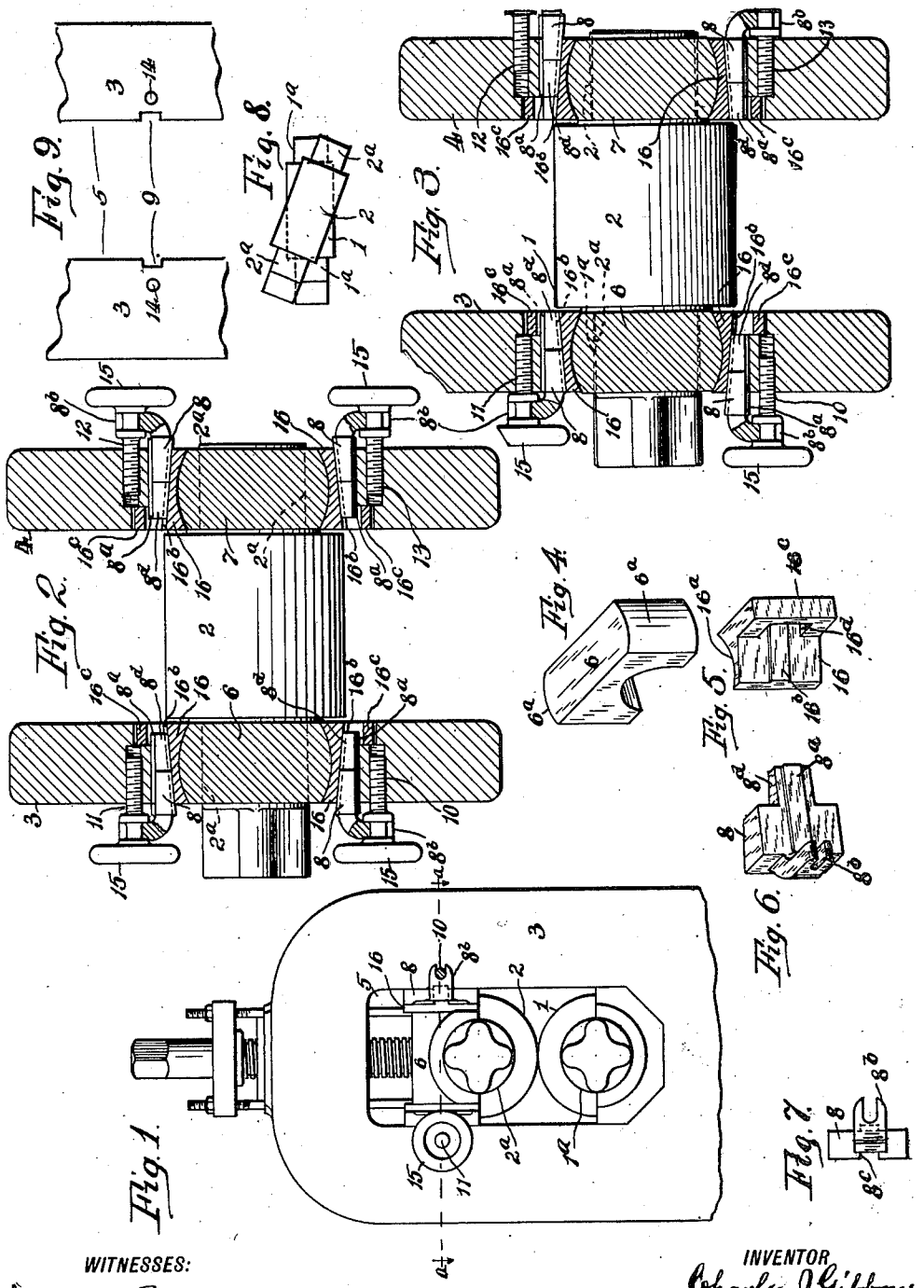
C. J. GIBBONS.

ROLLING MILL.

APPLICATION FILED JAN. 21, 1911.

1,004,771.

Patented Oct. 3, 1911.



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ROLLING-MILL.

1,004,771. Specification of Letters Patent. Patented Oct. 3, 1911.

Application filed January 21, 1911. Serial No. 603,817.

To all whom it may concern:

Be it known that I, CHARLES J. GIBBONS, citizen of the United States, residing at Stratford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Rolling-Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to rolling mills and it consists in certain mechanical means whereby the top roll of a pair of rolls can readily be adjusted to roll an even gage. The present method, so far as known, of rolling metal is with parallel rolls having no lateral adjustment. When metal is passed through rolls that are parallel, or with perfectly straight faces, the rolls will spring in the center and cause the sheet to be thicker in the center than at the edges. To counteract this, the rolls are crowned; in other words, the ends are ground down so as to leave the center higher to compensate for the spring or elasticity of the rolls. In rolling high carbon metal the center of the rolls must necessarily be crowned more than with low grade metal. For every grade of metal the rolls have to be specially ground to suit each particular grade, and, as this grinding or shaping of the rolls requires several hours to effect, and is performed without removing them from the housing, it will readily be seen that this delay in shaping the rolls seriously interferes with the output and materially increases the cost of production.

