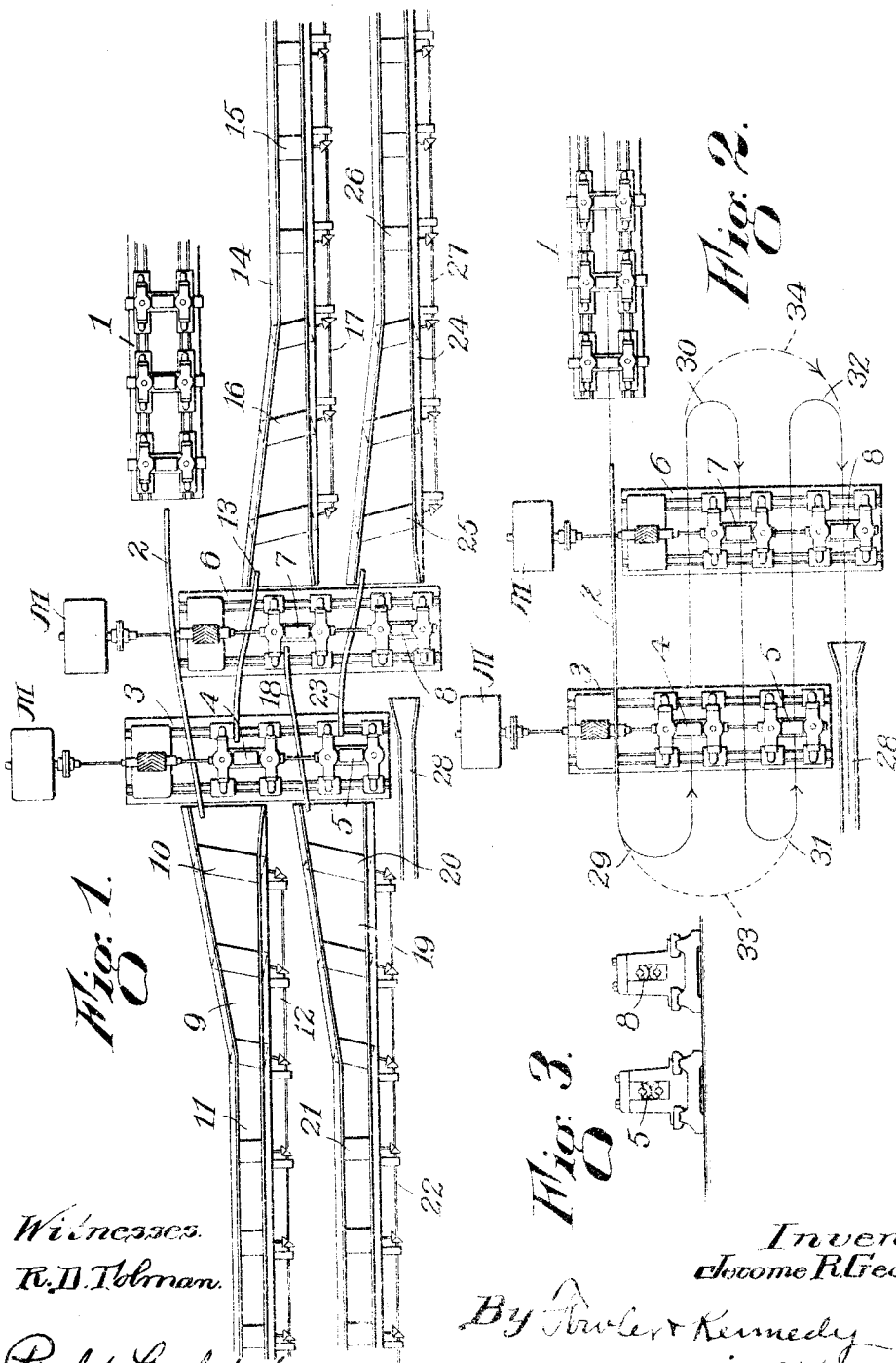


1,183,448.

Patented May 16, 1916.



Witnesses.
 R. D. Tolman.
 Paulope Comberbach.

Inventor
 Jerome R. George
 By Arthur Kennedy
 Attorneys

UNITED STATES PATENT OFFICE.

JEROME R. GEORGE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO MORGAN CONSTRUCTION COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

ROLLING-MILL.

1.183,448.

specification of Letters Patent.

Patented May 16, 1916.

Application filed August 20, 1914. Serial No. 857,761.

To all whom it may concern:

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Rolling-Mills, of which the following is a specification, accompanied by drawings forming a part of the same.

My invention relates particularly to that type of rolling mills known as a finishing mill and it has for its objects to facilitate the manipulation of the rolled product, to bring the groups of finishing rolls into separate trains, to render the grouping of the rolls more compact and, particularly, to render the mill capable of a great variety of finished product. These objects, among others, I accomplish by the construction and arrangement of parts as hereinafter described, the novel features being pointed out in the annexed claims.

Referring to the accompanying drawings, Figure 1 represents a plan view of a rolling mill embodying my improvement, having means for reversing the movement of the rolled product. Fig. 2 represents a plan view of the finishing mill arranged for the continuous reduction of the rolled product, and Fig. 3 is an end view of the roll housings in the two trains of rolls.

