(No Model.)

W. DOYLE & E. CARTWRIGHT.

ROLLS FOR STRAIGHTENING METAL RAILS AND BARS.

No. 598,140. Patented Feb. 1, 1898.

Fig. 1.

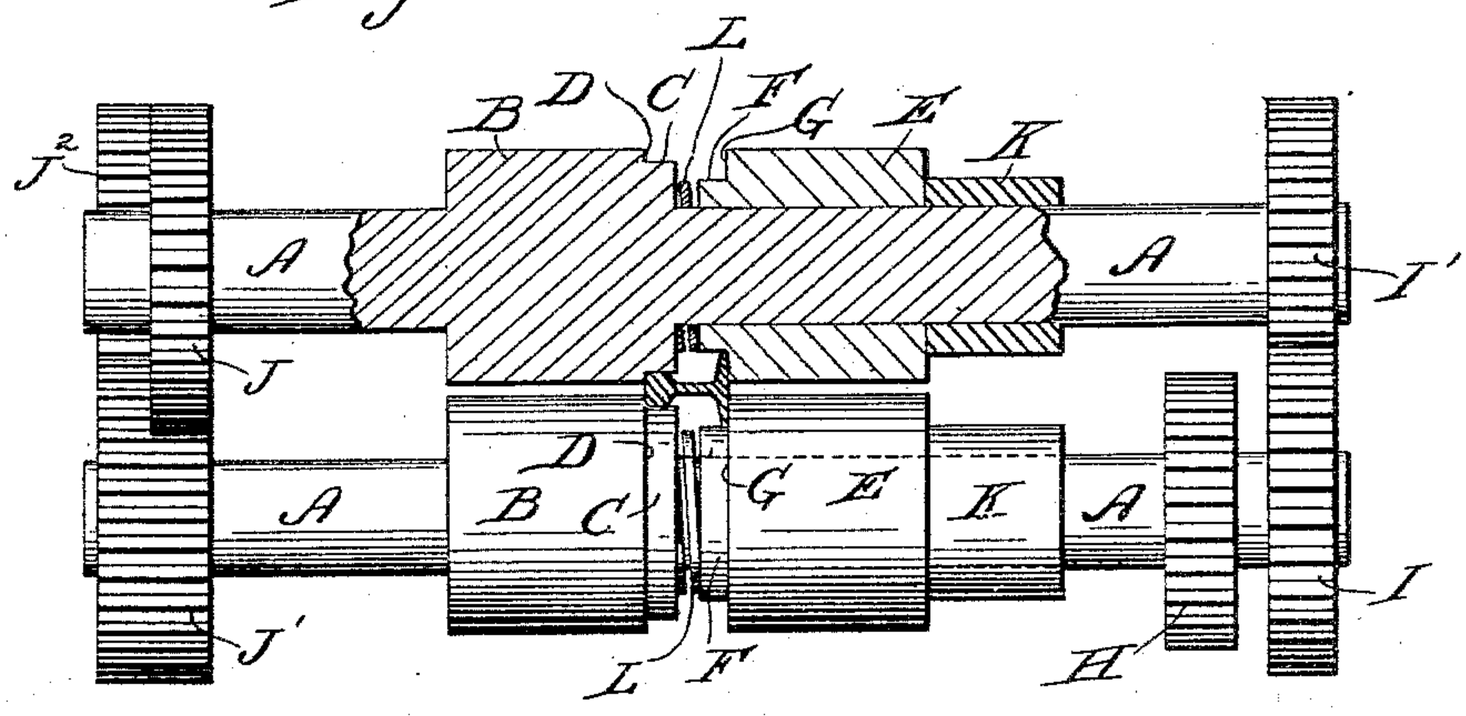


Fig. 2.

