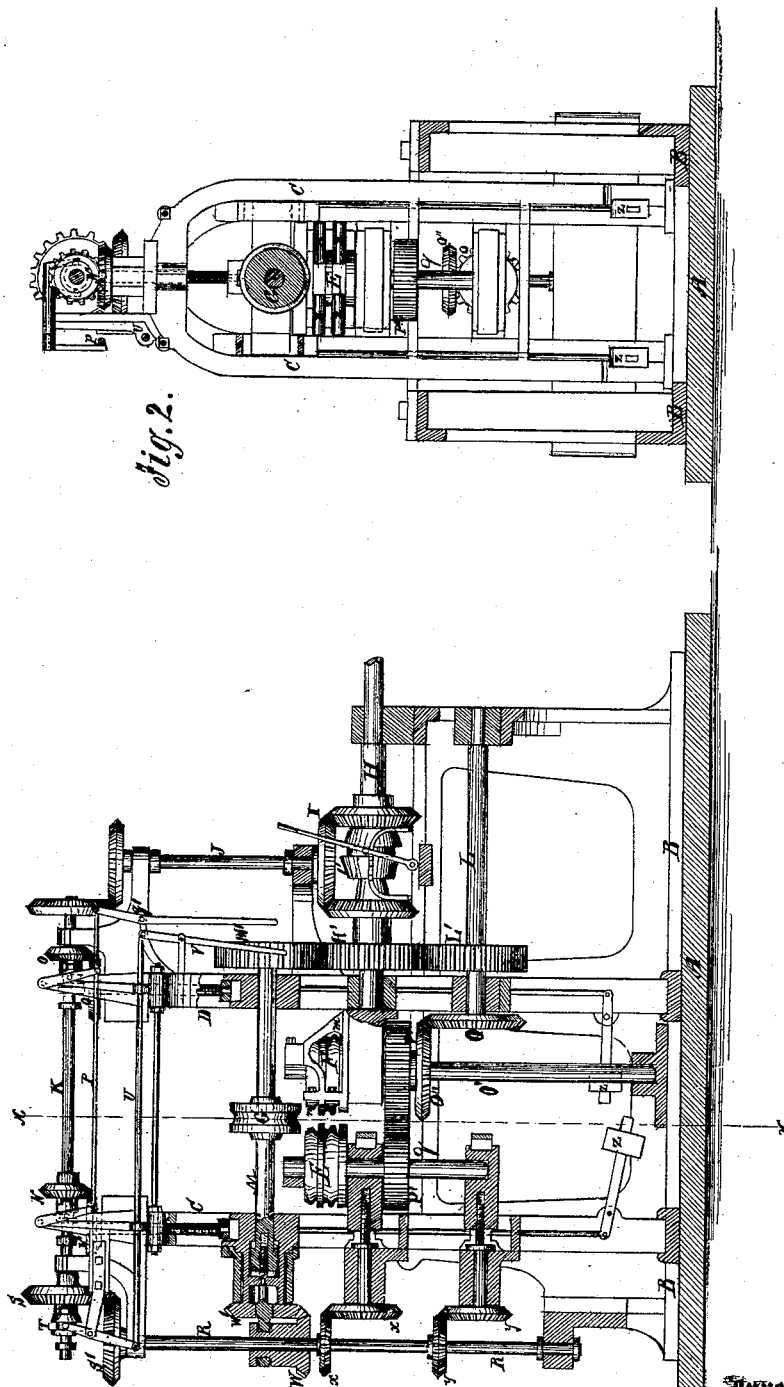


J. H. JONES.
ROLLING MILL.

No. 110.369.

Patented Dec. 20, 1870.



Witnesses:

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JOHN H. JONES, OF KNOXVILLE, TENNESSEE.

Letters Patent No. 110,369, dated December 20, 1870.

