

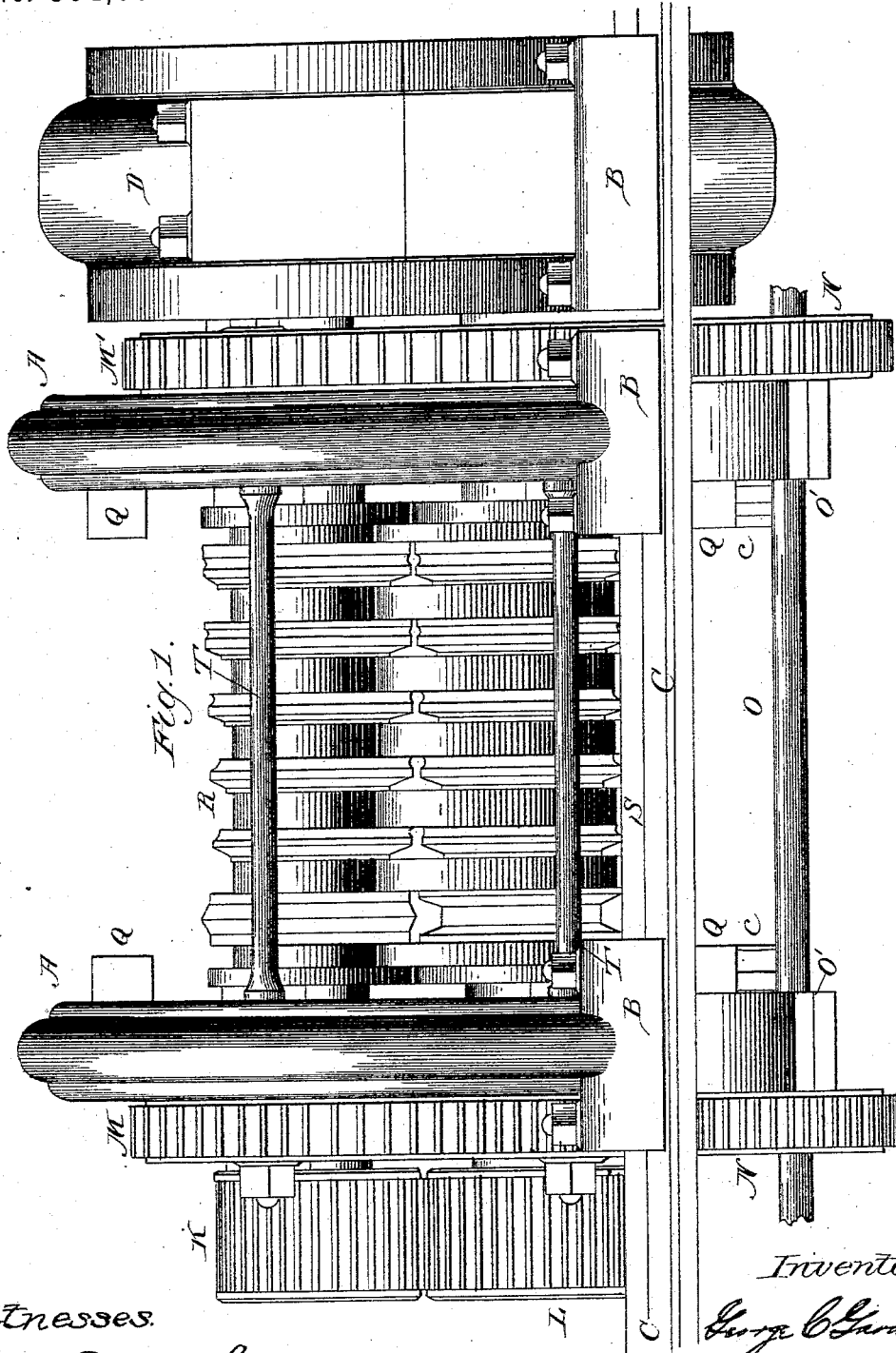
(No Model.)

4 Sheets—Sheet 1.

G. C. GARDNER.
ROLLING MILL.

No. 304,094.

Patented Aug. 26, 1884.