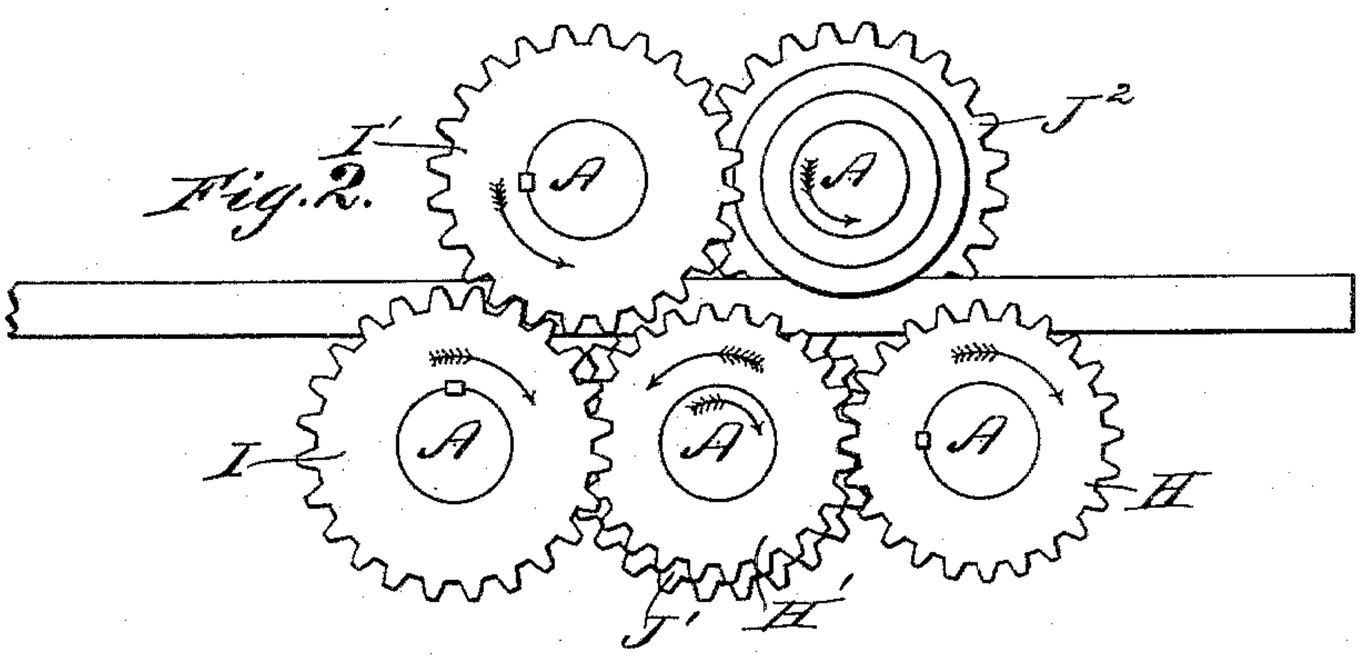
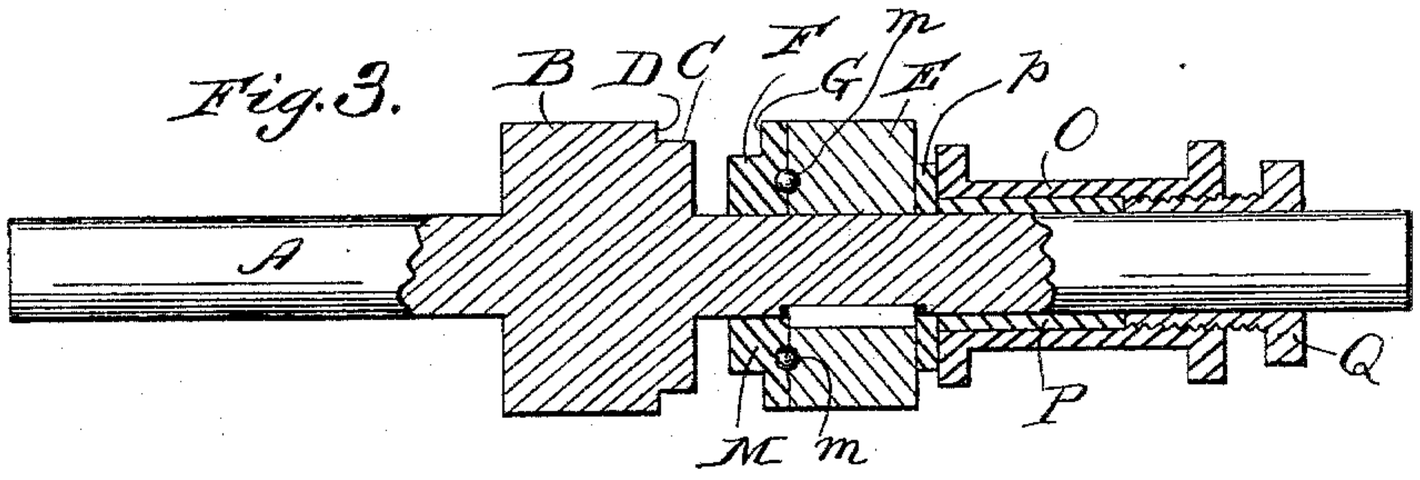


Fig. 3.



WITNESSES.

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ROLLS FOR STRAIGHTENING METAL RAILS AND BARS.

SPECIFICATION forming part of Letters Patent No. 598,140, dated February 1, 1898.

Application filed November 18, 1895. Serial No. 569,319. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM DOYLE and EDWIN CARTWRIGHT, citizens of the United States, residing at Milwaukee, county of Milwaukee, State of Wisconsin, have invented a certain new and useful Improvement in Rolls for Straightening Metal Rails and Bars; and we 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 the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of our invention is to enable us to rapidly and satisfactorily straighten metallic rails and bars which are of irregular shape in cross-section—such, for instance, as railway-rails, street-railway rails, and the like.

