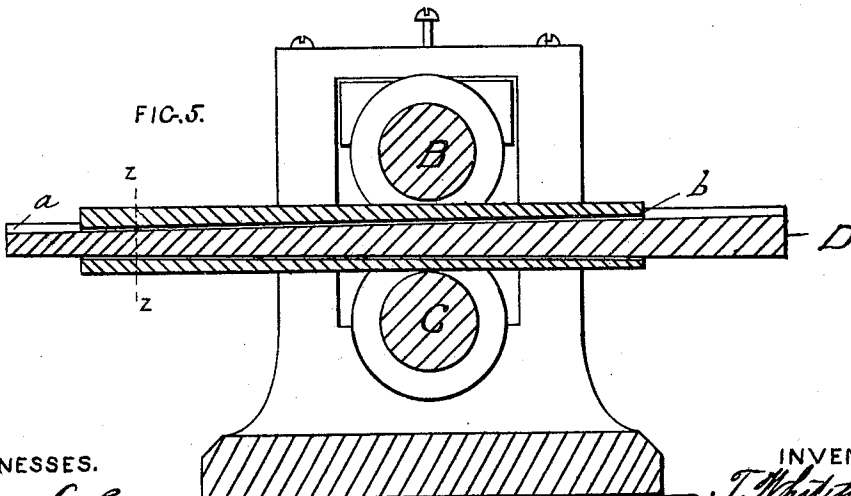
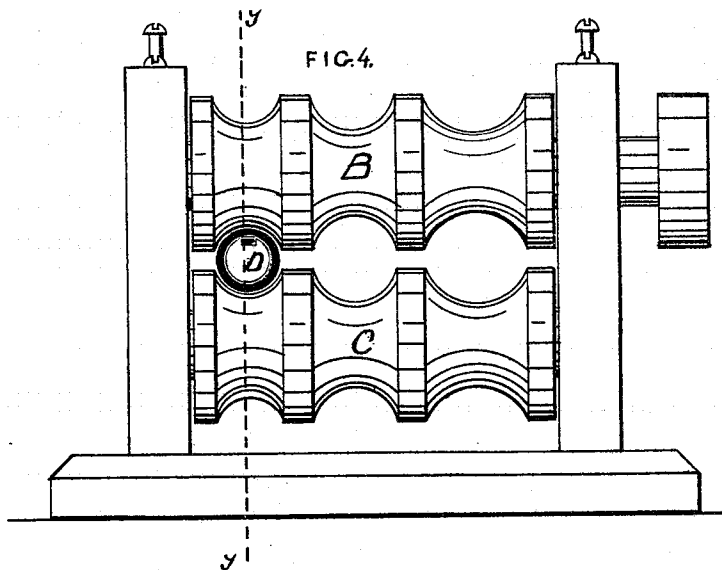
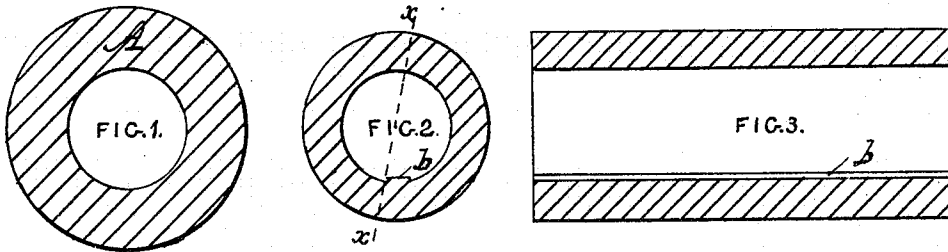


T. WHITEHOUSE.

MANUFACTURE OF COPPER PRINT ROLLS.

No. 185,377.

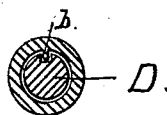
Patented Dec. 12, 1876.



WITNESSES.

*Henry A. Tolson*  
*Geo. W. Earl*

FIG. 6.



INVENTOR.

*T. Whitehouse*  
*Per Brown & Putnam*  
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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 COPPER PRINT-ROLLS.

Specification forming part of Letters Patent No. **185,377**, dated December 12, 1876; application filed  
August 3, 1876.

*To all whom it may concern:*

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

This invention relates more particularly to the manufacture of copper print-rolls, although, as will appear from the description hereinafter given, it is also applicable to the manufacture of rolls from other metals to be used for the same or for other purposes.

The invention particularly pertains to the formation or production upon the inner side or periphery, and along the length of the roll, of a rib or spline, or other equivalent device, so that when the roll is placed on its carrying-shaft it will be held against turning on said shaft, and be made to turn in conjunction with the shaft. As to this the invention consists, in substance, in the production of the said spline or rib, or other equivalent device, upon and along the length of the inner side or periphery of the metal roll, by placing a tubular casting, from which the roll is to be made, on a mandrel or former, suitably shaped with a groove, or otherwise, and then compressing the metal of the casting by rolling, drawing, or otherwise, so as to dispose the metal at the inner side or periphery of the casting to the shape of the mandrel or former, thereby producing a rib or spline, or other equivalent shape, all substantially as hereinafter described.

