

T. WHITEHOUSE.

MANUFACTURE OF METAL TUBES.

No. 185,375.

Patented Dec. 12, 1876.

FIG. 1.

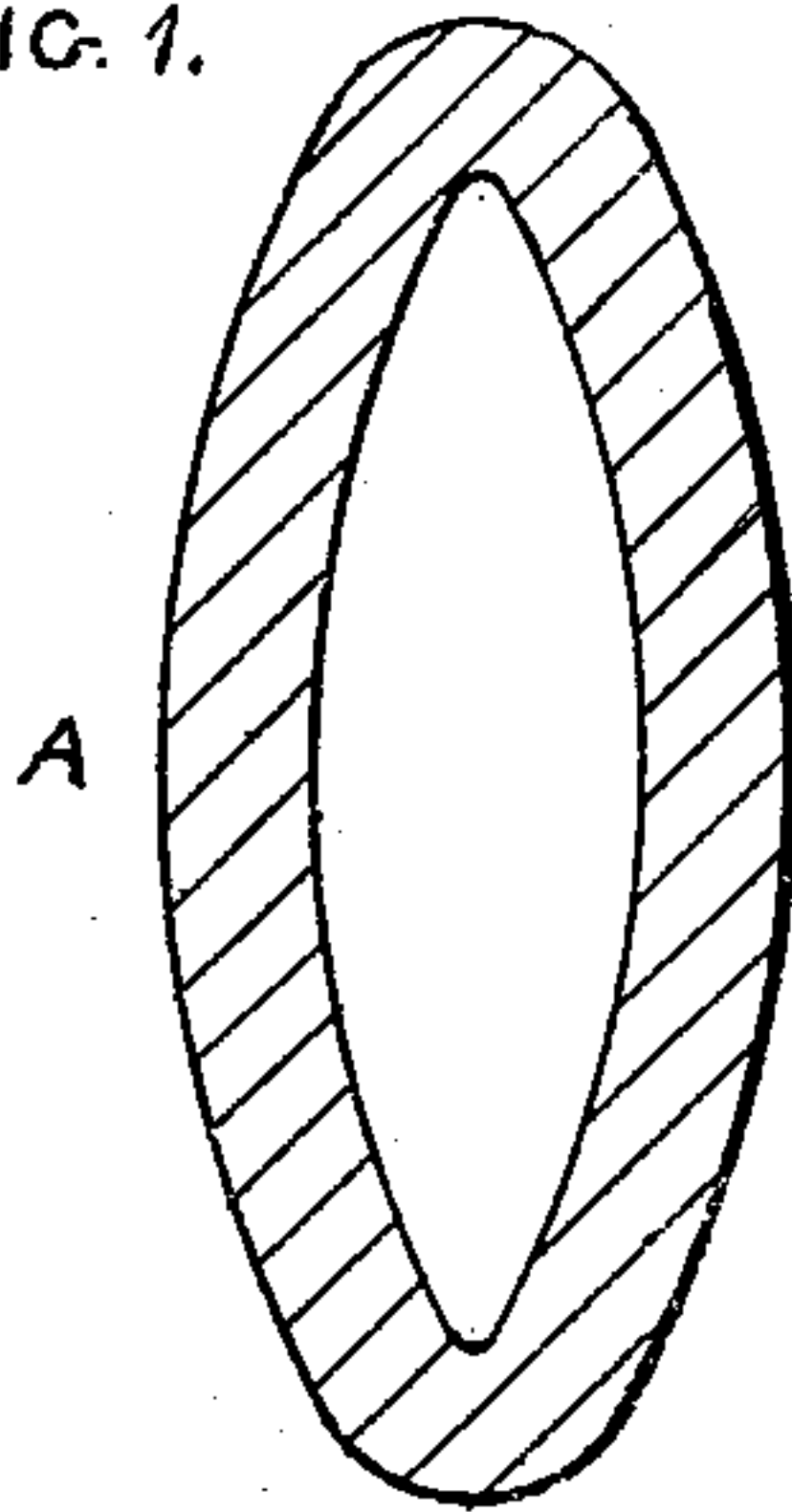


FIG. 2.