Our invention pertains, first, more especially to the arrangement upon a series of roller-driving shafts of a series of rigidly-affixed bearing-rolls in line with each other, in conjunction with a series of loose rollers or sleeves, also arranged in line with each other, capable of independent rotation upon such shafts and adapted to be rotated by the frictional contact of the rails or bars as they are drawn forward by the fixed bearing-rolls, whereby the rolls and sleeves respectively move in unison with that part of the rail or bar against which they are brought to bear regardless of their difference in diameter or cross-section, thereby preventing friction that would otherwise be caused by forcing a bar or rail of irregular shape either faster or slower than the surface of the roll against which it bears; second, to the arrangement of a vertical sleeve or collar upon the roll-supporting shaft opposite the stationary roll adapted to bear laterally against the rail or bar interposed between it and the end of said stationary roll, and, third, to the roller bearings or balls interposed between said lateral bearing-collar and a stationary flange or roll, whereby the friction of said sleeve is diminished.

In the accompanying drawings, illustrating our invention, Figure 1 is a view, partly in elevation and partly in section, of a set of rolls constructed according to our invention. Fig. 2 is an elevation of the end of the same, showing the arrangement of the rolls and the gearing for transmitting motion from one roll to another. Fig. 3 illustrates a somewhat different form of roll.

Referring by letter to the drawings, A A designate the axes of a series of rolls, which may be supported in any suitable or desired form of framework. Each shaft or axis A is provided with a part B, formed integral with the axis and of larger diameter than the axis and turned down upon one end, so as to form an annular bearing-face C and an adjacent annular bearing-shoulder D.

A loose sleeve E is journaled upon the axis of each roll and is likewise turned down or reduced in diameter at one end, so as to form an annular bearing-face F and an adjacent annular bearing-shoulder G.

The particular form of rolls illustrated in the drawings is designed for use in straightening railway-rails, and to this end the annular bearing-faces C C are made of such diameters as to engage with opposite sides of the heads of the rails, while the annular bearing-faces F F are made of such diameters as to engage with opposite sides of the bases of the rails.

The sleeves E E are adjusted upon the axes of the rolls to such a position as to cause the upper faces or treads of the rails to engage with the annular shoulders D D upon the integral portions of the rolls, while the bottom faces of the base-flanges of the rails will be engaged by the annular bearing-shoulders G G, thereby serving to firmly engage the top and both sides of the heads of the rails and the bottoms and both edges of the base-flanges of the rails. It follows, therefore, that as the rails are passed between the rolls they will be effectually straightened and freed from all vertical and lateral irregularities and delivered from the rolls in a perfectly straight condition. It follows also that by reason of the greater width of the bases of the rails and the consequent nearer approach of the same toward the centers of the rolls when in engagement therewith the loose sleeves which engage with the base-flanges of the rails will necessarily revolve at a greater speed than the solid or integral parts of the rolls which engage with the head portions of the rails.

Any desired means may be employed for transmitting motion to the series of rolls or from one roll to another—such, for instance,

as illustrated in Fig. 2 of the drawings, in which five of such rolls are employed, the lower tier or row consisting of three and the upper tier or row of two rolls. Motion is conveniently transmitted from one roll to another by means of suitable gears H H, keyed to the axes of the outer rolls of the lower tier, and an idler-gear H′, loose upon the axis of the middle roll and meshing with said gears H H. This gives rotation in the same direction to both of the outer rolls of the lower tier. A gear-wheel I is provided upon the axis of one of the outer rolls of the lower tier and meshes with a gear-wheel I′ upon the axis of one of the upper rolls, which axis also carries a gear-wheel J, meshing with a gear-wheel J′ upon the axis of the intermediate lower roll, this latter gear also conveniently actuating a gear-wheel J^2 upon the axis of the other upper roll. By this means a positive and uniform rotation is transmitted to all of the rolls, so as to cause their adjacent faces to travel in the same direction, to operatively engage with and advance rails or bars interposed between the same.

Any suitable means may of course be provided for holding the tubular sleeves E E in proper position upon the axes of the rolls to enable them to firmly engage with the bottom faces of the rails and hold the heads of the rails firmly against the annular shoulders D D of the solid or integral portions of the rolls, and to this end the said sleeves are conveniently arranged to bear against suitable collars K K, which serve to hold said sleeves in proper position upon the axes A A and which may, if desired, be made adjustable.

