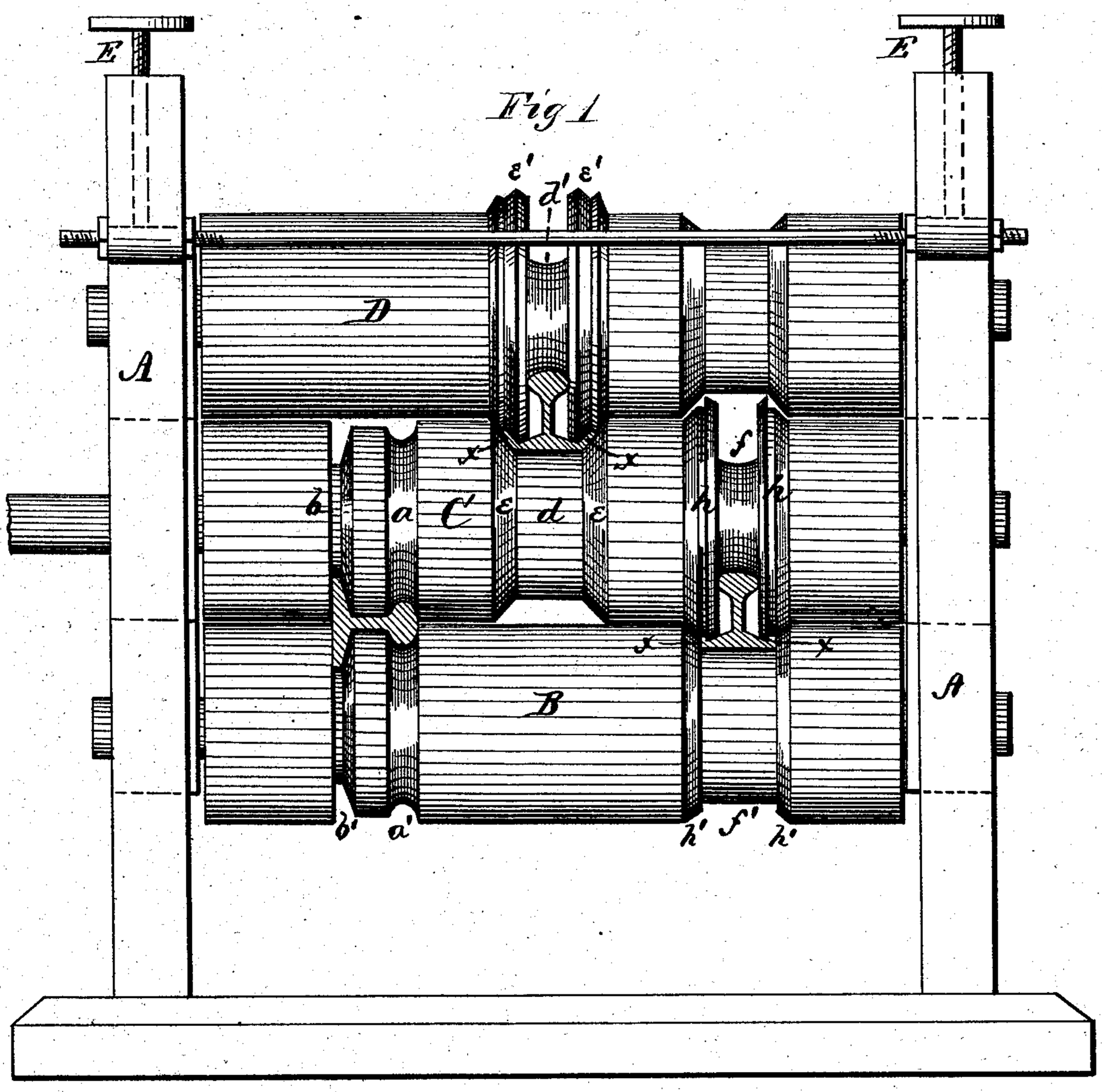
2 Sheets--Sheet 1.

J. M. CONNEL.

Railway-Rails and Rolls for Rolling Them.

No. 155,009. Patented Sept. 15, 1874.

Fig 1



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2 Sheets--Sheet 2.

