

(No Model.)

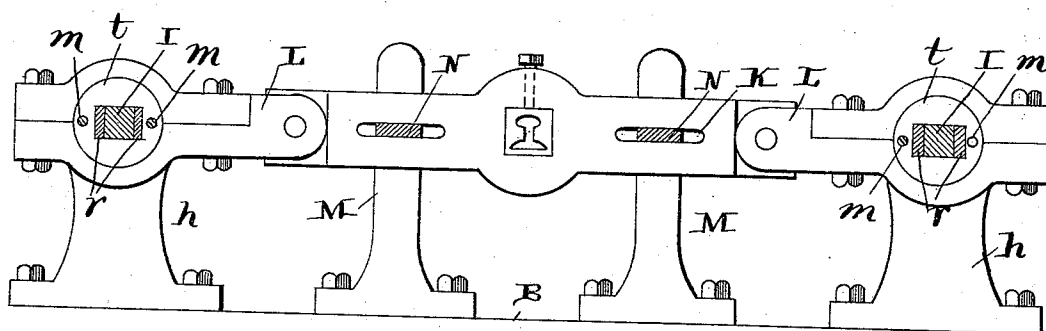
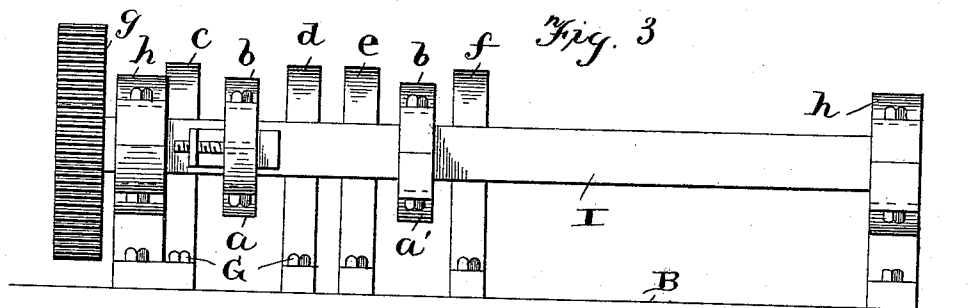
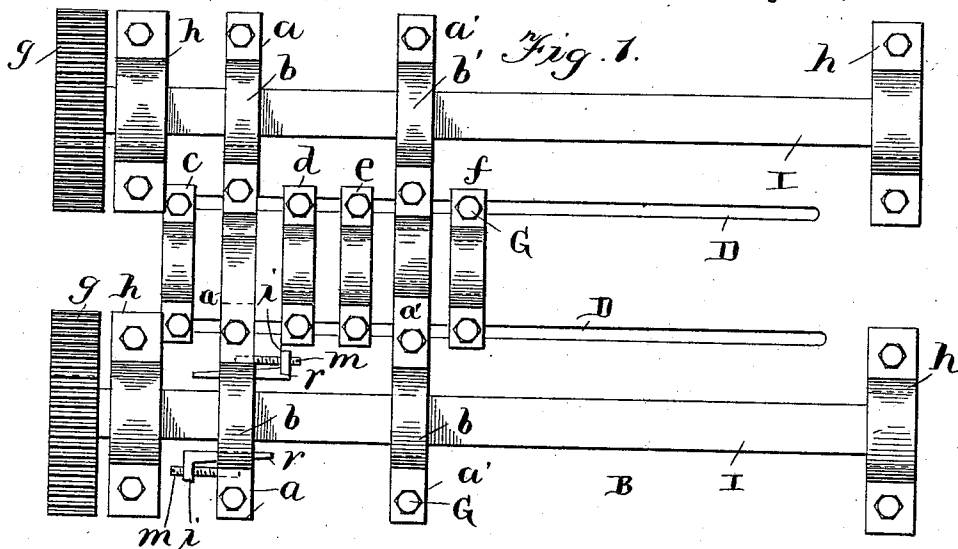
2 Sheets—Sheet 1.

H. WICK, Jr.

APPARATUS FOR STRAIGHTENING RAILS, BARS, &c.

No. 540,009.

Patented May 28, 1895.



