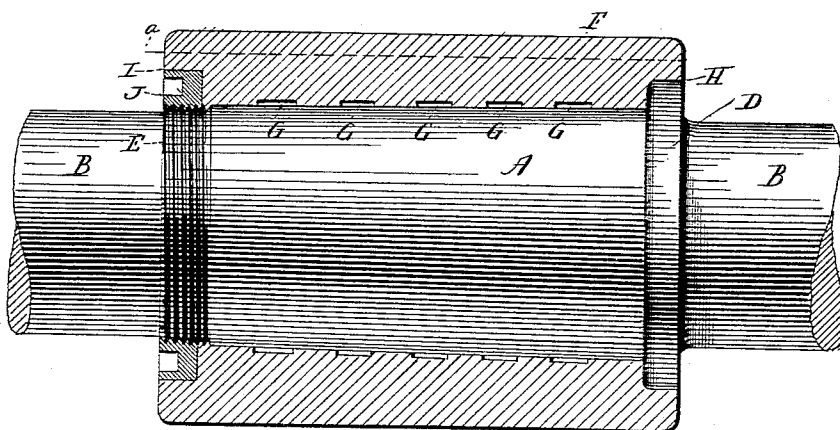


(No Model.)

W. POLLARD.
ROLLING MILL ROLL.

No. 476,552.

Patented June 7, 1892.



Witnesses.
J. H. Shumway
F. H. Peck

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Inventor
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UNITED STATES PATENT OFFICE.

WILLIAM POLLARD, OF ANSONIA, CONNECTICUT, ASSIGNOR OF ONE-HALF
TO FRANKLIN FARRELL, OF SAME PLACE.

ROLLING-MILL ROLL.

SPECIFICATION forming part of Letters Patent No. 476,552, dated June 7, 1892.

Application filed October 2, 1891. Serial No. 407,542. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM POLLARD, of Ansonia, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Rolling-Mill Rolls; and I do hereby declare the following, when taken in connection with accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of
10 the same, and which said drawing constitutes part of this specification, and represents a side view of the shaft, showing the sleeve in longitudinal section.

This invention relates to an improvement
15 in rolls designed for reducing iron and steel to very thin plates of strips of great length. Chilled-iron rolls for this purpose are objectionable, because of their liability to break at the neck or chip upon their face. Again,
20 such iron rolls wear rapidly and require frequent regrinding or refacing. Solid steel rolls have been employed for this purpose; but such rolls are very expensive, owing to their liability of injury or imperfection in casting. To overcome these difficulties, rolls
25 have been produced for this purpose consisting of a shaft slightly tapered, with a steel sleeve correspondingly tapered and secured upon the roll. These sleeves have
30 been hardened, and in hardening they are liable to change their surface shape upon the inside, so as not to conform perfectly to the tapered shape of the roll. Hence it has been necessary to introduce something in the
35 form of packing between the shaft and the roll, making the fitting of the sleeves difficult and expensive. Again, in such tempering there is great liability to crack the sleeves. Such cracking destroys the sleeve. It will
40 be understood that the outer surface of the sleeve forms the working surface of the roll. Again, in use of this class of rolls the continued rolling operation operates to expand the sleeve to some extent, and thereby
45 loosen it upon the shaft. It is to this latter class of rolls that my invention particularly relates, and has for its object to avoid the fitting as well as the possible expansion of the sleeve under operation; and the invention consists in the construction of the roll,

as hereinafter described, and particularly recited in the claim.

A represents the shaft, which is cast in the usual manner and preferably tapering over that portion of it between the necks or
55 geons B B. Near one neck the shaft is constructed with an annular collar D, preferably formed as a part of the shaft. At the other end and in like position the shaft is screw-threaded, as at E.

60 F represents the sleeve. This is cast from steel of the required thickness, and it is tapered upon the inside corresponding to the taper of the shaft, so that it may be passed on over the shaft from one end against the collar at the opposite end. Upon the inside
65 of the sleeve a series of grooves G are formed, preferably annular; but they may be of any shape which will produce substantially annular grooves around the inside of the sleeve.
70 The spaces between the grooves correspond to the diameter of the sleeve and so that these grooves leave clear spaces on the surface of the shaft between it and the sleeve. The grooves or spaces thus formed on the
75 inner surface of the sleeve produce a series of ribs, the internal diameter of which corresponds to the external diameter of the shaft and so that this series or ribs forms substantial bearings throughout the length of the
80 sleeve. The grooves need be of but slight depth, but must be sufficient to form some open space between the shaft and sleeve. The sleeve is constructed with an annular
85 recess H at one end, corresponding to the collar D and so that the sleeve will pass onto the collar and so as to substantially inclose the collar, as shown. At the other end the sleeve is constructed with a similar recess I,
90 and into this a nut J is screwed onto the shaft, so as to clamp the sleeve longitudinally between the collar D and the nut J, the sleeve inclosing both the nut and collar. By this construction of sleeve to inclose both the nut and the collar the sleeve may be of a length
95 substantially equal to the distance between the boxes in which the shaft is supported, thereby making it possible to shorten the distance between the sides of the frame over
100 what would be the case were the nut and col-

lar outside the ends of the sleeve, for in such case it is necessary to arrange the frames distant from each other equal to the length of the sleeve plus the length of the collar and nut. The sleeve is hardened from the outside and so as to give the required hard external surface for a short distance from the surface—say as to the line *a*—and from that point the hardening quickly dies out, leaving the inner portion of the sleeve of the normal condition of metal.

In operation any tendency to condense the metal radially will force the metal into the grooves *G* between the shaft and sleeve and without any substantial circumferential expansion, these grooves giving ample space to receive the displacement of metal produced in the rolling operation. The result of this is that the roll once fitted does not loosen. Again, the roll being soft upon the inside and unaffected by the tempering operation, no packing is required between the sleeve and roll, as must be the case where the sleeve is hardened throughout. Again, the hardening of the sleeve from the outside only, and leaving the body of the sleeve of substan-

tially normal temper, avoids the breaking which must frequently follow the hardening of the sleeve throughout.

I claim—

In a roll for rolling metal, the combination of a shaft, a steel sleeve thereon, the said sleeve constructed with substantially annular grooves upon its inside and so as to form recesses between the sleeve and the surface of the shaft, the inner surface of the sleeve between the said recesses corresponding in diameter to the diameter of the shaft and so as to form a series of bearings between the sleeve and shaft substantially throughout the length of the sleeve, said sleeve being hardened upon its outside, but the inner portion or body of the sleeve left in its normal condition, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM POLLARD. [L. S.]

Witnesses:

REUBEN H. TUCKER,
PETER TOMLINSON.