

(No Model.)

3 Sheets—Sheet 1.

J. M. PRICE.
ROLLING MILL.

No. 465,977.

Patented Dec. 29, 1891.

Fig. 1.

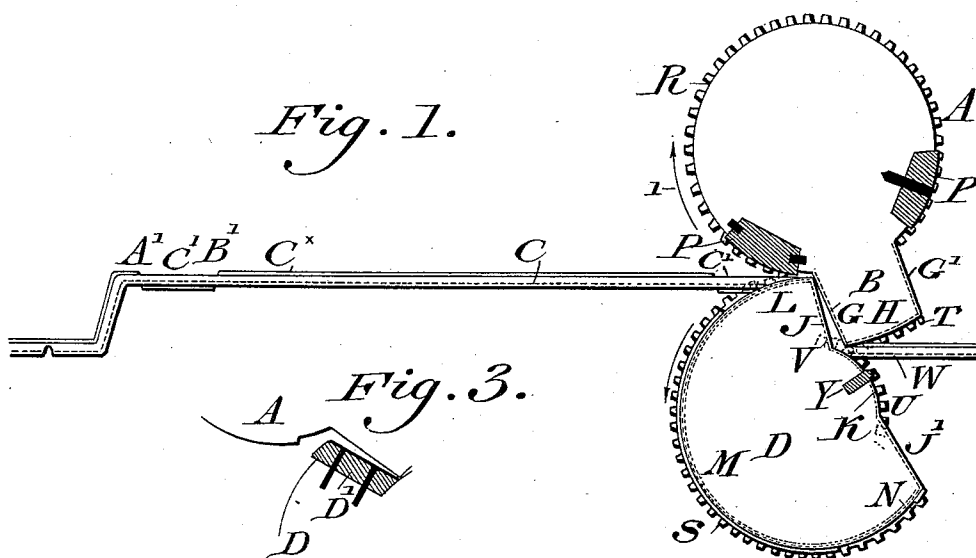


Fig. 3.

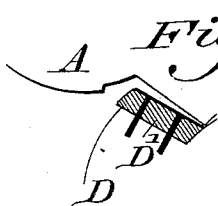


Fig. 2.

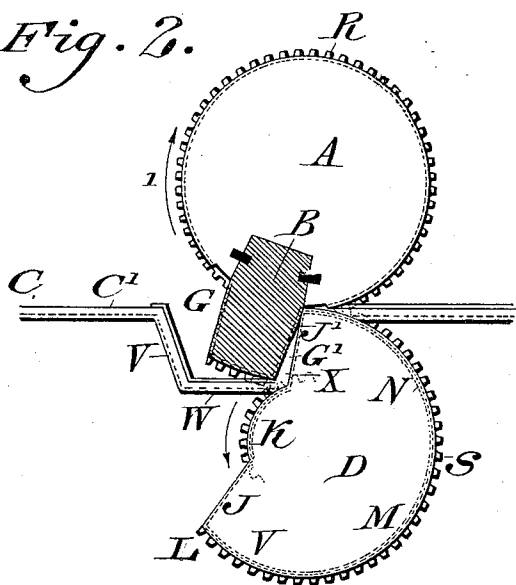


Fig. 4.

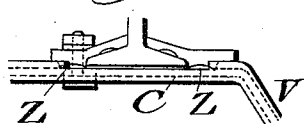
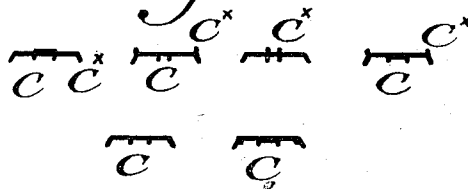


Fig. 5.