Witnesses

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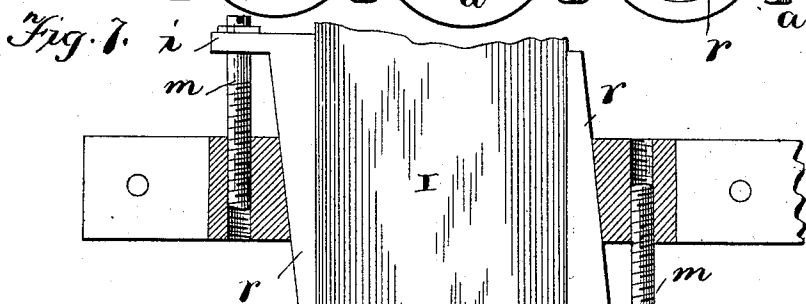
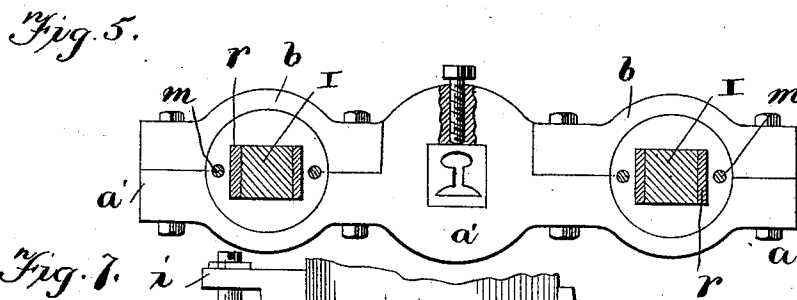
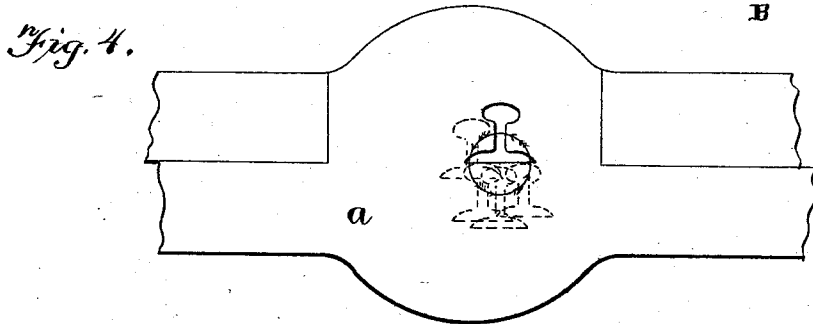
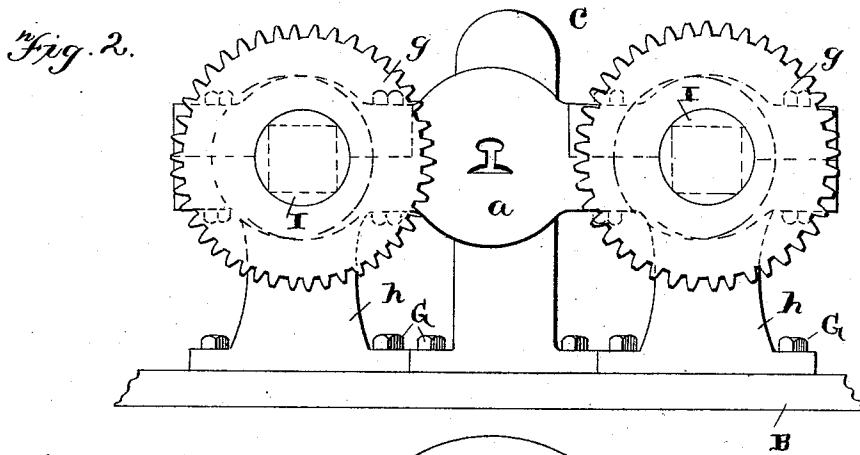
Pattison Nesbit

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UNITED STATES PATENT OFFICE.

HENRY WICK, JR., OF CLEVELAND, OHIO.

APPARATUS FOR STRAIGHTENING RAILS, BARS, &c.

SPECIFICATION forming part of Letters Patent No. 540,009, dated May 28, 1895.

Application filed October 2, 1894. Serial No. 524,756. (No model.)

To all whom it may concern:

Be it known that I, HENRY WICK, Jr., of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Straightening Rails, Bars, &c.; and I 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.

My invention relates to improvements in apparatus for straightening rails, bars, &c.