IMPROVEMENT IN ROLLING-MILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN H. JONES, of Knoxville, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Rolling-Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

The object of this invention is to provide a machine suitable for re-rolling and patching railroad-rails; and

It consists in certain vertical rollers, and in a horizontal roller arranged in a suitable frame, and in the mechanism connected and combined therewith, by means of which the said rolls are adjusted and actuated, and rails rolled as hereinafter more fully described.

In the accompanying drawing—

Figure 1 represents a sectional side elevation.

Figure 2 is an end elevation.

Similar letters of reference indicate corresponding parts.

A is the bed-plate.

B is the base of the frame, attached directly to the bed-plate.

C and D are two upright frames, connected with the base B, between which frames the rollers are placed.

There are two vertical rollers, E and F, the latter of which is made to rotate, but is immovable laterally or vertically, while the former roll E is adjustable or movable laterally.

On each side of the rollers E F is a pair of frames, m, one of which is shown in fig. 1.

In these frames are guides n n, which fit against each side of the rail, and serve to direct it.

The frames on the side of roller F are fixed, as that roller has no adjustability; but the guide-carrying frame belonging to the roller E is attached to the carriage of the said roller, and accompanies the latter in its adjustments.

These guides form an extended straight track for a short distance on each side of the rolls, to preserve the rail from bending laterally.

Above these rolls there is a roll, G, on a horizontal shaft, which is movable both laterally and vertically. The rail to be rolled is compressed laterally by the lateral movement of the roll E, and vertically by the vertical movement of the roll G. This roll G is moved laterally for the purpose of keeping it in the proper position in regard to the rail. The manner in which all the rolls are rotated—the roll E moved laterally, and the roll G moved laterally and vertically while rotating, I will proceed to describe.

H is the driving-shaft, upon which there is a spur-wheel, H', and two loose bevel-wheels, either of which bevel-wheels is thrown into or out of gear with the bevel-wheel I on the vertical shaft J by means of a shifting-lever and clutches, seen in fig. 1 at l.

This shaft J is for driving the horizontal shaft K, and the arrangement of the bevel-gears and shifter is for the purpose of reversing the motion of that shaft.

Beneath the driving-shaft H is a horizontal shaft, L, which is driven from the spur-wheel H' by means of the spur-wheel L' on the shaft L.

On the inner end of L is a bevel-wheel, O, which drives the shaft O' of the vertical roller F, by means of the bevel-wheel O".

The other vertical roller E is rotated from the shaft O' of the roller F by means of the pair of spur-wheels P' on the shafts of those rollers.

q is the shaft of the vertical roller E.

The spur-wheels P' are equal in diameter, so as to give the rolls E and F a uniform rotary motion.

M is the shaft of the roller G. This shaft is revolved by means of a spur-wheel, M', on its end, which engages with the wheel H'. It is pressed down by means of screws, which are revolved by the two pairs of bevel-gears seen at N and O. These gears are actuated by the horizontal shaft K, and are thrown out and into gear by means of clutches, with which the shifting-rod P is connected.

q' is the shifting-lever.

R is a vertical shaft, which is driven by the bevel-wheel S on the shaft K, which engages with the wheel S' on the shaft R.

The wheel S is loose on the shaft K, and is controlled by the clutch T, shifting-bar U, and lever V.

While, by means of the screws and bevel-gears N O, the roll G is pressed down so as to reduce the rail vertically, the roll is moved laterally by means of a screw at its end, which is actuated by the pair of bevel-gears W W'.

The wheel W has a sleeve-eye, and slides up and down by a feather and groove on the shaft R; and the journal of the shaft of the wheel W' has its box in the sleeve, so as to allow the gears to conform to the vertical movement of the roller G.

When the vertical roller E is adjusted laterally the width of the "groove" is increased or diminished, as the case may be, and an adjustment laterally of the roller G becomes necessary, in order to preserve its centrality over the middle of the groove.

For maintaining the proper relation of the rollers G and E, the motion of the latter requires to be double that of the former in adjusting laterally. This is accomplished by giving twice as great a pitch to the screws which move the bearings of the vertical roller

E as is given to the screw which shifts laterally the roller G.

