

# UNITED STATES PATENT OFFICE.

JAMES S. ATKINSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO JONES & LAUGHLINS, (LIMITED,) OF SAME PLACE

## MANUFACTURE OF ROLLS.

SPECIFICATION forming part of Letters Patent No. 364,157, dated May 31, 1887.

Application filed February 3, 1887. Serial No. 226,468. (No specimens.)

*To all whom it may concern:*

Be it known that I, JAMES S. ATKINSON, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in the Manufacture of Rolls, of which improvements the following is a specification.

Heretofore in forming steel or iron rolls for the reduction of metals it has been customary to give said rolls their approximate shape by casting the same in molds formed either of sand or metal. The roll is then turned or ground down to the desired shape and size. This method is objectionable, not only on account of the labor, difficulty and expense of forming the mold and turning down the roll, the frequent formation of flaws and blow-holes, which are only discoverable when the roll is in use, but also on account of the transverse weakness of rolls having no internal defects.

The object of the invention herein is to so construct both plain and grooved rolls for the reduction of metals that they shall have not only a greater transverse strength, be more easily and cheaply made, but shall also be stronger and more durable.

In the practice of my invention I cast an ingot, either of Bessemer, open-hearth, or crucible steel, of a length approximately equal to the length of the roll to be formed, and of a transverse area considerably larger than that desired in the finished roll. This ingot, which may be either square, round, or of any other desired transverse section, is then reduced, either by rolling or forging, or by rolling and forging, to approximately the size of the finished roll. The necks and wabblers are then formed on the ends of the shaped ingot or forging, which is then transferred to a lathe, where it is turned or ground to the finished size.

In making grooved rolls the grooves may be partially formed by forging, and then fin-

ished by cutting or grinding, or, and preferably, they may be formed entirely by cutting or grinding.

In this method of manufacturing rolls any flaws or blow-holes which may occur in the ingot during casting are closed or filled up by the rolling and forging operations to which the ingot is subjected. In addition to the avoidance or obliteration of flaws and blow-holes, as above stated, the rolling and hammering produce such density and compactness of metal as to prevent the formation of what is termed "surface-cracking"—a defect incident to cast rolls. By this method of forming rolls I am enabled to produce a surface which shall be nearly, if not quite, as hard and dense as the surface of a chilled roll, and am enabled to avoid the brittleness and transverse weakness necessarily consequent upon the sudden chilling of cast metal.

Care should always be taken that the ingot, whatever its sectional contour, should be of such transverse sectional area as to require considerable working to bring it to approximately the size of the finished roll, in order to obtain a dense and compact surface and the closing up of internal flaws and blow-holes.

I claim herein as my invention—

1. As an improvement in the art of forming rolls for the reduction of metals, the herein-described method, which consists in rolling or forging an ingot to approximately the size and shape of the desired roll, and then cutting or grinding such forged ingot to the desired size and shape, substantially as set forth.

2. As a new article of manufacture, a forged or rolled steel roll for the reduction of metal, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES S. ATKINSON.

Witnesses:

DARWIN S. WOLCOTT,  
R. H. WHITTLESEY.