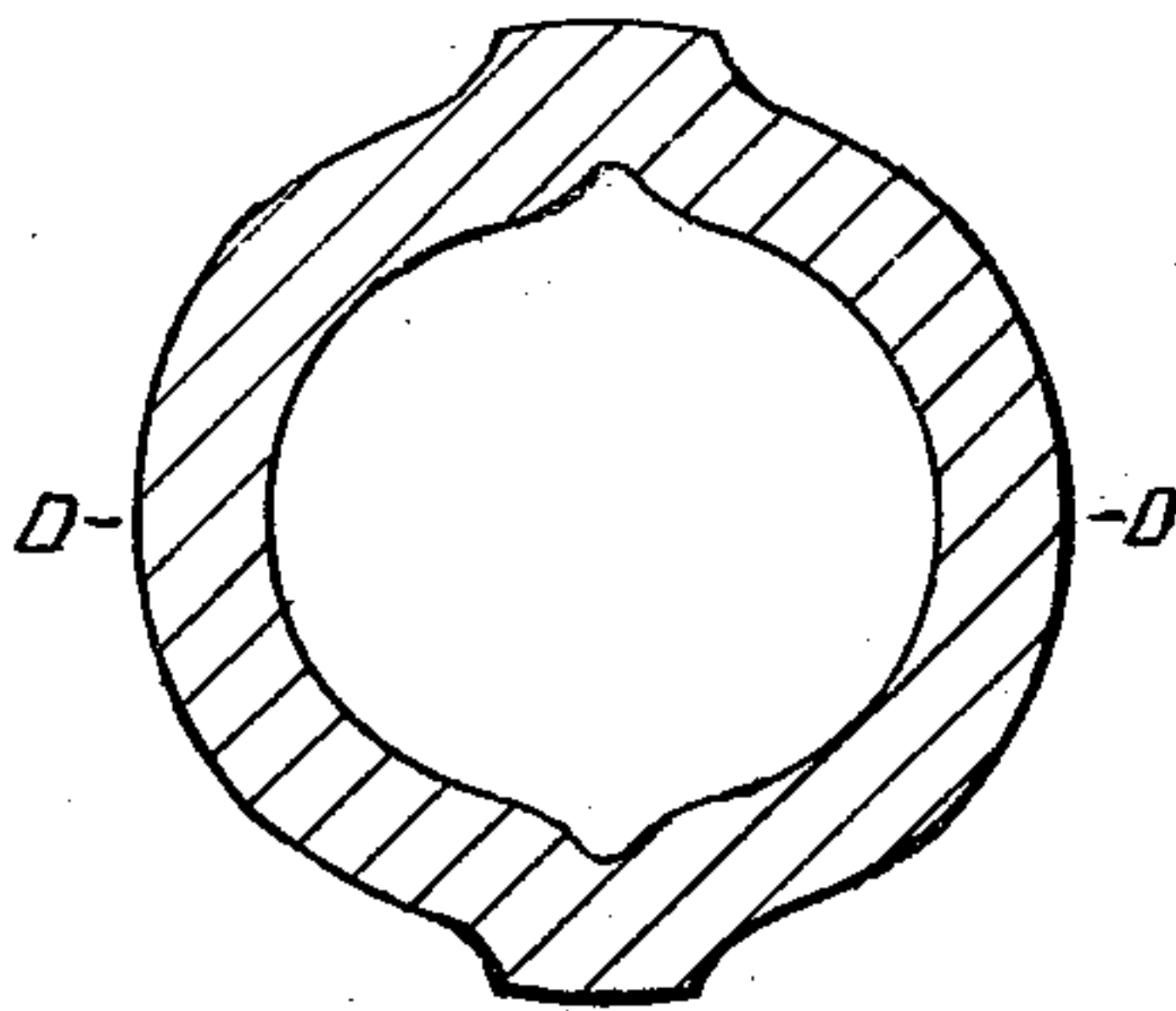


FIG. 3.