As a mechanical equivalent of the screws of varying pitches, I may make the requisite variation of speed of movement by varying the sizes of the bevel-wheels by which the said movements are performed.

I have shown two grooves for the passage of rails between the rolls, but three or more may be used, the rolls being proportionally lengthened, and the carriage by which the rail is presented to the rolls, and upon which the rail is received from the rolls, being adapted for the varying heights of the grooves.

The lateral movement of the shaft and roller E is produced by means of screws actuated by two pairs of bevel-gears, *x* and *y*, which operate upon the journal-boxes of the roller-shaft.

The journal-boxes of the shaft M of the roll G are connected, by means of bars and levers, with weights *z z*, which weights serve to balance the weight of the roll G, its shaft, and the parts attached thereto.

By means of the clutch and shifting apparatus described, the motions of the parts of the machine may be produced separately, if desired, although they are arranged to work simultaneously to reduce a rail to the proper size by running it several times through the rolls.

For actual use in rolling rails the rolls are made of such form as will roll a rail to the desired shape, and the rail is supported and fed into the rolls in the ordinary manner.

By this arrangement a cap, of steel or iron, may be welded to the rail, or a patch or piece welded on, without cutting the rail, and with very little expense compared with the ordinary cost of such work.

In rolling a rail in this mill, when the proper size is obtained vertically the operation of the screws and gears N O is made to cease by means of the shifting clutches and bar P. Then the horizontal screws which operate upon the shaft of the vertical roll E are put in motion to adjust the roll E, so as to reduce the rail to the required size laterally. When the rail is thus pressed laterally to near the proper size, it may be finished by passing it once or more through the lower finishing-groove.

The elevation, fig. 1, shows an upper and a lower passage-way between the rolls, known technically as grooves. In the upper one of these the operation of welding, patching, and shaping is performed; and in the lower or "finishing-groove" the operation is completed.

When the rail is passing through the upper groove the roller G acts upon the "tread" of the rail, and the depression of the axis of the said roller G is the means of bringing the rail to the required height, as well as of forcing down the welding-piece or patch upon the

rail under treatment. During this part of the operation the projecting, circumferential ribs on the rollers E F support the foot-flanges of the rail, and the lateral adjustment of the roller E toward the roller F is the means of determining the width of the rail.

When the latter is brought approximately to form, it is then passed through the lower or finishing-groove, the foot of the rail resting upon other circumferential flanges at a lower level.

When presented to the rollers the rail is supported upon a carriage, which travels upon a track, and at the delivery side of the rolls the rail is received upon another carriage, which travels off with it as fast as it issues from the rolls.

The difference in height between the upper and lower level is about six inches. The bed of the carriage on which the rail lies when presented to the rolls is adjustable in height, so as to introduce the rail either to the upper or the lower groove. The carriage on the delivery side of the rolls is also adjustable in height, to adapt it for receiving the rail.

This supporting and feeding mechanism is not intended, however, to be included with the improvements for which a patent is sought under this application, and hence it is not represented in the drawing, and it is alluded to here in order only to supply what, to a casual observer, might otherwise seem a deficiency.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

1. The combination of the roll F in stationary bearings, the rolls E and G in shifting bearings, mechanism to elevate and depress the roll G, and mechanism to simultaneously shift laterally the rolls E and G, the latter roll half the distance of the former, in order to preserve the centrality of the roll G over the groove formed by the rolls E E, as described.

2. The combination of the movable roll E and its frame and guides *m n* with the stationary roll F and its frame and guides *m n*, as and for the purpose set forth.

3. The construction of the pair of vertical rolls E F, with one or more welding and shaping-grooves and one or more finishing-grooves, located one above the other, and shaped, severally, substantially as described, for patching and re-rolling railway-bars.

4. The arrangement of the vertical shaft R, the several pairs of beveled gears *w x y*, the screws of varied pitch, and the roll-shafts M and *g*, substantially as described.

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Witnesses:

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H. P. WATTS.