Witnesses:

Phillip P. Quokhndro.
Edgar S. Bond.

Inventor:

George C. Gardner

(No Model.)

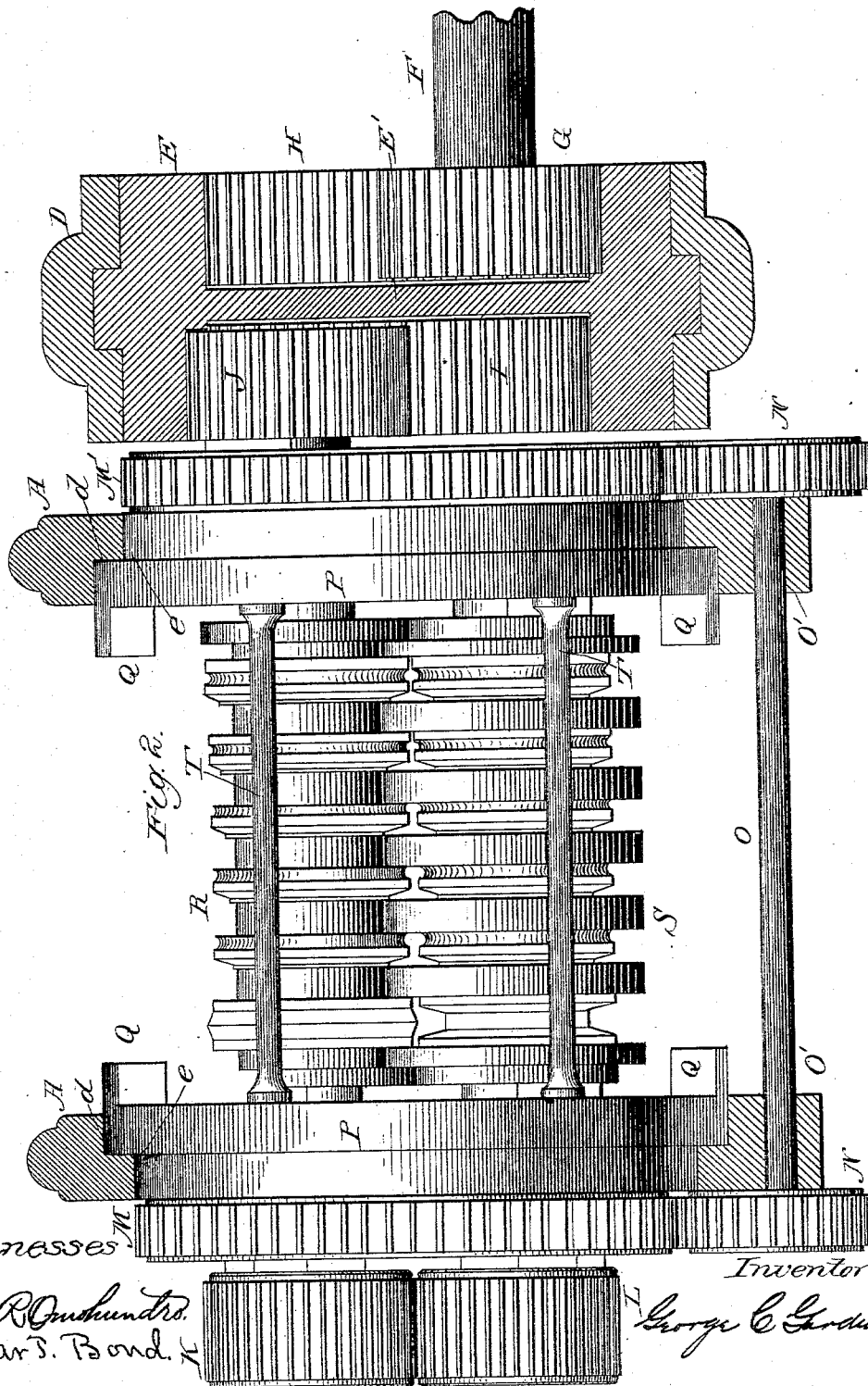
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Fig. 3.