By the methods now practiced, it is the cause of much expense in the manufacture of railroad rails, I-beams, angle bars, and other articles having an irregular cross-sectional outline or contour, because of the considerable labor required to straighten the bends in such articles after being finished in the rolls and allowed to cool, in which state they are almost invariably found to be kinked, crooked or curved in one or all directions. The work of such straightening is now done very imperfectly and with considerable labor by means of a power hammer or press. When employing such means, the rail or other article is first straightened so as to bring the surface of the head and flange into or approximately into parallelism with each other, and then the rail is given a quarter turn axially, and the remaining sides straightened in a similar manner.

The primary object of this invention is to straighten the bends or crooks in the rail by subjecting all portions of the article to lateral deflections to one side of the general longitudinal axis of the rail, to a degree (when finishing the operation) not exceeding the elastic limits of the metal, whereby the straight portion or portions are not permanently affected but return to their normal position, while the bends are given a permanent set toward or to the longitudinal axis of the article being acted upon.

Another object of my invention is to provide for the straightening of any and all bends, kinks or curves in one continuous operation regardless of the direction of such bend.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of my preferred form of apparatus for

carrying out my method. Fig. 2 is an end view of the same. Fig. 3 is a side elevation thereof. Fig. 4 is a diagrammatical view showing the motion given the article acted upon. Fig. 5 is a detail view showing a detachable die in one of the carriers. Fig. 6 is a view in transverse section of a modified form of carrier, in which the carrier is given merely a lateral reciprocatory movement across the line of feed of the machine. Fig. 7 is a detailed view of one of the eccentrics, showing the manner of adjusting the same either laterally or longitudinally of the shaft upon which it is placed.

The preferred form of machine for practicing my invention is illustrated in Figs. 1, 2, 3, 4, 5, and 7, and to these figures reference will now be made.

B indicates a suitable bed plate, and *h* pillow-blocks which project from the four corners thereof, and in which the shafts *I*, have their ends journaled and supported. Gear wheels *g* are secured to one end of each of these shafts (preferably outside of the adjacent pillow blocks) and through the medium of which the shafts are revolved by any suitable mechanism. These shafts are made square or angular in cross section between their journaled ends, and placed upon the square portions of said shafts are any desired number of eccentrics *t*, which are each provided with an opening larger than the said shafts, to permit a lateral and longitudinal adjustment of said eccentrics with relation to their shafts. Wedges *r* pass between opposite sides of the shaft and the walls of the opening in each eccentric, and these wedges are capable of endwise movement, through the medium of the screws *m* passing through the lateral projections *i* of the wedges and into openings *n* of the eccentrics. By means of these wedges the eccentric can be adjusted laterally with respect to the shaft, and they can be loosened and moved along the shaft to any desired point or points, for the purposes to be fully described hereinafter.

Any desired number of castings or carriers *a*, *a'*, are provided, and each casting has its ends adapted to embrace the eccentrics by having the removable portions *b'*, held in place by suitable bolts, as clearly illustrated in Fig. 7. The central portions of these castings or

carriers are enlarged and provided with openings, preferably, though not necessarily conforming approximately to the cross-sectional contour of the article being straightened. These openings form what may be termed dies, and if preferred removable dies may be used as shown in Fig. 5.

c, d, e and *f* are standards or pillars held to the bed plate by means of bolts *G*, which pass through longitudinal slots *D* made in said bed plate, thus permitting an adjustment of said pillars longitudinal of the machine as will be readily understood. These standards either have openings forming dies, or have removable dies as may be found best, and these standards form what I term holders or guides for the article operated upon. As the shafts revolve, the eccentrics give the castings or carriers a lateral circular or eccentric movement, as indicated in the diagrammatical view, Fig. 4 so that the rail or bar carried thereby when held at opposite sides of said carrier is given a lateral deflection in all directions from the general longitudinal axis of the article being operated upon, and which is the line of feed of the machine.

In operation the eccentrics are adjusted so that the lateral throw of the carriers beyond the longitudinal axis of the article acted on is not greater than the natural spring of the metal, so that the straight portion of the article is not deflected sufficiently to be permanently affected but will return to its normal position. It will thus be understood by those skilled in the art, that if the lateral deflection imparted to the straight portions of the article is not beyond the elastic limit thereof, the greater deflection resulting from the operation of the dies or carriers on the crooked or deformed portions, will produce a "set" in the material, and as such greater deflection is necessarily toward or to the longitudinal axis of the article, a "set" will take place in the bent portion of the article.

