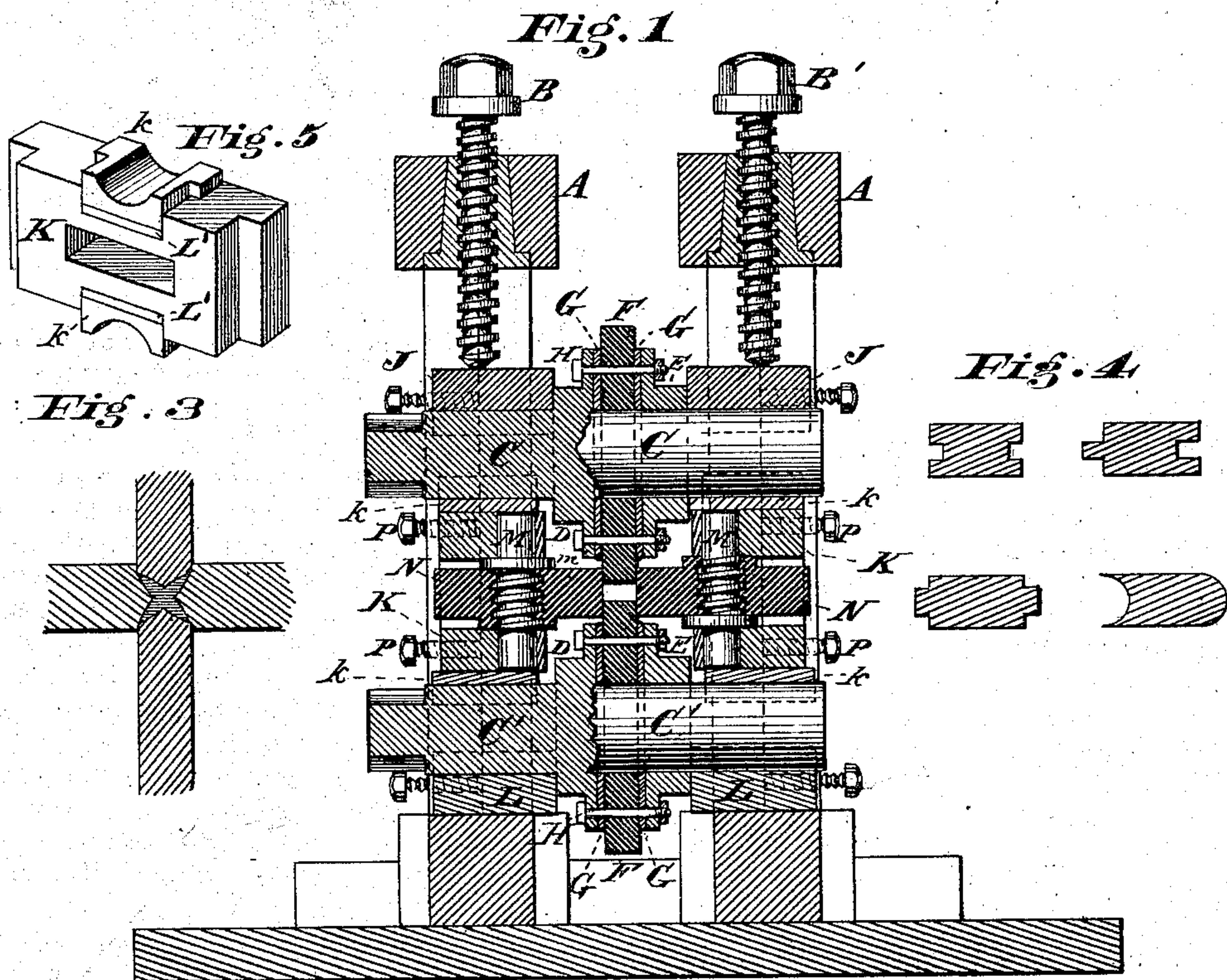


D. HALL.  
Rolling Mills.

No. 156,420.

Patented Nov. 3, 1874.



Attest  
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# UNITED STATES PATENT OFFICE.

DANIEL HALL, OF COVINGTON, KENTUCKY.

## IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **156,420**, dated November 3, 1874; application filed October 29, 1873.

