2 Sheets--Sheet 1.

W. HARRIS & J. M. AYER.

Three High Rolls.

No. 161,786. Patented April 6, 1875.

Fig. 1.

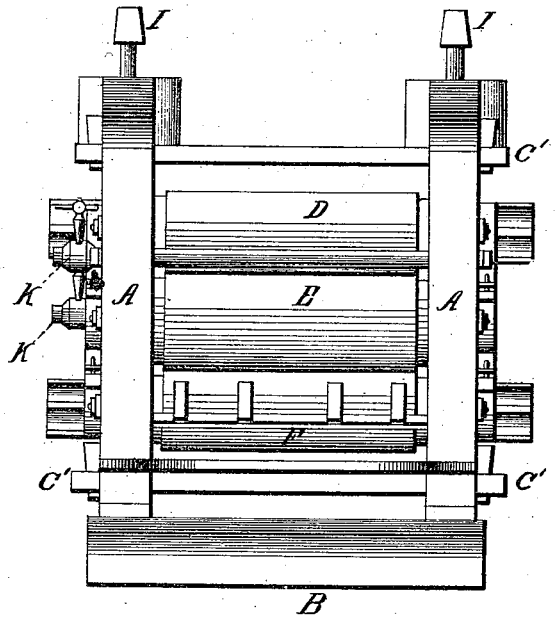
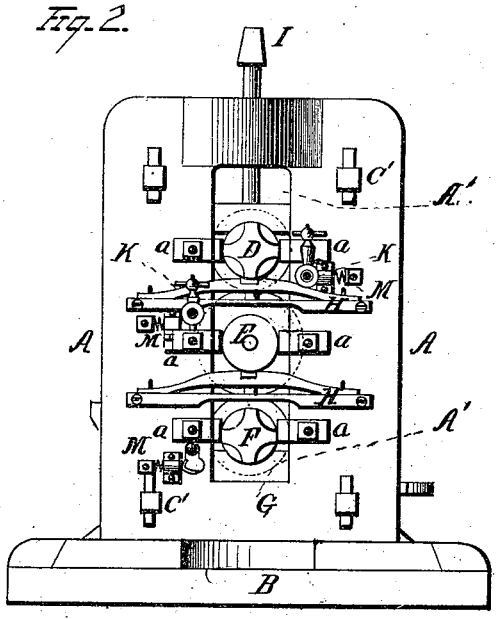


Fig. 2.



WITNESSES

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2 Sheets--Sheet 2.

W. HARRIS & J. M. AYER.
Three High Rolls.

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Fig. 3.

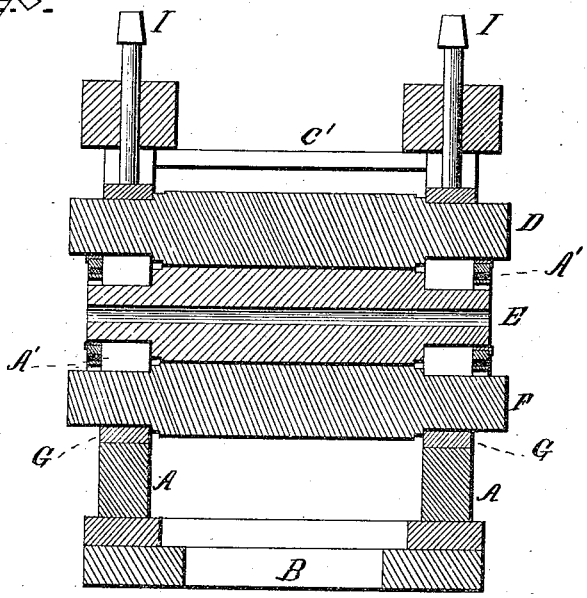
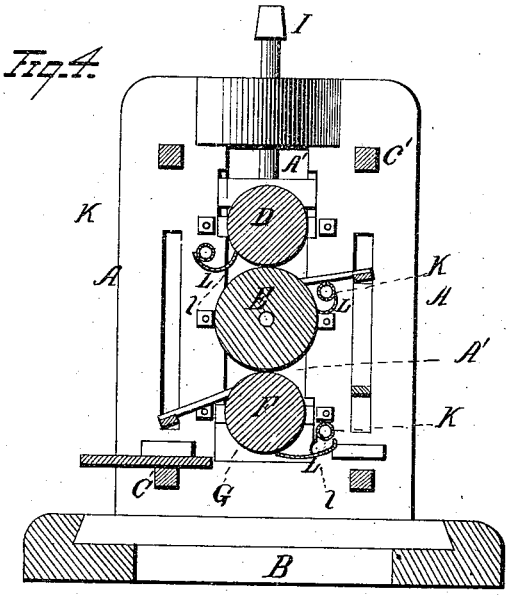


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM HARRIS AND JOHN M. AYER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN THREE-HIGH ROLLS.