Under this invention, for the purpose stated, the metal composing the body of the tubular casting or roll is compressed upon the former or mandrel, by passing the casting between semicircular grooved pressure-rolls, and again the said casting and the former or mandrel are, by preference, passed together and simultaneously between said grooved pressure-rolls, and also the outer periphery of said mandrel or former tapers from end to end, which secures the roll upon its shaft against movement on the length of the shaft.

In the accompanying plate of drawings, Figure 1 is a cross-section of a hollow tubular metal casting, from which to make a roll,

and Fig. 2, a similar section of the roll as made; Fig. 3, a section on line *x x*, Fig. 2.

In the manufacture of a tubular roll under this invention, first, I take a hollow tubular metal casting, A, which is cast in the ordinary manner, and of a proper thickness and length. The internal diameter of this casting should be equal, or thereabout—that is, say about one-eighth of an inch larger than the external diameter of the shaft on which it is to be used as a roll, and the thickness of the metal of the casting should be sufficient for it to be reduced to the proper density, and to be extended in length. I prefer the casting should taper slightly on its inner side or periphery. I now take this tubular casting A, and having heated it to the proper degree, I place it on a mandrel or former, having a groove, or other proper construction, in its length, which mandrel, preferably, is also heated, and I pass the two together between grooved pressure-rolls, which are shaped to work upon the outer side of the casting, and to compress and distend the metal of the casting by which compression the metal making up the casting is shaped, and disposed to the outer periphery of the mandrel or former, and thus a rib or spline, or other equivalent construction, is given to its inner side or periphery for the purpose stated.

The rolling of the casting between pressure-rolls, as above described, increases the density and length of the metal casting, and at the same time secures the inner rib or spline construction to the roll described, and, as is obvious, the production of said roll is wholly through a compression of the metal which makes up the body of the roll.

In the drawings, Fig. 4 is a front view of a set of grooved pressure-rolls and mandrel or former, suitable for the purpose above described, and Fig. 5 is a section on line *y y*, Fig. 4, and Fig. 6 a section on line *z z*, Fig. 5.

B is the upper and C the lower pressure-rolls, and D the mandrel or former, which is grooved in its length at *a*, so as to secure the rib or spline *b* on the inner side or periphery of the tubular casting, by compression of the metal in passing the metal casting and the

said mandrel or former between pressure-rolls. The mandrel tapers from end to end, and in practice this taper would be about one-eighth of an inch in three feet in length of the mandrel, and preferably the inner periphery of the casting is made of a slight taper from end to end, which, together with the said taper of the mandrel, enables the tubular roll, after being rolled, as described, the better to be detached from the mandrel or former, and to be secured to the shaft on which it is to be used against movement in the length of the shaft.

After the casting has been compressed by rolling, as above described, I then draw it with a mandrel of suitable shape to fit its interior, through a die in the usual manner of drawing tubes, by which drawing the tube or casting is more perfectly shaped, both exteriorly and interiorly, and after this I smooth off the exterior by turning it in any suitable lathe, in the usual manner.

In lieu of running the mandrel and casting together through the pressure-rolls, as has been above described, the mandrel may be held stationary, and the tubular casting drawn over it; and again, in lieu of rolling the casting on the mandrel or former, it may be, with the mandrel or former, drawn through a die in the ordinary manner of drawing a tube, and thus the metal composing the body of the tubular casting be compressed and formed interiorly to the shape of the mandrel, which is with a rib or spline, for the purpose stated; and again it may be, when on the mandrel or former, compressed, and thereby made to conform to the shape of the mandrel or former in many other ways, as, for instance, by hammering the metal of which the casting is composed upon its outer side.

I prefer, however, the mode of manufacture

which has been particularly described and shown, and my improvement, as has been before stated, is in the formation of a rib or spline, or other equivalent device, interiorly upon a hollow or tubular metal casting, by compressing the metal which makes up the casting, and thereby shaping it to an inner mandrel or former of the proper shape, for the object stated.

The rib or spline may be of various shapes, and, if desired, the roll may be made with more than one rib or spline, and in lieu of ribs with grooves; but I prefer the construction particularly described.

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

1. A hollow or tubular metal roll, having its inner side or periphery made with a spline or rib, or other equivalent construction, by a compression of the metal which composes the body of the said roll.

2. A hollow or tubular metal roll, having its inner side or periphery of a taper from end to end, and made with a spline or rib or of other equivalent construction, by a compression of the metal which composes the body of the said roll.

3. The manufacture of a hollow or tubular metal roll, with a spline or rib or other equivalent device upon its inner side, by passing the metal which makes the body of said roll, in conjunction with an internal mandrel or former of suitable shape, between grooved pressure-rolls, all substantially as described, and for the purpose specified.

THOS. WHITEHOUSE.

Witnesses:

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