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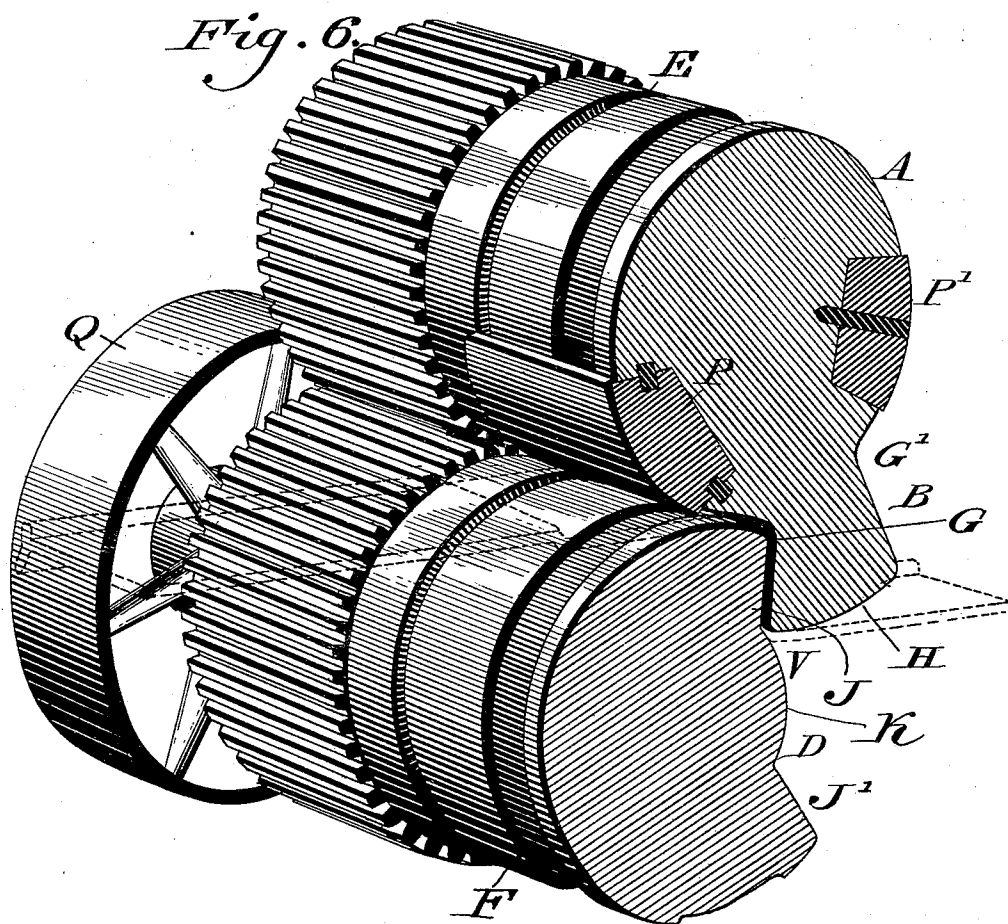
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3 Sheets—Sheet 2.

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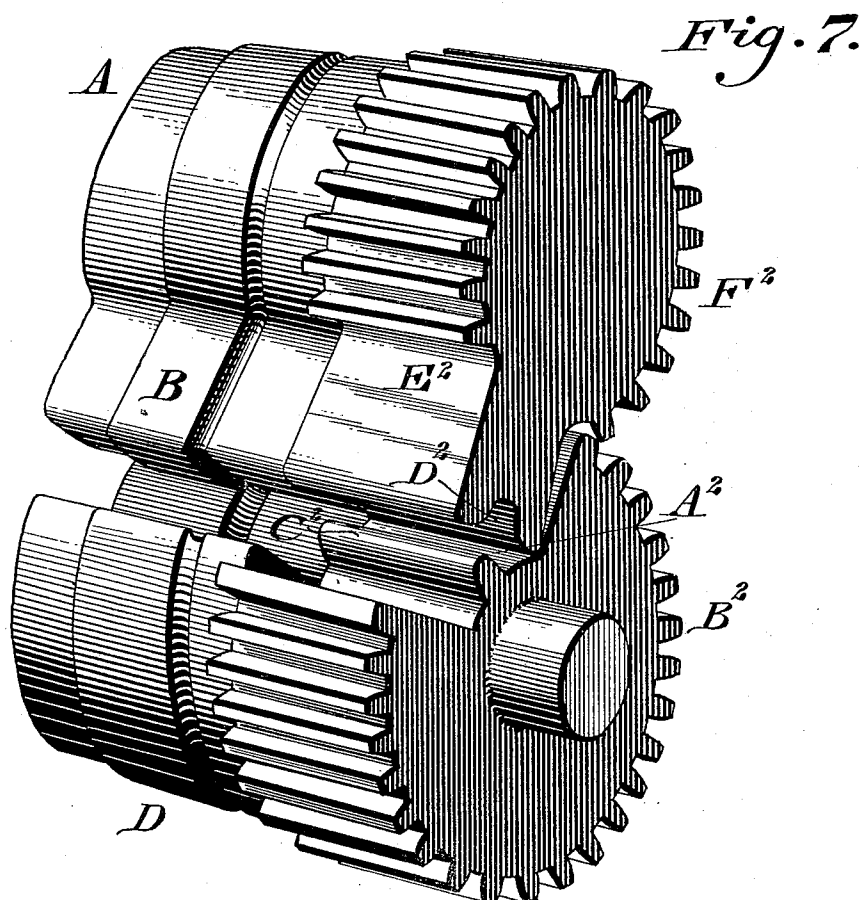
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3 Sheets—Sheet 3.

