W. GEORGE & W. F. DURFEE.

Machinery for Rolling Metal.

No. 139,000. Patented May 20, 1873.

Fig I.

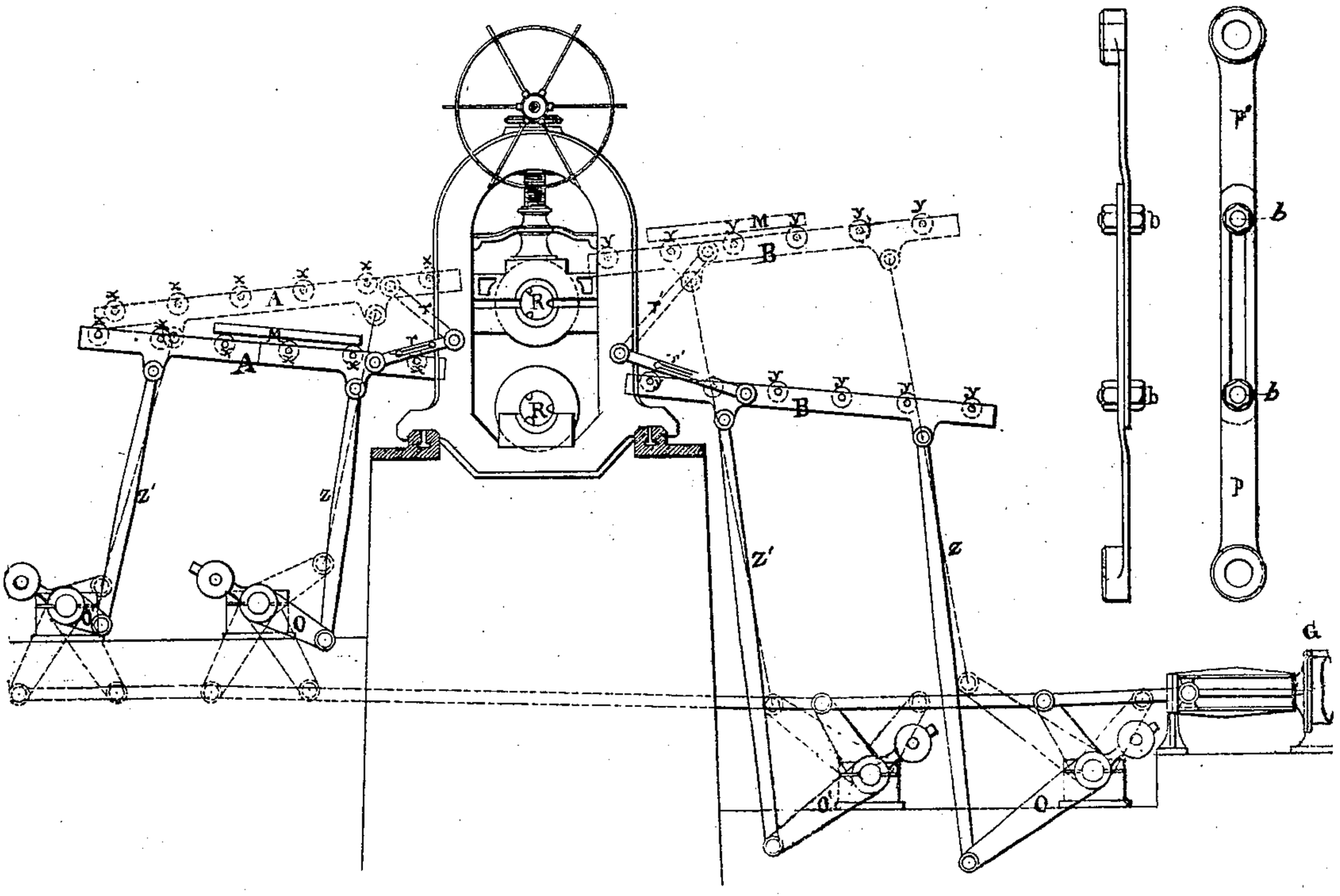
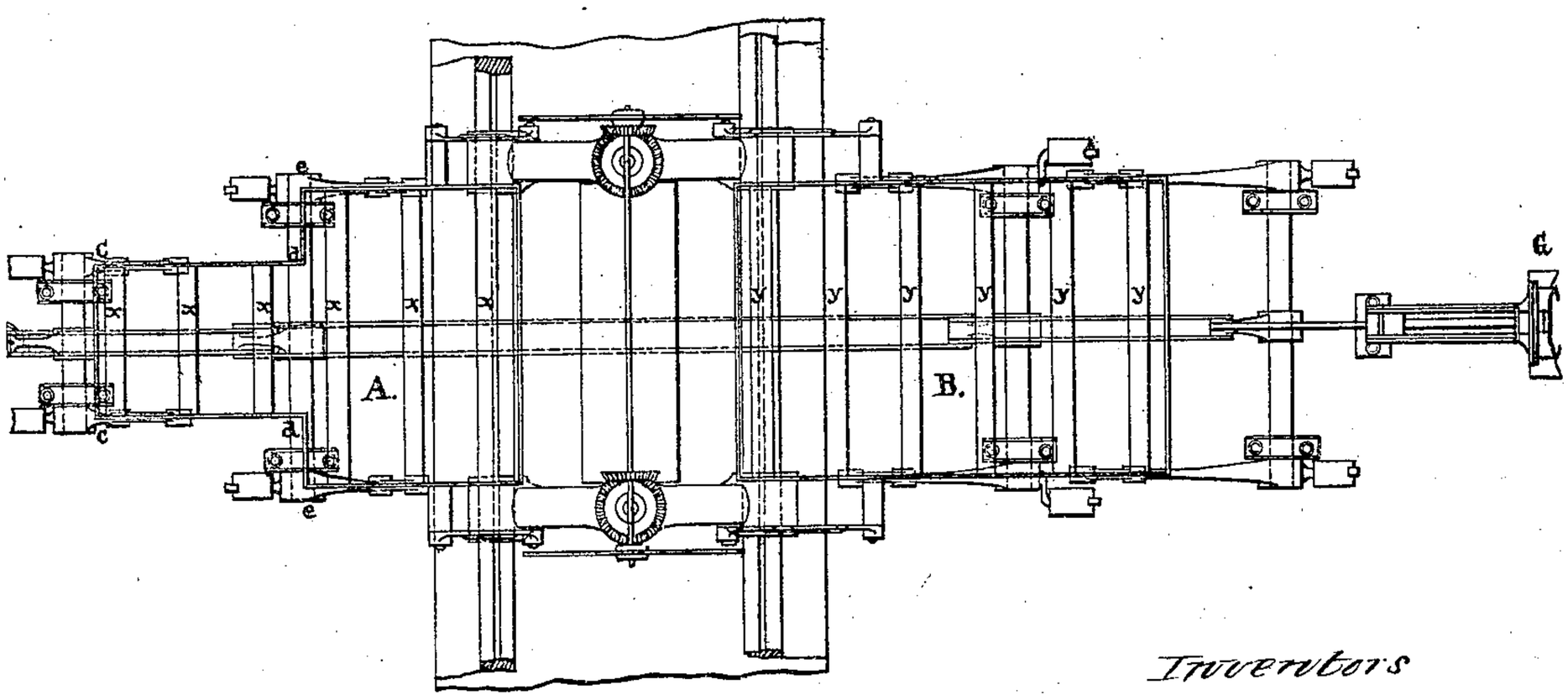