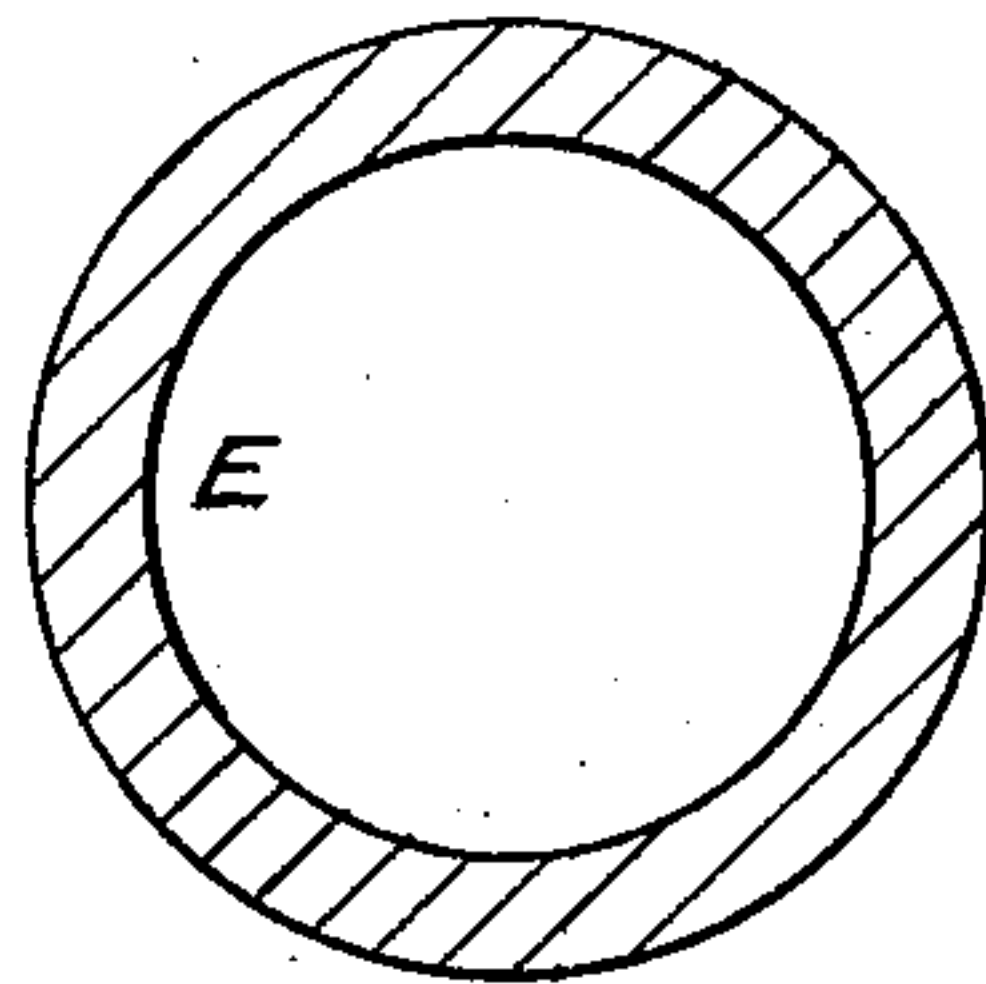


FIG. 5.