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ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 465,977, dated December 29, 1891.

Application filed December 31, 1890. Serial No. 376,353. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. PRICE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Rolling-Mills, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a mill for rolling metallic angle-ties, the same being constructed and operated as hereinafter described.

Figure 1 represents a vertical section of the rolls with a side view of a tie-strip. Fig. 2 represents a vertical section showing the rolls at a subsequent stage of action from that shown in Fig. 1. Fig. 3 represents a vertical section of a portion of the rolls having a die in the lower roll. Fig. 4 represents a side view showing a modified form of tie. Fig. 5 represents cross-sections of ties which may be formed in the rolls. Fig. 6 represents a perspective view of rolls broken at one end. Fig. 7 represents a perspective view of the rolls, showing a modification of the driving-wheels employed in connection therewith.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates an upper roll having suitable journal-bearings and provided with the anvil or projecting boss B, secured thereon, said anvil extending across the portion of the roll adapted to contact with the strip C from which the ties are to be made. The said strip C is first formed by converting the usual "bloom," "slab," or "billet" by reducing-rolls into long thin strips of the width desired for the ties. On the said strips are formed longitudinal ridges on either or both surfaces thereof by the last preliminary rolling through rolls of customary make or type.

D designates an associate roll or cylinder between which and the roll A the strips C of metal are passed. The faces of the rolls are formed to correspond with the said strips, so that the latter are passed between them without being reduced in thickness or changed in form, except as hereinafter stated, the upper roll A having the circumferential grooves E for the upper ridges of the strip and the lower roll D having the circumferential grooves F

for the longitudinal flanges or ridges in the under side of the said strip.

The anvil B of the roll A is formed with the inclined sides G G' and a circular end H, said parts being adapted to coincide with the side walls J J' and base K of a cavity or mold formed in the roll D on the rotation of the rolls, so that the strip may be bent in the desired shape when passed between said rolls.

The diameter of the upper roll or anvil A is smaller than that of the lower roll or mold D, so that the circumferential distance on the roll A from the base of the side G in the direction of the arrow I, Fig. 2, to the base of the side G' is the same as the circumferential distance from the outer edge of the wall J' on the periphery L M N of the lower roll, so that on the rotation of the said rolls the anvil B of the upper roll will exactly coincide with the walls of the cavity of the lower roll.

P P' designate dies secured to the roll A on opposite sides of the anvil and adapted to depress portions of the upper longitudinal flanges of the strips C to the plane of the groove thereof, so as to form beds for stringers on which the rails are supported. When strips having no upper flanges are to be passed through the rolls, the dies may be removed from the said roll A.

To rotate the rolls A and D, the following mechanism is employed: The shaft of the roll D carries a pulley Q, which receives power from any suitable motor, and the ends of the said rolls A and D are provided with meshing teeth R and S, respectively, on the circumferential portions of their coinciding peripheries, and the ends of the outer face of the anvil and the base of the cavity have meshing teeth T and U, respectively, whereby a uniform motion may be imparted to said rolls. Such gearing, however, is fully described in an application made by me for Letters Patent for improvement in rolling-machinery, filed June 26, 1890, Serial No. 356,758.

In operating the rolls power is first imparted to the lower roll by means of the pulley Q, and the strip of metal is then fed to the rolls. As the rolls rotate the strip is drawn so as to pass between the same without being changed in form until the lower end of the side G of the anvil coincides with the outer edge of the

side J of the cavity of the roll D, when the side G of the anvil forces the strip against the side J of the cavity of the roll D, thereby bending the strip, so as to form an angular portion constituting a foot V for the tie. As the rolls are further rotated, bringing the circular end H of the anvil in contact with the strip, the latter is forced against the curved base K of the cavity, whereby a second angle or bend is made, forming a base-piece W on the strip for the tie. A further rotation of the rolls causes the wall J' of the roll D to force the strip against the side G' of the anvil, and thereby form on the strip a foot X for the second tie. As the rolls rotate and the anvil leaves the strip C the latter is bent over the upper or outer edge of the side J' of the cavity and the strip passes between the peripheries of the rolls, forming a main portion or body of a tie.

The dies P P' stamp or force down the portions of the upper flanges C^x between A' and B' to a level with the plane of the base of the groove or grooves of the upper surface, thereby making the beds C' for the stringers, the extra metal of the tie at the beaten-down portion of the flanges being held in receptacles or grooves on the lower disk.

A cutting die or punch Y may be secured in the center of the bed or base K of the cavity, so as to partially sever the base portions of the strip, the same being afterward sawed or cut apart and the ties thereby separated. The said cutting-die may be omitted, if desired, and the ties sawed asunder.

