(No Model.)

J. H. BICKLEY.

ROLLING MILL.

No. 431,179. Patented July 1, 1890.

Fig. 1.

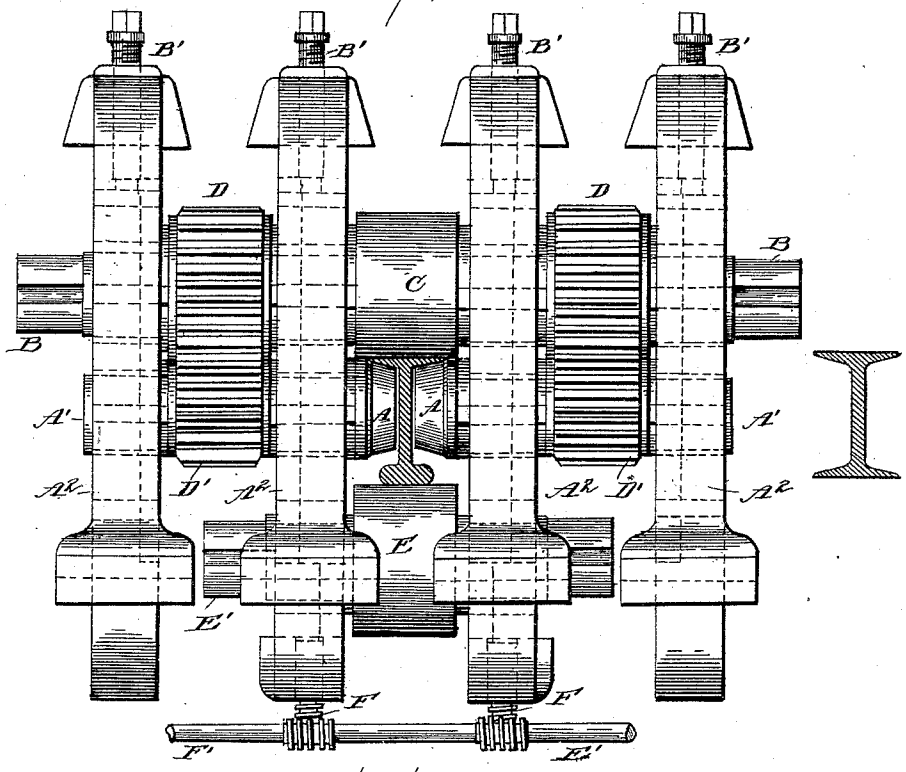
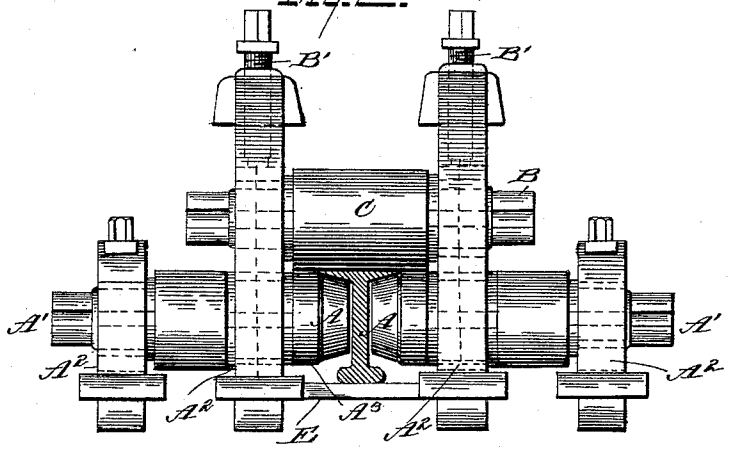


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN H. BICKLEY, OF DOVER, NEW JERSEY.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 431,179, dated July 1, 1890.

Application filed December 10, 1889. Serial No. 333,176. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. BICKLEY, a citizen of the United States, residing at Dover, in the county of Morris, State of New Jersey, have invented certain new and useful Improvement in Rolling-Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in rolling-mills designed for the manufacture of railway-rails and analogous devices; and it has for its object, among others, to provide simple means for rolling the rails, providing a number of oppositely-disposed positively-driven rolls with a positively-driven upper roll and a support for the rail while being operated upon, said support being preferably a roller-support with means for vertically adjusting the same to accommodate the machine to rails of different heights. The oppositely-disposed free-end rolls are tapered to give the necessary taper to the flange upon the inside, and are arranged so as not to contact with the web of the rail, thus avoiding torsion thereof and weakening of the web, as is the result where the web is rolled to reduce the thickness thereof, as has been heretofore the practice.

The present invention consists in the peculiarities of construction and the novel combinations, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the drawings, and then particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is an end view of portions of a rolling-mill illustrating my invention. Fig. 2 is a like view of a modified form.