*To all whom it may concern:*

Be it known that I, DANIEL HALL, of Covington, Kenton county, State of Kentucky, have invented a certain new and useful Improvement in Rolls for Rolling Bar-Iron, of which the following is a specification:

My invention consists in a certain arrangement and combination of rolls in their housings or frames, by which iron or other metal, of various forms in cross-section, can be rolled by the simple interchange of rolls, having the necessary form on the periphery; and my invention further consists in a certain peculiar construction of the rolls and their manner of attachment to their axles, by which the change from one form of roll to another may be effected by simple means and with great convenience.

Figure 1 is a vertical section of the rolls and housings embodying my invention. Fig. 2 is a cross-section horizontally through the housings in the plane of the side roll. Fig. 3 exhibits a partial section of the four rolls in the act of forming "lightning-rod" bars. Fig. 4 represents views of some of the many forms of bars these rolls are adapted to make. Fig. 5 is a perspective view of the journal-bearings of the rolls.

A A are the housings, to which are fitted the customary adjusting-screws B B'. C C' are the shafts or axles of the horizontal rolls, one end of each formed to connect with couplings of the usual train of geared roll-shafts, so that both rolls may be driven. A permanent collar, D, is formed upon each shaft C, and a loose collar, E, is also fitted to each shaft. Between these collars the forming-rolls F are fitted, and it is obvious that these rolls may be of any desired form on the periphery, and the forms may be interchanged without necessitating new shafts. In order to retain the rolls F in the center of the housings, still permitting the use of different thicknesses of rolls F, I provide washers or "liners" G, of various thicknesses, lessening in proportion to increase of width in the roll, and increasing with any decrease in width of roll, a pair of washers being necessary for every specified width of roll. The shafts C D, collars E, liners G, and rolls F are secured together by the bolts H, and by the withdrawal of these bolts the collars or rolls F may be removed and others of differ-

ent form or size substituted. The lower shaft, C', rests and turns upon the bearings L L, and the upper one, C, is journaled in the sliding adjustable bearings J J, upon which the screws B B' act. Between the two shafts bearing-blocks K are interposed, which carry journal-bearings *k* to fit the journals of the upper and lower shafts C C' in the manner shown. Liners L' are introduced between the bearings *k* and the blocks K, when required to adjust the distance of shafts C C' apart, the number or thicknesses of the liners serving to vary the distance. To provide for the use and change of liners for this purpose, the bearings *k* are made detachable and to slide, as shown in the blocks K. In these same blocks K upright shafts M are journaled, in the manner shown in Figs. 1 and 2, the shafts having screw-threads upon them, to which are fitted the side rolls N. The screws are of the same kind or direction in thread, and in order to prevent unscrewing one of the collars *m*, against which the roll N presses, is on the upper side, and the other collar upon the other shaft is on the lower side.

By this provision and arrangement of the collars it will be seen that the rolls N are constantly pressed against the collars and prevented from becoming loose. These rolls N, owing to the provision of the screw-threaded connection, may be removed and others of different form or size substituted upon the same shafts.

I arrange the axes of the four rolls F F N N in the same plane with the peripheries of one pair in contact with the sides of the other pair, so as to confine a space for the bar to be rolled, bounded by rolling surfaces whose lines of contact with the bar are in the same plane.

In order to admit of different sizes of rolls N, or to suit the use of different thicknesses of rolls F, the blocks K slide horizontally, carrying the rollers N with them, and are retained in place by the set-screws P.

In place of the employment of screws alike in direction upon the shafts M, requiring the collars *m* on alternate sides, the screws may obviously be right and left hand, so as to make both the collars on the same side, and I regard this as no departure from the principle of construction of the detachable rolls N N and their axles.

In the operation of these improved rolls it is preferable that they be connected to a regular mill "train," which can properly prepare the bar before it is introduced between the rolls F F N N.

R R are guides for the reception and guidance of the iron to the rolls, and S S are similar guides for the delivery. Both are preferably adjustable and detachable, so as to provide for different widths of bars and to connect in proper line with the rolls.

I claim—

1. The combination of the screw-threaded shafts M, permanent collars *m*, and screw-threaded rolls N, said rolls being tightened

and held against said collars by virtue of said screw-threads, as set forth.

2. The block K, provided with vertical bearings for the shafts M, and detachable vertically-adjustable bearings *k* for the shafts C C', in combination with said shafts, the adjusting-screws B B', and the bearings L and J, all substantially as specified.

In testimony of which invention I hereunto set my hand.

DANIEL HALL.

Witnesses:

FRANK MILLWARD,  
J. L. WARTMANN.