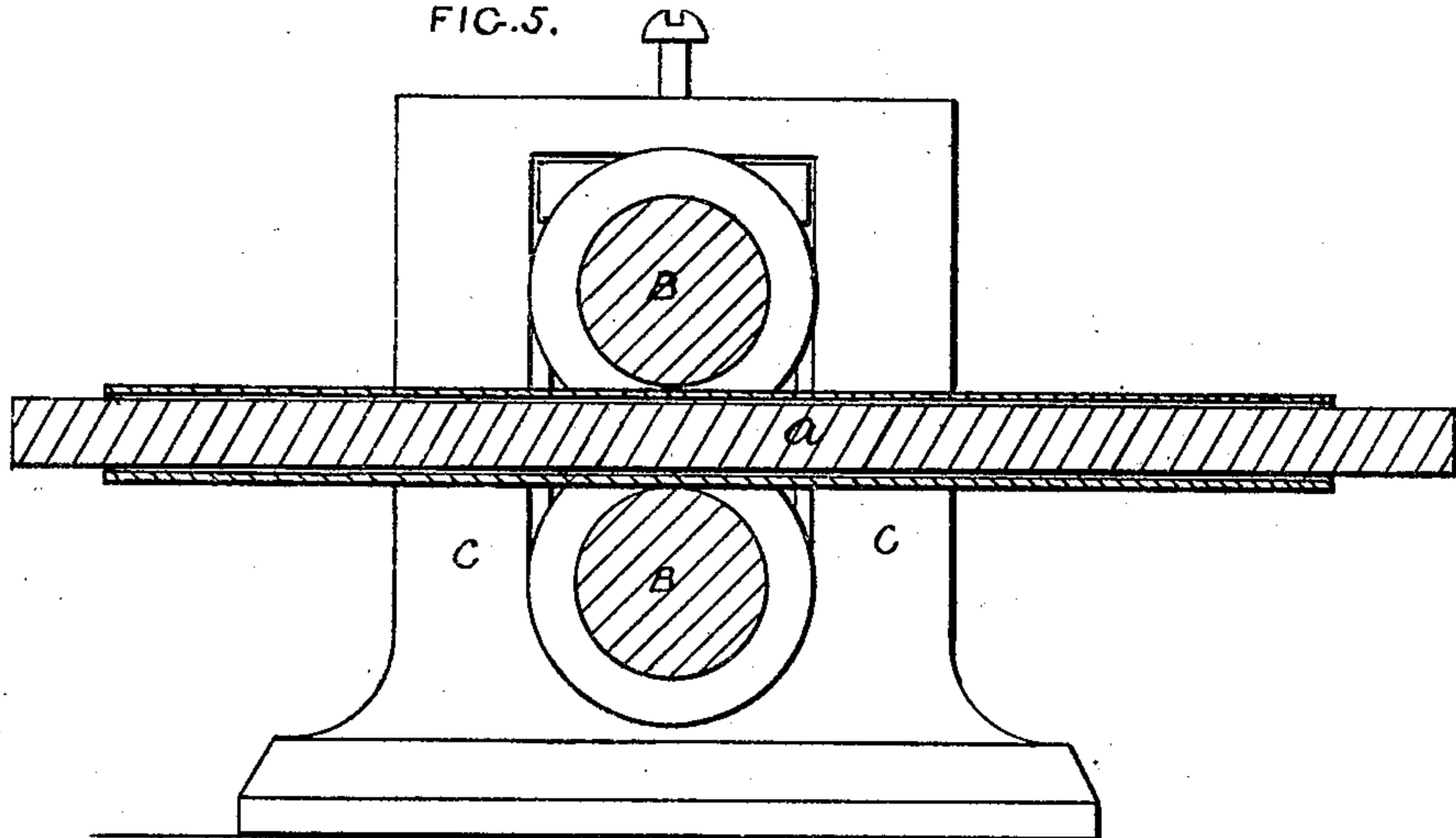