Similar reference characters refer to similar parts in the different figures.

Referring to Fig. 1, 1 denotes a train of rolls forming what is known as a roughing mill for the initial reduction of a billet as it is received from a heating furnace. From the roughing mill 1 the rolled product is delivered through a guide 2 and the first train 3 of finishing rolls comprising, in the present instance, two stands of rolls 4 and 5. At the side of the train 3 is a second train 6 of finishing rolls comprising, in the present instance, two stands of rolls 7 and 8. The rolls in the train 3 are independently driven in the opposite direction from that of the rolls in train 6 by any suitable means, in the present instance by independent motors M, M, which permit the speed of the rolls in each train to be independently varied.

The rolled product is delivered through the guide 2 upon a feed table 9 having at the end next the train of finishing rolls skew rolls 10 and at the opposite end the

feed rolls 11. The feed rolls 10 and 11 are driven by a common shaft 12 to continue the movement of the rolled product until its end is withdrawn from the guide 2. The feed rolls 10 and 11 are then reversed to feed the heated metal to the stand of rolls 4, the skew rolls 10 deflecting the advancing end of the rolled metal to bring it into alinement with the passes in the rolls 4. From the rolls 4 the product is conducted through a guide 13 to a feed table 14 having feed rolls 15 and skew feed rolls 16, similar to the feed table 9. The rolls 15 and 16 are driven by a common shaft 17 to remove the rolled product from the guide 13, when the feed rolls 15 and 16 are reversed and the rolled product fed to the stand of rolls 7 from which it is delivered through a guide 18 to the feed table 19 provided with feed rolls 20 and 21, similar to feed table 9, and driven by a common shaft 22. By the reversal of the feed rolls 20 and 21, the rolled metal is conducted to the stand of rolls 5, from which it is delivered through a guide 23 to a feed table 24 provided with feed rolls 25 and 26 driven by a common shaft 27. By reversing the feed rolls 25 and 26, the rolled product is conducted to the final stand of rolls 8 and from them delivered to a guide 28 by which it may be conducted to a cooling bed or reel, as desired.

In Fig. 2 I have shown the same trains of finishing rolls as shown in Fig. 1, but with the two trains preferably separated farther apart to facilitate the manipulation of the rolled metal which is conducted from the roughing mill 1 through the guide 2 and through the loop 29 to the first stand of rolls 4. From the stand of rolls 4 the metal is conducted through a loop 30 to the stand 7 and from the stand 7 through a loop 31 to the stand 5. From the stand 5 the metal is conducted through a loop 32 to the stand 8 from which it is delivered to the guide 28. By placing the rolls in the train 6 in staggered relation to the rolls in the train 3 and driving the rolls in each train in opposite directions, I accomplish the reversal in the movement of the rolled metal by employing two-high rolls only, as represented in Fig. 2. In Fig. 1 the reversal is accomplished by reversing the movement of the feed rolls in each of the feed tables 9, 14, 19 and 24, while in Fig. 2 the metal is conducted through suitable grooves, guides or

channels such as are usually employed in forming loops in rolling mills, and the reverse movement of the metal is accomplished by the rolls themselves, making the movement of the rolled product continuous through both trains of rolls. If the metal is conducted from the roughing mill 1 on the broken line 33, Fig. 2, rolls 4 and 7 will be omitted, or the metal may be conducted on the dot and dash line 34, omitting the stands 5 and 7, and finishing the product in either case with two passes. While I have shown but two stands of rolls in either train, the number of stands may be varied.

I claim,

1. A rolling mill, comprising two trains of rolls with their axes substantially parallel, with the rolls in one train in staggered relation to the rolls in the other train, and means for independently rotating the rolls of one train in the opposite direction to the rolls in the other train.

2. A rolling mill, comprising two trains of rolls, means for independently rotating the rolls in each train in opposite directions, the rolls in one train being in staggered relation to the rolls in the other train, and means for conducting the metal alternately from one train to the other.

3. A rolling mill, comprising a roughing train and two trains of finishing rolls, with the rolls of one finishing train in staggered relation to the rolls of the other finishing

train, means for independently rotating the rolls in each finishing train from corresponding ends of the trains, and means for conducting the metal from said roughing train to one of said trains of finishing rolls.

4. A rolling mill, comprising two trains of rolls with their axes substantially parallel, with the rolls of one train in staggered relation to the rolls of the other train, and means for independently rotating the rolls of one train in opposite direction to the rolls of the other train and at different angular velocities.

5. A rolling mill, comprising a roughing train and two trains of finishing rolls, means for rotating the rolls of each train of finishing rolls in opposite directions, and means for reversing the movement of the metal at each of said trains of finishing rolls.

6. A rolling mill, comprising two trains of finishing rolls, a feed table for each pair of rolls in said trains, said feed tables having positively driven conveyer rolls by which the movement of the metal product can be reversed, with the conveyer rolls of said feed tables next the rolls of said trains having their axes diagonal to the movement of the metal product.

Dated this fourteenth day of August 1914.
JEROME R. GEORGE.

Witnesses:

PENELOPE COMBERBACH,
GEO. H. KENNEDY, Jr.