If it be desired to form a cross-tie which is adapted to be used without a stringer of any sort to uphold the rail, by lengthening the dies P P' and narrowing their outer ends a cavity Z can be stamped in the strip, thereby giving a lateral bearing to the foot of a cheek-piece used therewith. (See Fig. 4.)

The roll A and the anvil B may be cast in one block, dispensing altogether with the shaping-dies, that are removable. The anvil B may be made into a removable die by deepening or increasing its vertical height (see Fig. 2) and fitting its base to a cavity in the roll in which it should be secured.

When ties having only lower ridges are to be formed, the dies P P' are removed from the upper rolls, so that there are unbroken arcs on the rolls from the base on one side of the anvil to the base on the other side thereof and the outer edge of one side of the mold-cavity to the outer edge of the other side thereof. When the dies are thus removed, the dies D' D', projecting from the curves L M N of the roll D, are provided, the said dies, which may be integral with the roll D, being adapted to stamp against the under side of the tie and form knobs or protuberances thereon for limiting the outward movement of a stringer.

In Fig. 7 the cavity A² of the driving-wheel B² is provided with a cog C², adapted to coincide with a female or hollow cog D² on the

projection E² of the associate driving-wheel F², for the purpose of communicating the motion to said wheel without shock or interruption.

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

1. A pair of rolls for shaping thin metal, consisting of two metallic cylinders, one of which is provided on one side thereof with a projecting anvil extending substantially parallel with the axis of the roll and having plane sides, the other roll having a cavity with plane side walls and a curved base, said parts being combined substantially as described.

2. A pair of rolls for shaping thin metal, consisting of two metallic rolls, one of which has a projecting anvil with inclined sides, the other rolls having a corresponding cavity, and gears on said rolls, one of said gears having a projecting portion with a tooth adapted to engage a tooth in a recessed portion of the other gear, said parts being combined substantially as described.

3. A pair of rolls circumferentially guttered or grooved on their edges, one being furnished with a projecting boss or anvil, the other having a cavity straight on its sides but curved at base, adapted to receive the anvil and allow a proper play or movement in its revolution, both anvil and cavity being grooved or guttered in the same way and shaped as the roll upon which each is seated, said parts being combined substantially as described.

4. A pair of rolls with a long removable die on each side of a projecting anvil or boss curved upon its top or face and straight on its sides, fitting in its revolutions into a wide cavity in the opposing roll, straight on its sides, curved at its base, and having on each side a depression to contain the metal forced down by the opposite die, said parts being combined substantially as described.

5. A pair of rolls, one of which presents a protruding boss or anvil circular on its face and reaching nearly to the circular base of an opposing wide cavity on the associate roll, in combination with rims or wheels cogged or toothed in places only and of unequal diameters to drive them, said parts being combined substantially as described.

6. A pair of rolls, one of which is provided with a large projecting boss or anvil passing in its revolution into and out of a wide recess or cavity in the other roll, both of said rolls being grooved on their edges or circumference and driven by the alternate action of embracing cogged rims or wheels of diverse diameters, with superfluous cogs removed, said parts being combined substantially as described.

7. A pair of rolls grooved edgewise but diversely on their circumference, the grooves or gutters continuing of the same shape for a projecting boss or anvil upon its face and sides, with the roll upon which it is seated, and with grooves cut in the sides and face of a cavity in the other roll to receive the anvil,

identical with the grooves upon the circumference of that roll, said parts being combined substantially as described.

5 8. A pair of rolls of unequal diameter, one carrying a projecting boss or anvil and the other provided with a wide cavity to receive the anvil, said rolls being so adjusted in their diameters that the circumference of the anvil-roll measuring to and from the anvil shall be
10 identical in length with the circumference of the other roll after deducting the entire length of the cavity, said parts being combined substantially as described.

15 9. A pair of rolls guttered or grooved, as indicated by the sections Fig. 5 or their equivalents, the one with a projecting boss or anvil fitting into a mold or cavity in the associate roll, every projection (indicated in Figs. 1 and 2) to form part of the roll itself by solid
20 casting, said parts being combined substantially as described.

10. A pair of rolls guttered or grooved, as herein described, with a die laid upon the inside of the cavity in the lower roll against each side and attached thereto, with its end
25 projecting above the circumference of the lower roll, so as to thrust upward against the metal passed between the rolls, said parts being combined substantially as described.

11. A pair of rolls with projecting boss or
30 anvil from the upper roll entering into a wide cavity of the lower roll, on each edge of which cavity the surface of the lower roll is raised or mounted slightly above the circumference of the lower roll, so as to produce a narrow
35 prominence or knob in the metal passed between said rolls, said parts being combined substantially as described.

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