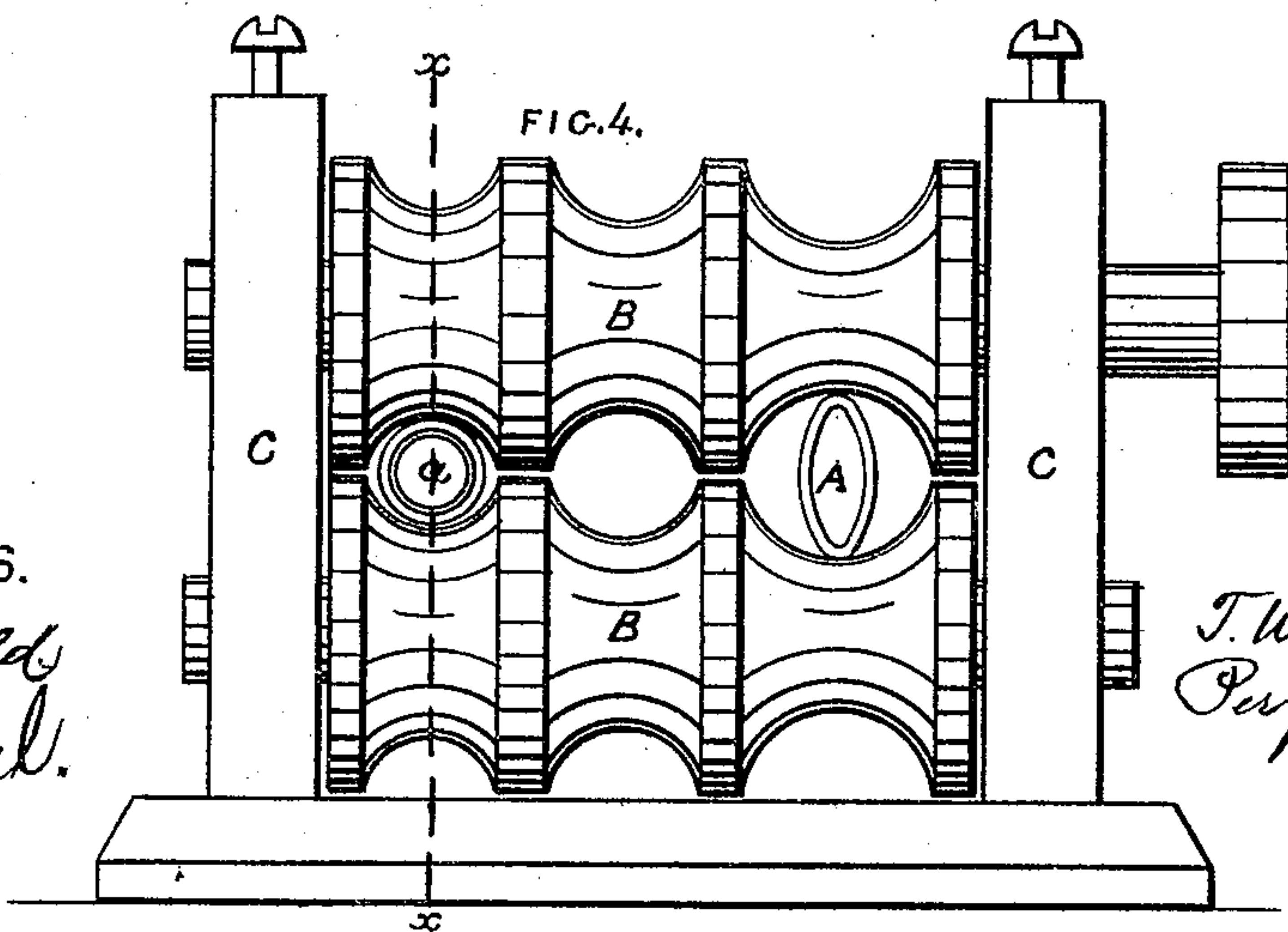


