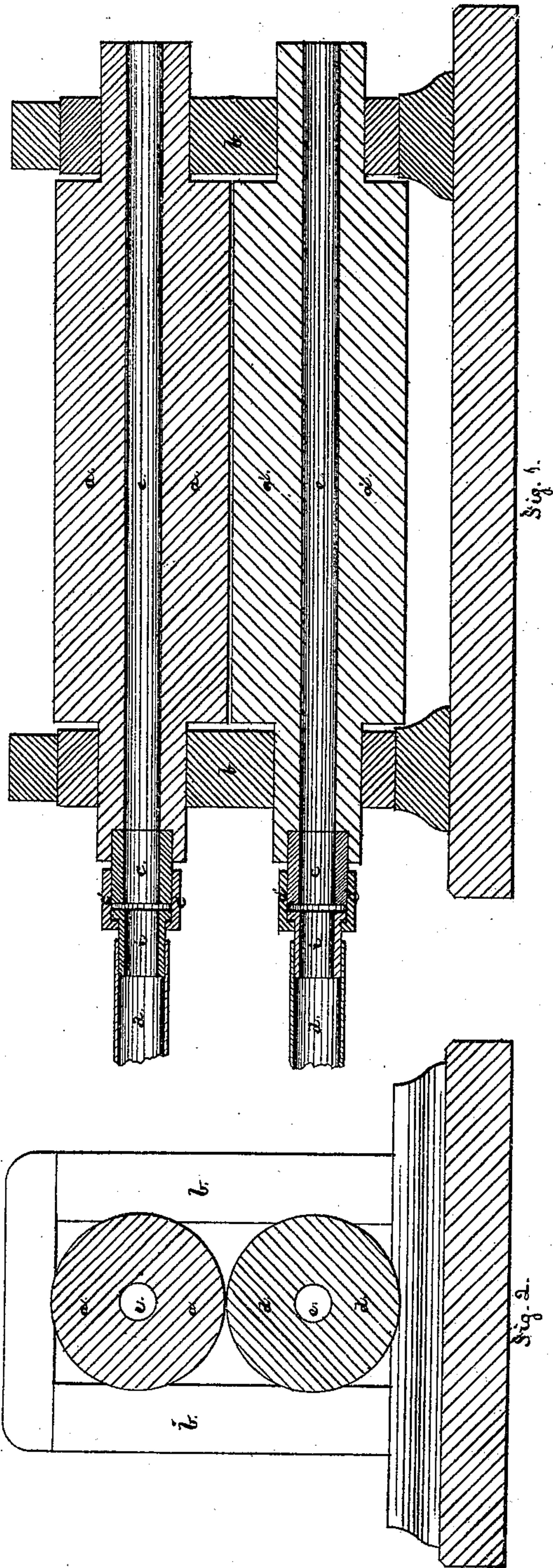


J. Lippincott,

Rolling Metal.

No. 96,600.

Patented Nov. 9. 1869.



Witnesses:
G. B. Rushing
Thos. B. Kent.

Inventor:
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United States Patent Office.

JOHN LIPPINCOTT, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 96,600, dated November 9, 1869.

IMPROVEMENT IN METAL-ROLLING APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN LIPPINCOTT, of the city of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Rolling Metals; and I do hereby declare the following to be a full, clear, and exact description thereof.

It is a well-established fact that cylindrical rolls, such as are employed for rolling sheets or slabs of iron and steel, expand when heated by the hot sheets or slabs passing between them; and, notwithstanding that the rolls are turned slightly concave, to compensate for the expansion, if the rolling is continued beyond a certain point, the expansion progresses to such a degree as to compel a cessation of the work, until the rolls become somewhat cooled.

It is also customary to run water on to the rolls, during the process of rolling, in order to keep down their temperature, but this is also objectionable, since the constant expansion and contraction of the metal tend to weaken it, and the rolls frequently break. In rolling hot sheets or slabs, the rolls generally heat and expand most in the middle, where they are most used, with a consequent tendency to convexity, so that, being higher in the middle than at either end, the greatest strain is there, and the sheets or slabs are pulled or warped in consequence, and are not rolled evenly.

