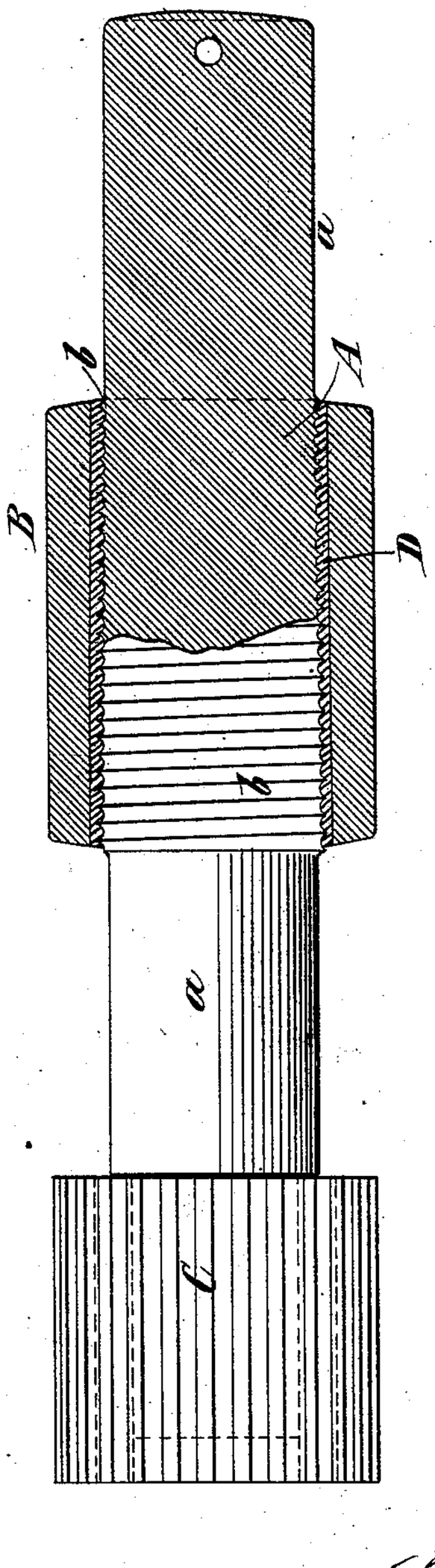
(No Model.)

S. R. WILMOT.

ROLLING MILL ROLL.

No. 281,596. Patented July 17, 1883.



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UNITED STATES PATENT OFFICE.

SAMUEL R. WILMOT, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO HIMSELF AND WILLIS F. HOBBS, OF SAME PLACE.

ROLLING-MILL ROLL.

SPECIFICATION forming part of Letters Patent No. 281,596, dated July 17, 1883.

Application filed October 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL R. WILMOT, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Rolling-Mill Rolls, of which the following is a specification.

My invention relates more particularly to rolls for reducing cold iron and steel very thin and in pieces of great length with few annealings, whereby is secured the greatest perfection of metal with the least possible waste. This method of rolling, however, is very hard and destructive to the rolls employed. Ordinary chilled-iron rolls are objectionable, because of their liability to breakage by fracture of the necks, or the rolls themselves, and because of the flaking out of the faces. Iron rolls wear rapidly and have to be reground often, and hence they soon become worn out and good for nothing but scrap. Solid-steel rolls are greatly superior to chilled iron, but are objectionable because of their liability, when made of large size, to break by contracting in cooling; and so great and well understood is this liability that it is almost, if not quite, impossible to get solid-steel rolls of the largest sizes from the roll-manufacturers at any price. Solid-steel rolls are also objectionable, because when they become worn or their faces flake out they are useless, except for scrap, and to replace them is expensive.

My invention consists in a rolling-mill roll composed of an externally-tapered and screw-threaded shaft adapted to receive a driving-gear or driver, and a roll-face or sleeve of hardened steel tapered internally, and screwed upon said shaft, whereby I enable the rolls to be made at moderate cost, because there is little liability of the annular roll-face or sleeve breaking by reason of contraction in cooling when hardened, and because the roll-face or sleeve may be removed and replaced by another when worn out. After the roll-face or sleeve has been hardened its inner surface will not be perfectly round and true, and I prefer to insert therein a soft-metal lining, which may be reamed out to correspond with the taper of the shaft, and has the screw-thread cut in its inner surface. In use this roll is rotated in a direction to screw the roll-face or sleeve on the shaft, and hence it can never become loose.

The accompanying drawing represents a partial longitudinal section and partial side view of my improved roll and a driving-gear.

The roll is composed of two principal parts—a shaft, A, and a roll-face or sleeve, B. The shaft A is of hammered steel, chosen for its toughness, but is not hardened, and therefore not liable to crack. On the end of the shaft is a driving-gear, C, and *a* designates the necks of the roll, which are made of great length, in order to get a large bearing-surface to prevent heating. The portion of the shaft between the necks is turned with a slight taper, and upon such tapered portion is cut a shallow screw-thread, *b*. The shaft is case-hardened and ground perfectly smooth and true. The roll-face or sleeve B is made of the best cast-steel, hammered, and is turned off and bored out somewhat larger than the screw-thread *b*. It is then hardened as deep as possible both inside and outside. After hardening it will be found that the interior of the roll-face or sleeve is not perfectly round and true, and therefore I cast or otherwise secure in the interior thereof a soft-metal lining, D, which may be of brass or other suitable alloy, reamed out taper, corresponding to the taper of the screw-threaded portion of the shaft, and has a screw-thread cut therein to correspond with the screw-thread *b* on the shaft, that it may fit along its whole length to the latter when screwed thereon.

In use, the roller is turned in a direction which will cause the roll, if it gets loose, to screw on the shaft, and it can therefore never get loose in use. When worn out, it may, however, be taken off, when suitably heated, and a new face or sleeve screwed upon the shaft.

This roll has all the advantages of a solid-steel roll, in that it has a hard steel face, and it may be made at a much less cost and larger in size than it is possible to make a solid-steel roll. When its face becomes worn out, it can be renewed at a fraction of the cost of renewing the entire roll.

If desired, I may make the roll-face or sleeve of cast or forged steel, with a cavity or hole slightly larger than the external diameter of the roll-shaft. Such casting or forging may be taken in the rough, and pickled or cleaned by acid, and, after being moderately treated, placed loosely upon the finished roll-shaft. The

ends of the roll-face or sleeve are then luted with clay and the soft metal poured in around the screw-thread, thereby casting the lining with its screw-thread complete, after which the periphery and ends of the roll-face or sleeve are finished in a grinding-machine.

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

1. A rolling-mill roll composed of an externally-tapered and screw-threaded shaft, adapted to receive a driving-gear or driver, and a roll-face or sleeve of hard cast-steel tapered internally and screwed upon said shaft, substantially as herein described.

2. A rolling-mill roll composed of an externally-tapered and screw-threaded shaft, adapted to receive a driving-gear or driver, and a roll-face or sleeve of hard steel provided with a soft-metal lining, tapered internally, and screwed upon said shaft, substantially as herein described.

S. R. WILMOT.

Witnesses:
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