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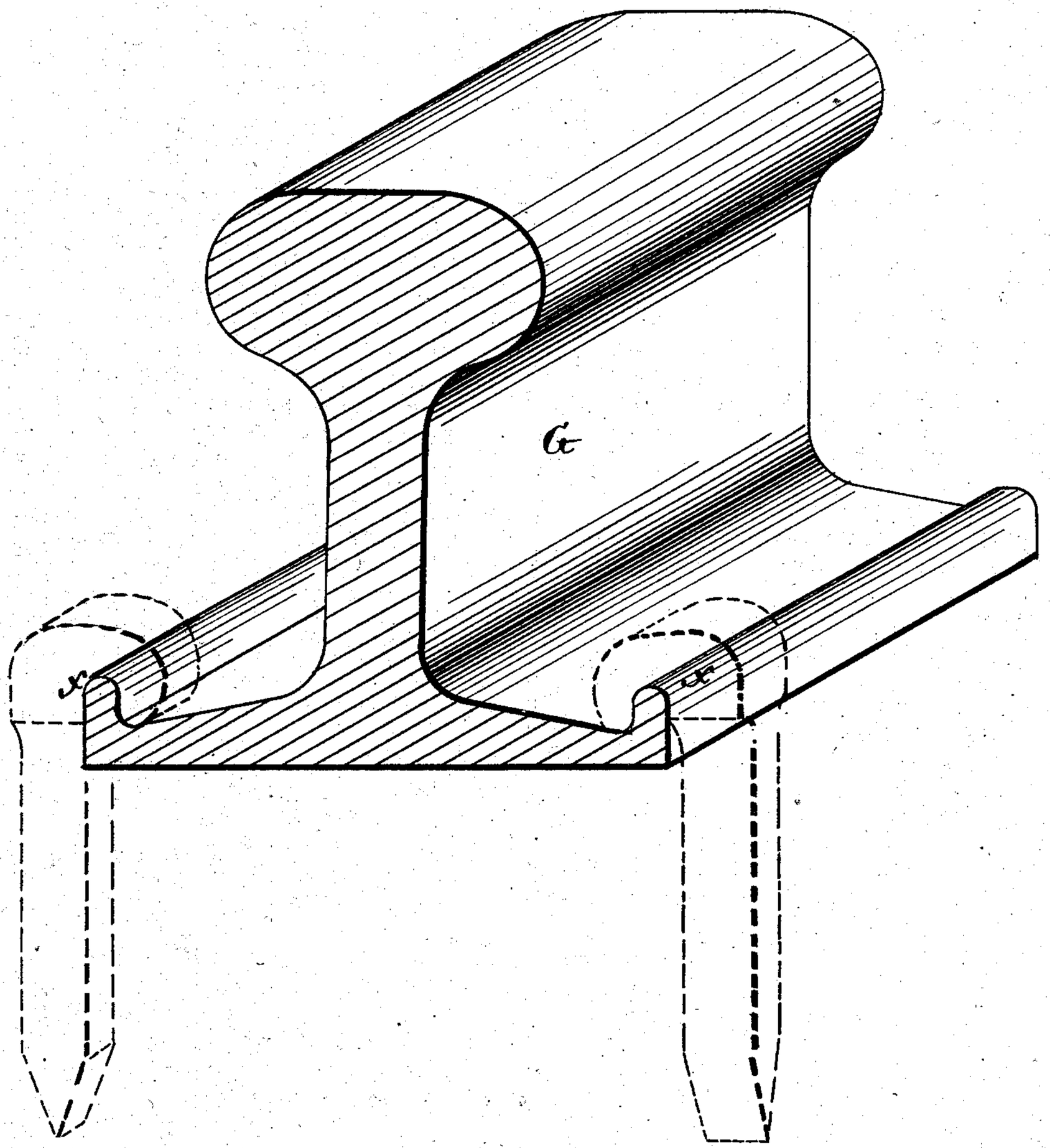
Fig 2



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UNITED STATES PATENT OFFICE.

JAMES M. CONNEL, OF NEWARK, OHIO.

IMPROVEMENT IN RAILWAY-RAILS AND OF ROLLS FOR ROLLING THEM.

Specification forming part of Letters Patent No. **155,009**, dated September 15, 1874; application filed March 2, 1874.