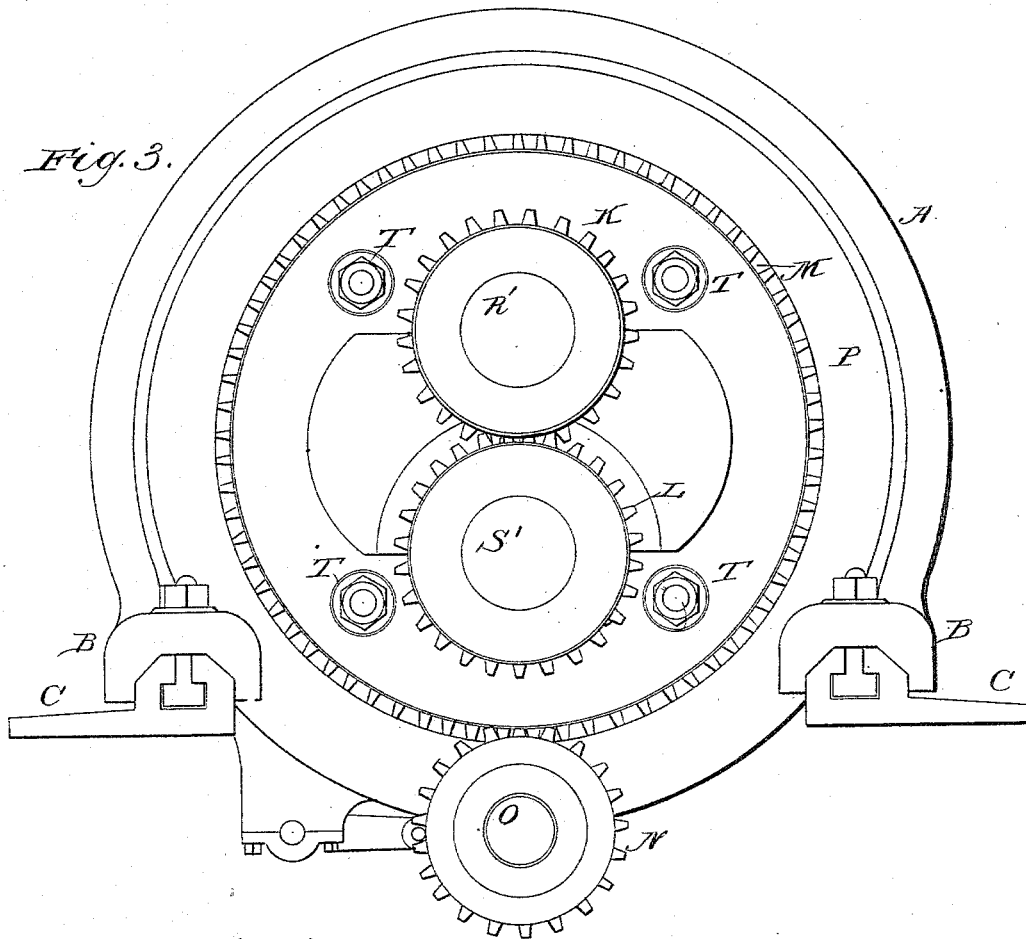
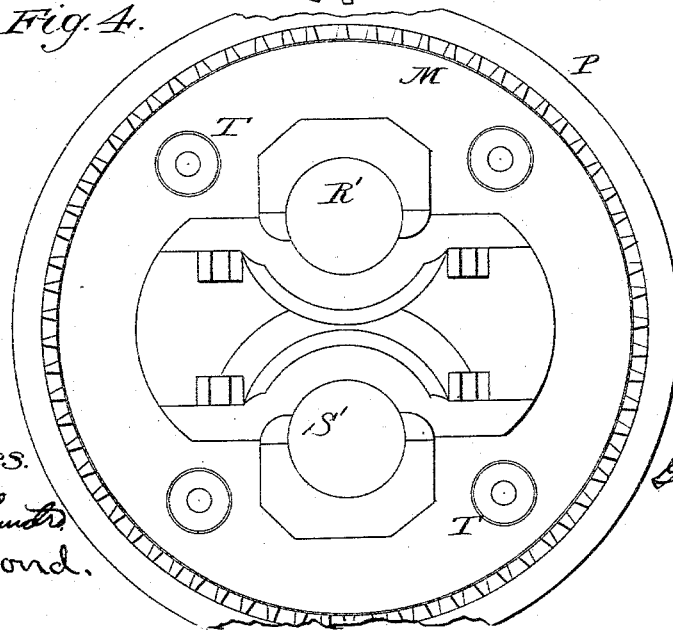


Fig. 4.