My improvement consists in obliquely adjusting the top roll to compensate for both the spring and unevenness of either the top or bottom rolls, and to maintain the journals and bearings of the rolls perfectly parallel regardless of the amount of offset or obliquity given to the top roll.

Referring to the drawings wherein the same figures of reference indicate like parts throughout the several views, Figure 1 is a broken end elevation of a mill, and sectional view of one of the adjusting screws; Fig. 2 is a sectional view of the mill housing and roll caps on line *a a* of Fig. 1, and broken view partly in section of the roll adjusters; Fig. 3 is a broken sectional view of the mill housing on line *a a* of Fig. 1, broken view partly in section of three of the roll adjusters, broken view of one of the roll adjusters, and two of the roll adjuster screws; Fig. 4 is a detail perspective view of one of the roll caps; Fig. 5 is a detail perspective view of one of the cup bearings for the roll caps; Fig. 6 is a detail perspective view of one of the roll adjusters; Fig. 7 is a front end elevation of one of the roll adjusters; Fig. 8 is a reduced detail view of a pair of rolls showing the obliquity of the upper one greatly exaggerated; and Fig. 9 is a broken view of one end of the roll housings.

The rolls 1 and 2 are of the usual kind employed in rolling mills with their necks 1^a and 2^a projecting into openings in the ends of the housings 3 and 4. One of such openings, 5, is shown at Fig. 1. 6 and 7 are caps for the necks of the upper roll. As the roll adjusters 8 are all alike, they will be indicated by the same figure of reference. These roll adjusters each have the rib 8^a on their outer straight faces adapted to slidably engage the grooves 9, Fig. 9, of the housings to maintain them in proper vertical alinement. 10, 11, 12 and 13 are roll adjuster screws engaging threaded holes 14, Fig. 9, in the outer faces of the housings. These screws are journaled in the overhanging forked portion 8^b of the roll adjusters and their outer ends carry the hand wheels 15.

The caps 6 and 7, Fig. 4, have the cylindrical or convex ends 6^a adapted to be journaled in the end bearings 16, Fig. 5, provided with the concave seats 16^a for that purpose. Each of these end bearings is provided on its outer face with the rib 16^b with which the groove 8^c, Fig. 7, in the taper face of the roll adjuster slidably engages in order to maintain said bearings and adjusters in close vertical relation with each other. Each bearing has the flange 16^c with the opening 16^d therethrough to admit the small end 8^d of the roll adjuster and thus permit of an uninterrupted inward travel of said adjusters.

Fig. 2 represents the rolls parallel, and Fig. 3 represents the top roll obliqued or thrown out of alinement with the lower roll to compensate for the spring of the rolls, as well as whatever unevenness may occur in either of said rolls. To offset or oblique the top roll as shown at Fig. 3, the roll adjusters, controlled by the adjusting screws 10 and 12, are moved outward, and the roll adjusters controlled by the adjusting screws 11 and 13 are correspondingly moved in-

ward so that said top roll will always be firmly maintained in workable relation with the lower roll in any of its adjusted positions. The circular joint formed by the upper roll caps 6 and 7 and the end bearings 16 will enable said caps to turn as said upper roll is thrown around to preserve a parallel bearing for the necks 1^a and 2^a of the upper roll with the caps and thus avoid cramping.

From the foregoing it will readily be seen that any imperfections of the rolls or spring of the same can readily be counteracted by the oblique adjustment of the upper roll with respect to the lower one and the quality of the metal to be rolled, and that by means of this oblique adjustable feature of the upper roll all regrinding or shaping of the rolls can be dispensed with, thereby saving a vast amount of labor and expense.

I do not wish to be held strictly to the exact mechanism shown for effecting a lateral oblique adjustment of the upper roll, as equivalent means would effect the same purpose.

Having thus described my invention, what I claim is:—

1. In a rolling mill of the character described, the combination with the rolls and roll housing, of means substantially as shown for obliquing the upper roll, and means for preserving the parallelism of the necks of the upper roll with their caps.

2. In a rolling mill of the character described, roll adjusters located between the housings and necks of the upper roll, caps for said necks, said caps having convex ends, end bearings interposed between the roll adjusters and caps, said bearings having concave seats for the ends of the caps, and means for actuating the roll adjusters to effect an oblique adjustment of the upper roll with respect to the lower roll.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. GIBBONS.

Witnesses:
GEO. D. PHILLIPS,
JAMES FEELEY.