To all whom it may concern:

Be it known that I, JAMES M. CONNEL, of Newark, in the county of Licking and in the State of Ohio, have invented certain new and useful Improvements in the Manufacture of Railroad-Rails; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a machine for rolling railroad-rails with vertical flanges along the sides of the foot or base; and it also consists in a railroad-rail having an upward-projecting vertical flange along each side of its base, all of which will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation of my machine; and Fig. 2 is an enlarged perspective view of the rail as formed by said machine.

A A represent two vertical side pieces or standards, in which are placed three rolls, B, C, and D, one above the other, as shown. The side pieces A A are slotted vertically for the reception of the boxes in which the journals of said rolls are placed. The boxes for the journals of the bottom roll B rest in the bottom of said slots, while the journal-boxes for the two upper rolls C D rest on the former and the pressure between the rolls is regulated or adjusted by means of set-screws E E passing through the upper ends of the standards and operating upon the top journal-boxes. The power is applied in any suitable manner to the journal of the middle roll C. In the middle roll C are made two circumferential grooves, *a* and *b*, with corresponding grooves *a'* and *b'* in the bottom roll B, to form the ordinary T rail, with this difference, however, that the grooves *b b'*, which form the base of the rail, are made deep enough to make said base sufficiently wide to allow of a flange being turned up along either side. In the middle roller C is made a circumferential recess, *d*, of suitable depth, and of the same width as it is intended to have the under side of the rail base when finished. The sides *e e* of the recess are made at an incline of about forty-five degrees. On the upper roller D are formed two collars, *e' e'*, the outer surfaces of which are at an angle corresponding or nearly corresponding with the angle of the recess sides *e e* on the roll C. The inner sides of the collars *e' e'* are vertical with the axis of the roll, and a circumferential recess, *d'*, forms a continuation of said collars, the depth of said recess corresponding with the height of the rail. The rail having been passed through between the rolls B C and formed in the usual T shape, it is passed back between the rolls C D for turning up the flange *x* along each side of the rail at an angle of about forty-five degrees. When the rail is first placed on top of the roll C the base, being straight, does not fit down in the recess *d*, but the corners at that end of the rail are at once turned up by the sides *e e* of the recess, and the collars *e'* at once take hold and carry the rail through, the bottom of the rail resting in the bottom of the recess *d*, the inner sides of the collars *e' e'* bearing against the sides of the head of the rail and the bottom of the recess *d'* on top of the rail. The pressure on the main part of the rail is only sufficient to hold and guide the rail, and not to change its form in any way. The inclined sides *e* of the recess *d* on the middle roll C, in conjunction with the outer inclined sides of the collars *e'* on the roll D, turn up the flanges *x* on the base of the rail, as above described, in such a manner as not to draw the metal longitudinally, but make said flanges slightly tapering—that is, the metal is thicker at the angle than at the edge, and the metal is not buckled or kinked. On the middle roll C are formed two other collars, *h h*, the inner and outer sides of which are vertical with the axis of the roll, and the inner sides are continued by a circumferential recess, *f*, in the roll, as shown. In the bottom roll B is a recess, *f'*, of the same width as the width of the bottom of the rail between the angles, where the flanges *x x* are bent up. The sides *h'* of this recess are vertical for a short distance from the bottom outward and then inclined outward. The rail, after having been passed backward be-

tween the rolls C and D, is passed forward again between the rolls B and C, when the collars *h h*, in conjunction with the vertical portions of the sides *h'* of the recess *f'* in the roll B, turn the flanges *x x* in a perfectly vertical position, both the inner and outer sides of said flanges being thus made vertical, and at the same time compresses the metal at the angles where the flanges are turned up, whereby the rail is made stronger at these points than it would be if the metal were drawn out either longitudinally or laterally. The rolls are to be revolved in such a direction that during the first pass the rail will move toward the saw usually placed on one side for cutting the rail to the proper length; during the second pass it will move away from the saw, and during the last or third pass it will move toward the saw again, and be in proper place to be cut off.

The rail thus formed is to be used with spikes having hooked heads fitting closely over the turned-up flanges *x x*, whereby all lateral movement of the rail in either direction is entirely prevented.

In Fig. 2 I have shown a portion of such rail G with the spikes in dotted lines fitting over the flanges.

