,

A. B. THOMSON.