If desired, the form of construction illustrated in Fig. 3 may be employed in place of that illustrated in Fig. 1. In said form of construction the sleeve E upon the axis A is splined or feather-keyed to the axis A, as shown, so as to revolve therewith, and a collar M is loosely supported upon the axis of the roll and is turned down, so as to form the annular bearing-face F and the annular bearing-shoulder G for engagement with one part of the rail or bar. In this form of construction the collar M revolves freely and is held up to its work by the sleeve E, and, if desired, suitable antifriction-balls *m m* may be interposed between the sleeve E and the collar M to reduce friction and prevent wear. If desired, also, an adjusting mechanism, such as shown in Fig. 3, may be employed for setting up the sleeve E and the collar M, such mechanism comprising a bushing P upon the axis A and inside of the box O and operatively engaging at one end with a washer *p*, bearing against the end of the sleeve E, and a nut Q, screw-threaded within the box O and engaging with the end of the bushing P and adapted for operation to adjust said bushing and the sleeve E longitudinally upon the shaft or axis A.

It is obvious that when a railway-rail or other bar of irregular shape is being drawn forward between the straightening-rolls, as shown in Fig. 1, the stationary rolls engage the head or narrower part of the rail and carry forward such rail with a speed corresponding with the speed of the greater diameter of said stationary rolls, while the loose sleeve which is caused to roll by contact of the flange or wider part of the rail acting nearer its axis or center has a more rapid movement than its supporting-shaft, corresponding with the movement of that part of the rail which passes over it, whereby it is obvious that the intense friction and loss of power which would be otherwise caused by rigidly-affixed rolls is avoided. The work is more easily performed and the wear and tear upon the rolls is greatly diminished.

Any suitable means may be provided for normally holding the sleeves E E against said bearing-collars K K—such, for instance, as an interposed spring or elastic washer L or any other desired form of elastic body which may be conveniently interposed between the end of the sleeve and the integral or solid part of the roll.

By our improved method and apparatus we are enabled to very readily and rapidly remove all irregularities from rails or bars and to deliver the same in perfectly straight form from the series of rolls. Our invention is of course equally applicable to the work of straightening railway-rails or any other form of rails or bars having an irregular shape in cross-section, it being only necessary, in order to adapt our device for straightening forms of rails or bars other than that shown in the drawings, to simply modify the shapes of the integral and the tubular portions of the rolls, so as to enable the same to engage with the desired portions of the rails or bars under treatment,

It will of course be understood that although we have shown and described our improved construction of rolls as consisting of upper and lower tiers or rows of horizontally-arranged rolls, yet the rolls may readily be arranged vertically or in any other desired position without material change in the construction of the device and without departure from our invention.

We would also have it understood that while we have shown and described one form of mechanism for transmitting motion from one roll to another, yet any other desired form of actuating mechanism may be employed, if desired, and any device comprising a series of rolls for engagement with opposite sides of metallic rails or bars of irregular shape in cross-section and each of said rolls being provided with a loosely-revoluble sleeve for engaging with one part of the rails or bars we would regard as coming within the scope of our original invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. An apparatus for straightening metal

rails or bars having irregular shape in cross-section, comprising a series of opposed rolls arranged so as to alternate or break spaces with each other, and each roll being provided with a solid or integral bearing portion having an annular bearing-face for engagement with one portion of the rails or bars under treatment, and with an independently-revoluble sleeve or collar adapted for engagement with another portion of the rails or bars under treatment substantially as described.

2. In a machine or apparatus for straightening metal rails or bars of irregular shape in cross-section, a series of alternately-arranged parallel rolls, each provided with a solid or integral bearing portion turned down or reduced in diameter so as to form an annular bearing-face and an adjacent annular bearing-shoulder and further provided with an independently-revoluble sleeve or collar likewise turned down or reduced in diameter so as as to form an annular bearing-face and an adjacent annular bearing-shoulder, said annular bearing faces and shoulders being adapted for engagement with desired parts of the rails or bars under treatment, substantially as described.

3. In a machine for straightening metal rails or bars of irregular shape in cross-section, the combination of two series of opposed rolls, the plane of one series being located above the other and the rolls of one series being arranged so as to alternate or break space with the rolls of the other series, the rolls of each series being provided with a fixed or integral bearing portion, having an annular bearing-face for engagement with one portion of the rails or bars under treatment and with an independently-revoluble sleeve adapted for engagement with another portion of the rails or bars under treatment, substantially as and for the purpose specified.

4. In a machine for straightening metal rails or bars of irregular shape in cross-section, the combination of two series of opposed rolls, the plane of one series being located above the other and the rolls of one series being arranged so as to alternate or break space with the rolls of the other series, the rolls of each series being provided with a fixed or integral bearing portion having an annular bearing-face for engagement with one portion of the rails or bars under treatment and with an independently-revoluble sleeve adapted for engagement with another portion of the rails or bars under treatment; and mechanism for adjusting said independently-revoluble sleeve longitudinally upon its supporting-shaft, all substantially as and for the purpose specified.

In testimony whereof we sign this specification in the presence of two witnesses.

WILLIAM DOYLE.
EDWIN CARTWRIGHT.

Witnesses:
A. J. COHN,
JOHN E. WILES.