Witnesses.

Wm. B. Onchumter
Edgar J. Bond.

Inventor,
George Colander

(No Model.)

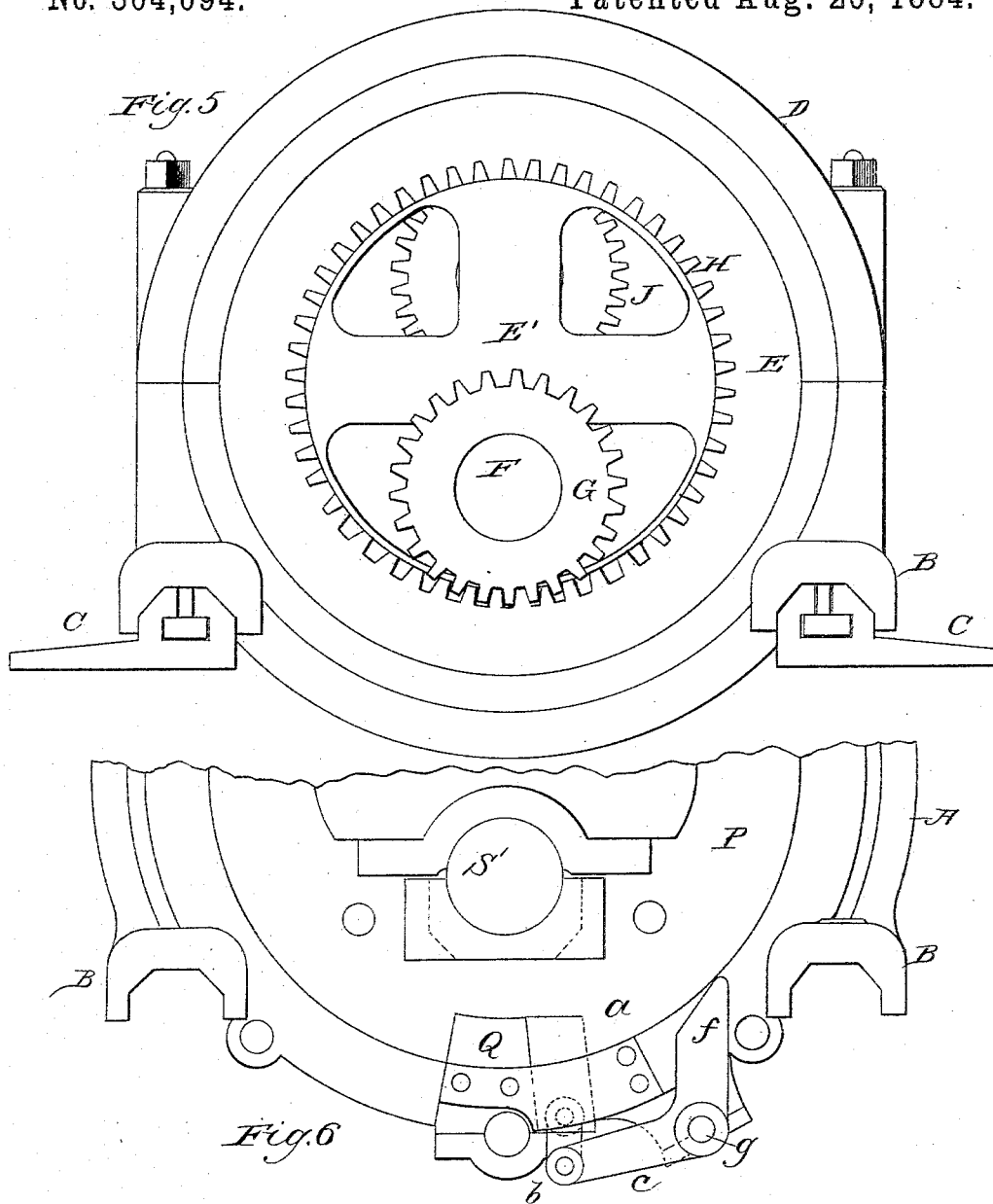
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Witnesses.