FIG. 4.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

THOMAS WHITEHOUSE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO  
AMERICAN TUBE WORKS, OF SAME PLACE.

## IMPROVEMENT IN THE MANUFACTURE OF METAL TUBES.

Specification forming part of Letters Patent No. **185,375**, dated December 12, 1876; application filed  
September 6, 1876.

*To all whom it may concern:*

Be it known that I, THOMAS WHITEHOUSE, of Boston, Suffolk county, State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Metal Rolls and Tubes, of which the following is a specification:

This invention pertains to the production of hollow metal rolls, and of metal tubes from a hollow or tubular metal casting or ingot; and it is more particularly applicable to copper, although, as will be obvious from the description hereinafter given, it is also applicable to other metals.

Under this invention, I take a hollow or tubular casting or ingot of an oval shape, and of an even thickness in cross-section, and subject it to pressure in the direction of its longer axis, either by passing it between grooved pressure-rolls or otherwise in any suitable manner, and thereby open it out into a round shape, or a shape which is substantially round, and then compress and shape it, either by passing it with a suitable internal mandrel or former between grooved pressure-rolls, or by drawing it in the usual manner, with a suitable internal mandrel or former, through a die of suitable shape, by both rolling and drawing it, as aforesaid, or by any other suitable means.

In the accompanying plate of drawings, Figure 1 is a cross-section of the casting, and Fig. 2 a cross-section of the casting shown by Fig. 1, after having been opened out into a round shape, or substantially so, by passing it between grooved pressure-rolls; Fig. 3, a cross-section of the roll or tube as completed; Fig. 4, a front elevation of two grooved pressure-rolls, for opening out the casting shown in Fig. 1; and Fig. 5 a cross-section on line *x x* of Fig. 4.

In the drawings, A represents a hollow or tubular oval-shaped casting, which is of an even thickness; from which casting a hollow roll or a tube is to be made, according to this invention; B B, two grooved pressure-rolls, arranged, as ordinarily, to turn in bearings of standards C C, and to be adjusted as to their pressure as may be desired; D, the casting after having been opened out into a

round shape, and E the casting as made into a tube or hollow roll.

I take the casting A and, by preference, pass it between the two grooved pressure-rolls B B, with its longer axis vertical or in the direction of the pressure of the rolls, (see Fig. 4,) and by the pressure of these rolls, which acts on the casting in the direction of its longer axis, the casting is opened out into a round shape, or substantially so, as is shown by Fig. 2. I now take this casting, opened out as has been described, and pass it, together with an internal mandrel or former, *a*, of suitable shape, (see Figs. 4 and 5,) as described in my now pending application for Letters Patent of the United States, between grooved pressure-rolls B, so as to compress and shape it, after which, if deemed advisable, I draw it with a mandrel through a die, in the ordinary manner of drawing tubes.

In lieu of opening out the oval casting into a round shape, by passing it between grooved pressure-rolls, as has been particularly shown and described, it may be similarly opened out by forcing or drawing it through dies of suitable shape, to exert a pressure on it in the direction of its longer axis, or by hammering or otherwise in many obvious ways.

In lieu of rolling and then drawing the casting, as has been described, it may be simply rolled, or simply drawn, and in lieu of rolling it with a mandrel, as described, it may be rolled on a mandrel, the mandrel being held stationary in any suitable manner, and obviously after being opened out, as described, it may be compressed and shaped in many ways other than those herein particularly specified; and I do not intend to limit myself to any particular way of compressing and shaping the casting after it has been opened out, as described.

The casting, if desired, may be made with an internal rib or groove, or other equivalent construction, and also of an internal taper, as described in specifications accompanying other pending applications made by me for Letters Patent of the United States, and if so, the mandrel to be used afterward in compressing and shaping it must be correspondingly

adapted to receive the rib or groove, and to conform to the taper.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

In the manufacture of hollow metal rolls or tubes from a hollow casting or blank, as an improved method, casting the hollow blank of oval shape and uniform thickness, and then

rounding it up by pressure in the direction of its longer axis, and afterward compressing and shaping its metal, and finishing it on a mandrel, all substantially as described.

THOS. WHITEHOUSE.

Witnesses:

EDWIN W. BROWN,  
GEO. H. EARL.