Specification forming part of Letters Patent No. **161,786**, dated April 6, 1875; application filed February 2, 1875.

To all whom it may concern:

Be it known that we, WILLIAM HARRIS and JOHN M. AYER, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Three-High Rolls; and we 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to certain improvements in three-high rolls, or apparatus for rolling iron sheets or plates, by means of which we are enabled to produce grades of sheet or plate metal varying from the lightest gages to the heaviest that may be required.

Our invention consists, first, of a train of three-high rolls supported or journaled, one above the other, in a suitable frame, the central roll being hollow and of a larger diameter than the other two, and receiving through it a constant stream of cold water, the top and immediate rolls, supported upon flat springs secured under the journals, and forming the journal-boxes or bearings therefor; all constructed, arranged, and operating as and for the purposes hereinafter described. Second, in a new and improved device for carrying off the water and preventing it from falling upon the sheets or plates when the same is applied to the outside of the rolls by means of perforated pipes, as in the ordinary manner.

In the drawings, Figure 1 represents a front elevation of our apparatus; Fig. 2, a side elevation; Fig. 3, a longitudinal vertical section of the same, and Fig. 4 a transverse vertical section of the same.

A A represent strong vertical standards, of cast iron or other suitable material, secured to a bed or frame, B, and held together by longitudinal braces C, as usual. Each of said standards A A is slotted vertically, as shown at A′, for the reception of the journals of the rolls D E F. These rolls are arranged one above the other, in the usual manner, the journals of the lower roll having bearings in the blocks G G, secured in the lower parts of the slots A′, and the upper and intermediate rolls having bearings upon the flat springs H H, extending across the slots A′ in the standards A A, as shown in Fig. 2. The object of these springs is to follow up the rolls when in operation, and hold them in downward passage, to prevent pounding or chipping. Over each journal of the upper roll is a block resting upon the same, and sliding in the slots A′, which block may be caused to bear upon said journals, with the requisite degree of force, by means of the screws I I passing through the upper portions of the standards A A. By means of these blocks and screws the rolls may be adjusted for the various gages of sheet metal to be produced. The journals of all the rolls have lateral bearings against the blocks *a a*, secured in the sides of the slots A′. The upper and lower rolls we form of the same diameter, usually about twenty inches; but the intermediate roll we make somewhat larger—about twenty-one or twenty-two inches in diameter. By this construction of the rolls we are enabled to bring a greater pressure to bear upon the metal to be rolled than where the intermediate roll is smaller than the others, and can consequently produce sheets of a much heavier gage than usual, and we also entirely obviate any tendency to "buckle" the metal during the operation, from which much trouble has hitherto been experienced. In order to cool the intermediate roll, during the passage of the hot metal, we make said roll hollow throughout its interior, and supply it with a continuous current of cold water, by means of a flexible hose or tube, proceeding from a suitable source of supply, and entering the roll at one of its journals. We construct the intermediate roll only in this manner, preferring to cool the other rolls in the usual manner. This is effected by means of a series of perforated tubes, K K, extending across the apparatus near the surfaces of the rolls, and so arranged as to constantly shower jets of cold water upon the same. In order to carry off the water and keep it from falling upon the metal, we arrange under each pipe or tube K K a trough, L, projecting at each side of the apparatus through apertures *l l* in the standards A A, through which the pipes K K also pass. The edges of these troughs are kept

closely in contact with the rolls by means of a series of spiral springs, M M, secured in any convenient manner to the standards A A, so as to press against the ends of the troughs. By keeping the water away from the metal during the process of rolling, and thus keeping it from being rapidly cooled, we overcome the tendency of the metal to cool in working a light or fine grade of sheets, and are thus enabled to produce light or fine gages, which has been hitherto practically impossible in similar machines, owing to the waste occasioned by the sticking of the sheets. Our apparatus is constructed in other respects similar to the ordinary three-high rolls in common use, and its operation will be readily understood by persons skilled in the art of rolling metals, so that further explanation of the same is unnecessary.

What we claim, and desire to secure by Letters Patent, is—

1. The improved three-high rolls herein described, consisting of the top roll D, intermediate hollow roll E, and lower roll F, supported or journaled, one above the other, in a frame, A B, the top and intermediate rolls D E, supported upon flat springs H, and the central hollow roll E, being larger than the others, and adapted to receive through it a constant stream of water, as and for the purposes described.

2. The troughs for carrying off the water, and preventing the same from falling upon the metal, substantially as set forth, in combination with the spiral springs for pressing them against the rolls, and the pipes for supplying the water, as herein described.

In testimony that we claim the foregoing we have hereunto set our hands.

WILLIAM HARRIS.
JOHN M. AYER.

Witnesses:
JAMES THOMAS,
JOHN LAWLOR.