Wm. R. Owsen
Edgar T. Bond.

Inventor:

George C. Gardner

UNITED STATES PATENT OFFICE.

GEORGE C. GARDNER, OF CHICAGO, ILLINOIS.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 304,094, dated August 26, 1884.

Application filed July 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. GARDNER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Roll-Trains, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation; Fig. 2, a similar elevation, partly in section; Fig. 3, an end elevation; Fig. 4, a similar elevation with the gear-wheels and housing omitted; Fig. 5, an end elevation of the opposite end to that shown in Fig. 3; Fig. 6, a broken section of one end, showing the stop.

The object of this invention is to provide a roll-train which may be inverted, so that the bars being rolled may pass in both directions in the same plane or at the same elevation, and thereby avoid the use of a "three-high" roll-train; and its nature consists in making the rolls reversible as to position, and in the several parts and combinations of parts hereinafter described; and claimed as new.

In the drawings, A indicates the framing or housings for the ends of the roll-train; B, the means for attaching the framing or housings to the foundation; C, top plates of the foundation; D, case or housing for a portion of the driving-gear; E, the rotating disk or cylinder having interior cogs or teeth; E', partition or spokes of the cylinder E; F, main or driving shaft; G, driving-pinion; H, interior cogs in the front end of the cylinder E; I, interior cogs or teeth in the inner end of the cylinder E; J, driving-pinion for the roll R; K L, gear-wheels for driving the roll S and for moving the two rolls in unison; M M', gear-wheels for revolving the roll-carriage, to change the relative positions of the rolls; N, driving-pinions connecting with the gear-wheels M M'; O, shaft of the pinion N; O', bearings for the shaft O; P, disks or end plates by which the rolls are supported and held in position; Q, stop projections; R, flange-roll; R', its shaft or bearings; S, groove-roll; S', its shaft or bearing; T, cross-bars or rods connecting the disks or plates P and forming the roll-carriage; a, stop-block; b, connecting-link; c f, lever by which the stop a is advanced; d, groove in the casing or housing A; e, shoulder or enlargement in the end plates fitting into the groove d.

The rolls R S are made in the usual manner, so far as the flanges and grooves are concerned, and in the form shown they are adapted to the rolling of railway-rails; but I do not limit myself to such use. These rolls are supported in suitable bearings in the end plates, P, as shown in Figs. 3 and 4.

The end plates, P, are cast or otherwise made in the form shown in Fig. 2—that is, with the interior portions larger, so as to form the shoulders e, and they are provided with the gear wheels or teeth M, which are usually cast as a part of the end plates, but may be separately made and applied, if desired. These end plates are held together and in position by the cross-bars T. They are also provided with projections Q, which projections, with the block a, form stops by which the rolls are brought accurately to the desired position.

The gear-wheels M M' engage with the driving-pinions N, which pinions are supported on the shaft O, which shaft is supported in suitable bearings, O'. The wheels N connect with the shaft O, and serve to move the end plates, P, in unison, and the shaft O may be extended out, as indicated in Fig. 1, so as to drive the pinions N by separate machinery, or by a separate part of the machine; but for this last-mentioned purpose they are not essential, as the movement of the main driving-pinion G will, in use, rotate the roll-train when the stops are unlocked.