Like letters of reference refer to like parts throughout both views.

While in this description I refer to the article being operated upon as railway-rails, I of course do not wish to be understood as restricting myself to such devices, as the machine or mill may be advantageously employed for other longitudinal bars, girders, or the like.

Referring to the drawings, A designates the oppositely-disposed rolls, carried by suitable shafts A′, which have bearings in the supports of the frame-work A^2, and have their adjacent ends tapered inversely, as shown, with the space between the adjacent ends of the rolls somewhat greater than the thickness of the web of the rail which it is designed to roll, so as to avoid pressure against the web of the rail.

B is a shaft journaled in suitable bearings in the frame-work A^2, which bearings are vertically adjustable by means of set-screws B′ in a well-known manner. On this shaft B is the upper roll C, arranged to revolve in contact with the peripheries A^3 of the rolls A, as shown. This upper or resistance roller C may be driven either positively or by frictional contact with the pressure-rolls A. In Fig. 2 it is shown as designed to be operated by friction, while in Fig. 1 it is shown constructed to be driven positively by means of the cog-gears D′ on the shafts A′ and B and intermeshing in a common manner in devices of this character.

Motion is imparted to the power-shaft in any manner well known in the art to a suitable train of gearing not shown, however, in the present drawings.

E is a support for the lower end of the rail during the operation of rolling. In Fig. 2 it is shown as a plate or beam supported by the frame-work A^2; but in Fig. 1, which is the preferred form, it is shown as a roller carried by a shaft E′, which may be driven positively by a suitable train of gearing, if desired, or revolved by frictional contact of the rail in its passage through the mill. The shaft E′ is carried in suitable bearings, which are vertically adjustable, so as to accommodate the varying heights of rails. In the drawings I have shown this adjustment as accomplished by means of the worms F and the worm-shaft F′, designed to be operated so as to adjust both ends of the shaft simultaneously.

In practice the rail, which has been previously formed with its flange and tread of the form shown at its lower end in Figs. 1 and 2, is passed through the mill, as illustrated in the drawings, the support E supporting the rail and the pressure-rollers A A pressing the upper flange upward and outward against the resistance-roller C, pressing it out thin and wide, as illustrated. After having been once

passed through the mill the rail is turned upside down and again passed through, the flange completed or formed by the first operation being thus formed at the bottom and held on the support E, while the upper flange is formed as above. This method of rolling the rail enables me to roll the flange thinner and wider without danger of breaking, the rollers A A being tapered inversely to give the necessary taper to the inner side of the flange.

Where in the description in the claims I refer to "opposite rolls" I mean the rolls A A, and by "free end" I mean rolls that are unsupported at their end, as the rollers A A.

What I claim as new is—

1. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls, of the resistance-roll arranged above said pressure-rolls, substantially as described.

2. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls tapered inversely, of the resistance-roll carried by a shaft parallel with said shafts and above the same, substantially as described.

3. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls horizontally arranged and the resistance-rolls above and in contact with said pressure-rolls, of a support for the rail beneath said rolls, substantially as described.

4. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls horizontally arranged and the resistance-rolls above and in contact with said pressure-rolls, of a roller-support for the rail beneath said rolls, substantially as described.

5. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls horizontally arranged and the resistance-roll above and in contact with said pressure-rolls, of a vertical adjustable support for the rail beneath said rolls, substantially as described.

6. The combination, with the oppositely-disposed positively-driven free-end pressure-rolls horizontally arranged and the resistance-rolls above and in contact with said pressure-rolls, of a vertical adjustable roller-support for the rail beneath said rolls, substantially as described.

7. In a rolling-mill, four horizontally-arranged rolls, three operative, and one forming a support only for the rail, substantially as described.

8. In a rolling-mill, four horizontally-arranged rolls, three operative, and one forming a support only for the rail, and vertically adjustable, substantially as described.

9. In a rolling-mill, two oppositely-disposed horizontally-arranged positively-driven free-end pressure-rolls arranged at a distance apart greater than the thickness of the web of the rail, substantially as described.

10. In a rolling-mill, two oppositely-disposed horizontally-arranged positively-driven free-end pressure-rolls arranged at a distance apart greater than the thickness of the web of the rail and tapered inversely, substantially as described.

11. In a rolling-mill, the combination of two oppositely-disposed horizontally-arranged inversely-tapered free-end pressure-rolls arranged at a distance apart greater than the thickness of the web, combined with a resistance-roll arranged in operative contact with the pressure-rolls, substantially as described.

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

JOHN H. BICKLEY.

Witnesses:
JAMES H. NEIGHBOUR,
EDW. D. NEIGHBOUR.