Fig III.

Fig IV.

Fig II.



Witnesses,

Marriott C. Smyth

John M. Newbold

Inventors

William George

William Franklin Durfee

UNITED STATES PATENT OFFICE

WILLIAM GEORGE AND WILLIAM F. DURFEE, OF PHILADELPHIA, PA.

IMPROVEMENT IN MACHINERY FOR ROLLING METAL.

Specification forming part of Letters Patent No. **139,000,** dated May 20, 1873; application filed February 3, 1873.

To all whom it may concern:

Be it known that we, WILLIAM GEORGE and WILLIAM F. DURFEE, of Philadelphia, Pennsylvania, have invented certain Improvements in Machinery and Appliances for Handling Metal at the Rolls of a Rolling-Mill, of which the following is a specification:

Our invention relates to an improved method of constructing and operating the "tables" at the front and back of the rolls of a rolling-mill, on which the metal is placed before it passes through the rolls of the rolling-mill, and on which it is received after passing through said rolls.

These tables, as heretofore constructed, have been provided with a number of parallel "rollers," which were caused to revolve either by power applied to their axes or by the rolling friction between their surfaces and the surface of the piece of metal to be rolled when said piece of metal was pushed by men employed for that purpose. In the first case considerable complicated machinery is required, and in the last case a large number of men.

Now, the object of our invention is to greatly simplify the machinery, and at the same time to dispense with a large part of the manual labor required.