The cylinder E revolves within the casing D, and is held in position by an exterior flange fitting a corresponding groove in the casing, as shown in Fig. 2, or by other suitable means. This cylinder is provided at its outer end with cogs or teeth, H, which, being acted upon by the pinion G, causes the cylinder to revolve. In revolving, the cogs I, on the inner end of the cylinder, which engage with the pinion J, cause this pinion to revolve, and this pinion, being fast on the shaft or journal of the roll R, causes the roll, with its pinion K at the opposite end, to revolve. The gear-wheels K and L, being of the same size and operating together, cause the roll S to revolve with the same speed or in unison with the roll R, and in opposite directions, so as to give them their proper rolling action in use. While the rolls are in action, they are held

firmly in position by the stops *a* Q, so that their action upon the metal passing through is the same as that of rolls held permanently in position. The stop *a* is a strong block of iron passing through the under frame-work, as shown in Fig. 6, and is connected by a link or otherwise with the lever *c*, by which it is operated; and in use the machine will be so arranged that, when the lever *c* retracts the stop *a*, the end plates will revolve half-way around, or so as to reverse the position of the rolls R S, as shown, the roll S on the half-rotation becoming the upper instead of the lower one; and this arrangement will be made so that, if they are rotated by the shaft O, it will commence to revolve; or, as before stated, the power from the shaft F on the cylinder E will of itself cause the roll-carriage to rotate until it is again locked.

The pinions G and J are so located, in reference to the cylinder E and the cogs or gear H I, that, unless stopped, the roll-carriage will commence and continue to rotate. The reversal of the rolls R S, as to their upper and lower positions, does not change their rotation in relation to the gear-wheels K L, but it reverses the movement in relation to the bar of iron passing between them, so that when in operation the bloom or bar has once passed through, the releasing of the stop *a* will cause the rolls to rotate in the bearing of the end plates, P, in the frame or housing A and reverse their position, so that the bar can be run through the same elevation, and thus do what has heretofore required a train of three rolls, or a stopping and reversing the rotation of the rolls themselves, to do; and by this arrangement the bars to be rolled can be handled with less help, with greater speed, and bars can be rolled to a greater length than in the rolls heretofore used for bars which require passing through between the rolls more than once. The stops *a* may be retracted by a lever or treadle attached to the shaft *g*, and the rotation of the carriage will cause the stops Q to strike against the bent portion *f* of the lever *c*, and force the stops *a* back to stopping or backing position.

The method of supporting and operating the rolls shown is that which I deem best; but it is obvious that the parts may be somewhat varied without departing from the principle or construction of my improved roll-train.

It will be obvious that a brake may be used to control the rotation of the roll-carriage in

case its movement should be quick or too strong, and that while, as shown, the roll-carriage continues to rotate in the same direction when free to revolve it may be rotated in reverse directions by using racks applied to or in place of the pinions or wheels N.

I am aware that it has been proposed to construct a metal-bending machine of two pairs of rolls journaled in revolving disks, rotated by a screw between the two pairs of rolls, as described in the patent granted to S. P. M. Tasker, July 2, 1878, No. 205,588. My invention, however, is in a different art, and operates differently, as will appear from an inspection and comparison of said patent with this my present description.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination of a rotary carriage, a series of rolls supported thereby and adapted to revolve in opposite directions to each other, and means for rotating said carriage to reverse the position of said rolls, whereby bars of iron may be rolled back and forth in the same plane and between the same rolls without reversing the movement of the rolls, substantially as described.

2. The combination of the frame A, the rotary end plates, P, the rolls R S, means for revolving the rolls, and means for rotating the carriage to reverse the position of the two rolls, substantially as described.

3. The rollers R S, rotary carriage, and frame A, with the gear-wheels M, M', and N, substantially as set forth.

4. The rotary carriage having the stops Q, and supporting the roll-train, in combination with the stop *a*, holding the rolls in position, substantially as specified.

5. The combination of the rotary carriage and rolls R S with the cylinder E, having the gear or cogs I, pinion J, and gear-wheels K L, substantially as described.

6. The combination of the cylinder E, having the gear or cogs H I, with the pinions G J, rotary carriage-rolls R S, and gear-wheels K L, substantially as specified.

7. The combination of the driving-pinion G, cylinder E, having the gear or cogs H I, rotary carriage having the stops Q and rolls R S, with the gear-wheels J K L M M' N, and stop *a*, substantially as described.

GEORGE C. GARDNER.

Witnesses:

E. T. BOND,
O. W. BOND.