These difficulties I avoid, and entirely overcome excessive expansion and contraction in the rolls, and prevent the heat accumulating beyond a point, at which no injury can result, either by expansion in the rolls or injurious effects to the sheets or slabs passing between them.

I also enable the operator to run his rolls continuously, without loss of time in waiting for the rolls to cool.

The nature of my invention consists in passing a stream or current of water or a blast of air through a hollow cavity or chamber, which extends lengthwise through each roll, for the purpose of preventing the undue heating of such roll, and in the construction of devices for supplying hollow rolls with water for such purposes.

To enable others skilled in the art to make and use my invention, I will describe its construction and manner of use, referring, for that purpose, to the accompanying drawing, making a part of this specification, and to the letters of reference marked thereon—

Figure 1 being a vertical section, formed by a plane passing longitudinally along the axes of a pair of hollow cylindrical metallic rolls, and

Figure 2 being a vertical cross-section of the same. *a a'* are a pair of hollow cylindrical metallic rolls, mounted in any convenient style of housings *b*.

Each of the rolls *a a'*, I cast in a mould, and around a core of any usual or known construction, whereby a cavity or chamber, *c*, will be secured, extending lengthwise of the roll from end to end. This cavity *c* may be of any desirable shape, or of any size, in cross-section, provided sufficient thickness of roll be left to insure the required strength. The casting is done in the usual way.

If deemed desirable, the rolls may be chilled on their inner surface, and cooled from the centre. In this way they may be made of great density and strength.

In order to overcome the expansion and contraction, which in rolls for rolling iron and steel is so objectionable, and keep the rolls, while in use, at a temperature as nearly uniform as possible, I pass a flow of cold water through them, along the cylindrical cavity *c*, which carries off the heat as fast as it is absorbed by the roll.

This result I accomplish by connecting with the necks of the rolls, the hose-pipe *d*, in any convenient way, whereby water will be freely supplied as the rolls revolve.

One form of coupling is shown in fig. 1, in which *c* is a tube, set into the neck of the roll.

c' is a sleeve, which couples the rolls *a a'* and nozzles *i* together, and which slides, so as to permit the roll to revolve, while the pipe *d* remains stationary.

The water may be turned on and off by cocks of the usual construction. Similar attachments may be made to carry the water off at the opposite ends of the rolls *a a'*.

By the use of the devices described, the temperature of the rolls can be regulated at pleasure. The water may flow, or be forced through more or less rapidly, or turned on and off, at intervals, as the operator may desire or find most expedient.

A blast of cold air or other fluid may take the place of the water, both in the casting and in the rolling, or in either separately, and such blast be forced through by a fan, or other equivalent device, with useful result.

I am aware that hollow rolls have been used in mangles, for purposes of drying, the rolls being first heated to a moderate temperature, by the introduction of red-hot iron, heated gravel stones, boiling water, alcohol, or other like means; but in rolling iron, the intense heat of the metal, which is passed through, speedily raises the temperature of the rolls to such a degree, as greatly to injure the rolls, and hence the necessity of so constructing them as to pass through them continuously a cooling-fluid, to keep their temperature down, and at a uniform degree, as near as may be.

The uses are entirely different, and the ends to be attained are so essentially diverse, that one device would not be suggestive of the other; hence,

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

Constructing rolls, for metal-rolling mills, hollow, and adapting, to said hollow rolls, tubes or other appliances, by which a stream of water may be con-

stantly kept flowing through them, substantially as described, for the purpose set forth.

In testimony whereof, I, the said JOHN LIPPINCOTT, have hereunto set my hand.

JOHN LIPPINCOTT.

Witnesses:

A. S. NICHOLSON,

G. H. CHRISTY.