As the curves, kinks and bends vary considerable as regards their length and depth in the same article, it is obvious that if all the dies were adjusted the same distance apart longitudinally of the frame, the shorter crooks or kinks would not be affected. I provide for this by making the pillars *c, d, e*, and *f* adjustable longitudinally of the frame as before described, whereby they can be moved nearer to or farther from the carriers *a* and *a'*, and nearer to and farther from each other between the said carriers. From this it will be seen that the machine can be set according to the length of the bend or kink in the article acted upon. It will also be understood that the amount of lateral throw or movement given the article acted upon can be regulated by moving the pillars *c, d, e*, and *f* nearer to or farther from the carriers, or this lateral throw or deflection can be regulated by moving the eccentrics laterally as before described. This latter method is the most convenient, but in some instances it will be found

desirable to regulate the lateral deflection by the movement of the pillars *c, d, e*, and *f*.

It is a characteristic of my invention that as the crook or bend in the rail is made either by accident or by unequal contraction in the process of cooling, a disturbance in the relation of the particles of the metal exists at the points of deformity in consequence of which the degree of stress that will bring the undeformed portions to the limit of elasticity will, acting upon the deformed portion, restore in such portion normal conditions, so that the deformed portions of the rail instead of springing back upon the release of stress, will remain straight. I here show two of the stationary pillars *d* and *e* between the carriers *a, a'* but it will be readily understood that one may be used; that is, one omitted. The carriers *a, a'* are preferably adjusted to move in contrary directions, as in the patents herein referred to, or they may be adjusted to move in the same direction in this particular machine without departing from the spirit of my invention.

While I have thus far described machines capable of giving the article acted upon what I term a circular-lateral movement, it will be understood that the bar may be deflected to one side of the longitudinal axis thereof, a degree not exceeding the spring of the metal, so that the bends are carried to or toward the longitudinal axis and given a "set," can be carried out by means of a machine having carriers which give the article a simple transverse deflection. A machine constructed something on the principle of that shown in Fig. 6 would accomplish such results. In this figure the pillar blocks *h*, the shafts *I*, the eccentrics and the means for adjusting them are similar to those shown in the other figures of the drawings. However instead of the carriers being like those shown and described, I use the eccentric links *L* pivotally connected to the ends of carriers *J* which are provided with the slots *K* receiving the guides or projections *N* projecting from suitable pillars *M* extending upward from the base plate. From this brief description and the drawings it will be seen that the carriers are given a simple lateral reciprocation, but which will deflect the straight portion of the bar within the limits of the spring of the metal and carrying the bent or deformed portion of the bar beyond the natural spring of the metal.

In some instances it may be found desirable to set the carriers at the inlet end of the machine so that they will carry the straight portion of the article beyond the limit of the spring of the metal, as in very crooked bars, but the carriers at the outlet end must be set not beyond the elastic limit, for otherwise the article would come from the machine in a bent condition as will be readily understood.

When using a machine like that described and shown in Fig. 6, in which instance the article acted upon is given a simple reciprocatory movement, it may be found necessary

to change the position of the dies in the carriers and to pass the article through in another position, or to provide two or more machines each having the dies in different positions and the rail or other article fed from one machine to the other in order to straighten the article in all directions.

While I prefer to use the outside or inlet holder *c*, and the carrier *a'* and holder *f*, yet it is possible to straighten the bar by omitting the outside or inlet holder *c*, the carrier *a'* and the holder *f*, the two holders *d*, and *e* serving to hold the article while the carrier *a*, is giving the article the deflections, but the construction would not be so effective. So also in this event the holders *d*, and *e*, might be moved together and form a single long holder, or a long holder substituted therefor, without departing from my invention. The greatest objection to this construction would be the vibrating of the free end of the bar, where no holder or guide *c* is provided, or its equivalent.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A machine for straightening bars, rails, &c., comprising stationary non-rotatable hold-

ers, and an intermediate positively transversely reciprocating carrier, and a holding means to prevent rotation thereof in respect to the article acted upon.

2. A machine for straightening bars, rails, &c., comprising stationary non-rotatable holders, a holding means for preventing rotation thereof in respect to the article acted on, an intermediate positively laterally and circularly moving carrier, and an intermediate holding means for said carrier to prevent rotation thereof in respect to the article acted upon.

3. A machine for straightening bars, rails, &c., comprising a base, stationary holders extending from said base and longitudinally adjustable in respect thereto, an intermediate positively transversely moving carrier, and an intermediate holding means for said carrier to prevent its rotation in respect to the article acted upon.

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

HENRY WICK, JR.

Witnesses:

A. S. PATTISON,
J. M. NESBIT.