Now, our invention consists in so constructing the tables in question, (which are shown at A and B, Figs. 1 and 2, in the drawing hereunto annexed and forming part of this specification,) that when a piece of metal, M, is placed upon the rollers X of the table A in front of the rolls R R of the rolling-mill its natural tendency, in obedience to its gravity, will be to move upon the rollers X of the table A toward the rolls R R of the rolling-mill, between which rolls the metal M will then pass and be received by the rollers *y* of the table B at the back of the rolls R R of the rolling-mill, which table B is so inclined that when the piece of metal M has left the rolls R R of the rolling-mill and is received upon the rollers *y* of the table B its natural tendency, in obedience to its gravity, will be to roll upon the rollers *y* of the table B from the rolls R R of the rolling-mill. The tables A B are then raised simultaneously by any appropriate mechanism—such as a steam-cylinder, G, or its equivalent—in such a way that they are caused to approach the rolls of the rolling-mill, and to have their respective inclinations reversed, so that the natural tendency of the piece of metal M, resting on the rollers *y* of the table B, will be, in obedience to its gravity, to roll upon said rollers toward the rolls R R of the rolling-mill, and to pass between the top and middle roll of the rolling-mill in the case of what is known as a "three-high mill," or over the top roll of the rolling-mill in the case of what is known as a "two-high mill," which is the form represented in the drawing; and then, after passing between or over the rolls of the rolling-mill, the piece of metal M will be received by the rollers *x* of the table A on the front side of the rolls of the rolling-mill, which table A, together with the table B, are immediately returned to their original position, as shown in the drawing, and the succession of operations described above are repeated until the piece of metal M has received its proper reduction and elongation by the rolls of the rolling-mill; and, in case the inclinations of the tables A B are properly regulated, the movement of the piece of metal M toward and from the rolls R R of the rolling-mill will be accomplished by its gravity, requiring only manual assistance sufficient to regulate its rate of movement and to insure its entering (in the case of grooved rollers) the proper groove in the rolls of the rolling-mill; though we do not confine our invention to rolling-mills with grooved rolls, but claim its application to the handling of metal at rolling-mills of every description that require the use of tables for handling the metal being operated upon.

The manner in which the tables A B are caused to vary their inclination as they rise and fall, and at the same time to approach the rolls of the rolling-mill R R, is as follows: the tables A B are supported on bars *z z'*, which are connected to the tables A B and to the arms *o o'*, by pins, or their equivalents, so that the said bars *z z'* can move about said pins, or their equivalents, as centers of motion, and the character and extent of said motion is determined and regulated by the radius-bars *r*, *r'*, which are made adjustable by being divided into two parts, with a slot in each part, bolts being passed through said parts in the slots, and so coupling them together by inducing

friction between the two parts of the radius-bars r r' by screwing up the bolts b b, which confine the two parts, p' p, of the radius-bars together. (See Figs. 3 and 4.)

This construction, or some equivalent one, of the radius-bars r r' is for the purpose of preventing breakage caused by the piece of metal being rolled as it passes through or over the rolls R R of the rolling-mill coming in accidental contact with the tables A B, in which case, if the friction between the two parts, p' p, of the radius-bars r r', is properly adjusted they will slip upon each other, and the table, with which such contact occurs, will then move away from the rolls uninjured.

This is but one way of accomplishing this result; many other well-known devices could be used.

The tables A B are caused to vary their inclination as they rise and fall as follows: The bars z z' are attached by their lower ends to the extremities of arms o o', which arms are caused to vibrate through a fixed angle by means of any suitable mechanism; but arms o are made longer than the arms o', so that the ends of the tables A B, which are attached to the arms o by the bars z, rise and fall faster than the ends which are attached to the arms o' by the bars z'.

The table A, in front of the rolls of the rolling-mill, is made with re-entrant angles c d e, as shown, for the purpose of enabling the men employed on the front side of the rolls to approach nearer to said rolls in case the piece of metal M being operated upon is so small that it would be inconvenient or impossible for the men to guide the same if they were obliged to stand at the extreme end c c of the table A. Now,

What we claim as our invention, and desire to secure by Letters Patent, is—

1. For movement of the tables at the front and back of the rolls of a rolling-mill, the lever-arms o and o', combined with the rods z and z' and the radius-bars r r', or their equivalents, so that the said tables vary their inclination as they rise and fall, and at the same time approach and recede from the rolls of the rolling-mill, the whole operating substantially in the manner, and for the purpose hereinbefore described.

2. The construction of the tables of a rolling-mill with re-entrent angles, substantially in the manner hereinbefore described.

WILLIAM GEORGE.
WILLIAM FRANKLIN DURFEE.

Witnesses:
MARIOTT C. SMYTH,
JOHN M. NEWBOLD.