One principal object of my invention is to improve the commonly-used T-shaped rail. It is well known that the common T-rail often becomes laterally displaced by the continual pressure of the fast-rolling wheels of the cars on the rails, and the loosening of the spikes in the ties, causing the spikes to be shifted from the flanges of the rails, and in many cases the cars to be thrown from the track, thereby endangering life and property.

With a rail constructed as I have described the defects hitherto existing in the T-rail will be in a great measure, if not entirely, obviated.

Another object of my invention is to form the rail entire of one piece of metal, and to so construct mechanism that the rail may be quickly, cheaply, and perfectly made.

To this end the devices hereinbefore described will enable me to accomplish the desired result.

In compound rails, or rails made in two parts, one part forming the base and the other the cap of the rail, it has been found to be very difficult to either roll or cast the two parts thereof, so that when placed in position together for use the one part will perfectly fit the other part. Even if rolled or cast to perfectly fit, when one or both parts have a longitudinal groove, (as is usually the case in compound rails,) the rails, after being exposed any time to the weather, will contract and expand; hence, in placing them together, unless such contraction or expansion is perfectly equal, the parts will not fit together. The greatest difficulties in the construction of compound rails have been in forming the parts. In all such rails the two parts have been, of a necessity, in different shapes; hence it is necessary to use one set of rolls (when the parts are rolled) of one form and another set of rolls of another form to construct such rail.

In a compound rail where the base is provided with an upward-projecting part or flange extending longitudinally the length of the base to form one-half of the thickness of the web of the rail, this upward-projecting part must be very narrow in width. The cap of this rail being provided with a downward-projecting part or flange extending longitudinally the length of the cap to form the other half of the web must also be very narrow in width; hence in rolling through the usual metal rolls these two narrow parts are not only difficult to roll, but are liable to become twisted, crimped, or broken, or to have their edges so turned or scaled as to render them useless unless these flanges are made very thick, in which latter case extra weight is added to the rail, thereby entailing additional expense in construction and weight of rail.

Great difficulties arise in a two-part rail, where one or both parts have a longitudinal groove. The rolling of these grooves requires rolls of very neat construction to form them perfectly straight and prevent the edges from being turned over or crimped. In a two-part rail, where the base has a longitudinal groove and an upward-projecting flange, the metal surrounding this groove or flange must be enlarged to give the necessary support to the top part when attached. This also entails additional weight in construction. To roll the lower part of such a rail, the base which forms the side flanges must be in the rolls with its flat under part on a plane parallel with the rollers. Otherwise it could not be rolled, but must be cast.

To roll the base part of the rail in a compound rail in the manner as hereinbefore described, the common rolls and process for rolling T-rails could not be employed.

In rolling a rail as I desire to form it, I am enabled to roll it substantially as rails are now rolled; and I roll my rail by first passing the heated metal bar through the rolls to form the common T-rail, then back through to form the inclined flanges on the base, and then back again to turn up said inclines at right angles to the base, all being accomplished by one set of rolls, and forming a rail of one piece of metal, with advantages not possessed by and without any material weight over and above the common rail, or any material additional expense in the construction thereof, and a rail both in construction and in the mode of manufacture that is not open to the objections now found in a compound or two-part rail.

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

1. The roll C, provided with circumferential recess *d*, having inclined sides *e e*, in combina-

tion with the roll D, provided with circumferential recess *d'* and collars *e' e'*, all constructed substantially as and for the purposes herein set forth.

2. The roll C, provided with circumferential recess *f* and collars *h h*, in combination with the roll B, provided with circumferential recess *f'*, having its sides *h' h'* constructed substantially as and for the purposes herein set forth.

3. The combination, in a machine for rolling railroad-rails, of the roll B, provided with grooves *a' b'* and recess *f'*, the roll C, provided with grooves *a b*, recesses *d f*, and collars *h h*, and the roll D, provided with recess *d* and collars *e e*, all constructed substantially in the manner and for the purposes herein set forth.

4. A T-shaped railroad-rail rolled from one piece of metal, with head, web, base or side flanges, and flanges *x x*, extending vertically upward from the edges of the base flanges, substantially as herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of March, 1874.

JAMES M. CONNEL.

Witnesses:
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C. L. EVERT.