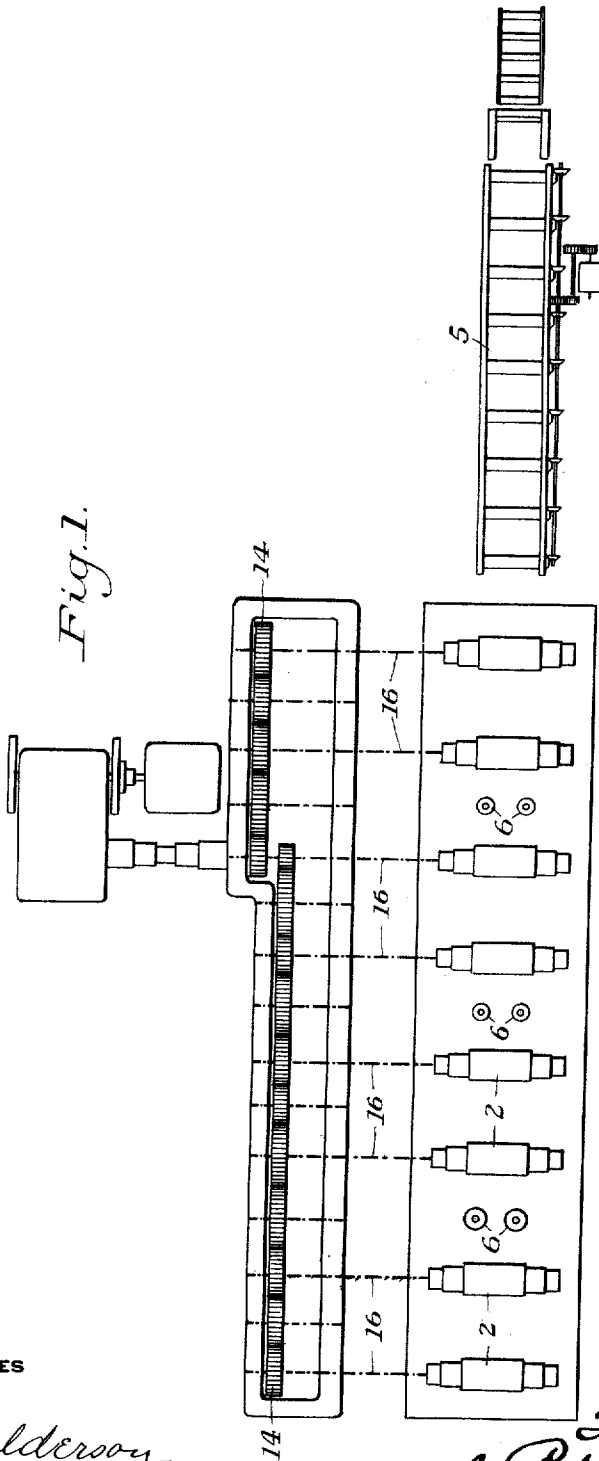


1,354,976.

Patented Oct. 5, 1920.
4 SHEETS—SHEET 1.



WITNESSES

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by Robert J. Jones, Attorney

L. JONES.
ROLLING MILL.

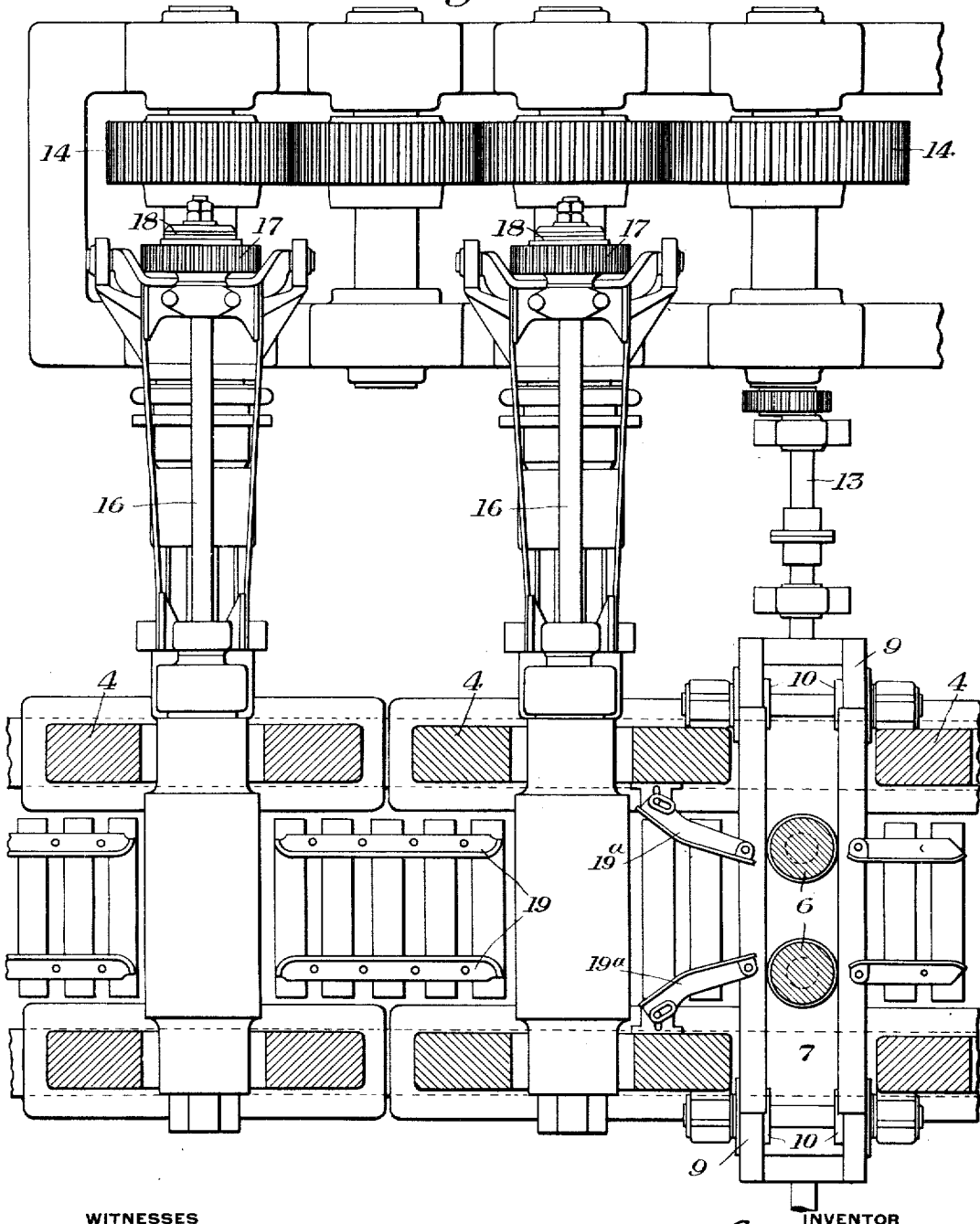
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4 SHEETS—SHEET 2.

Fig. 2.



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1,354,976.

Fig. 3.



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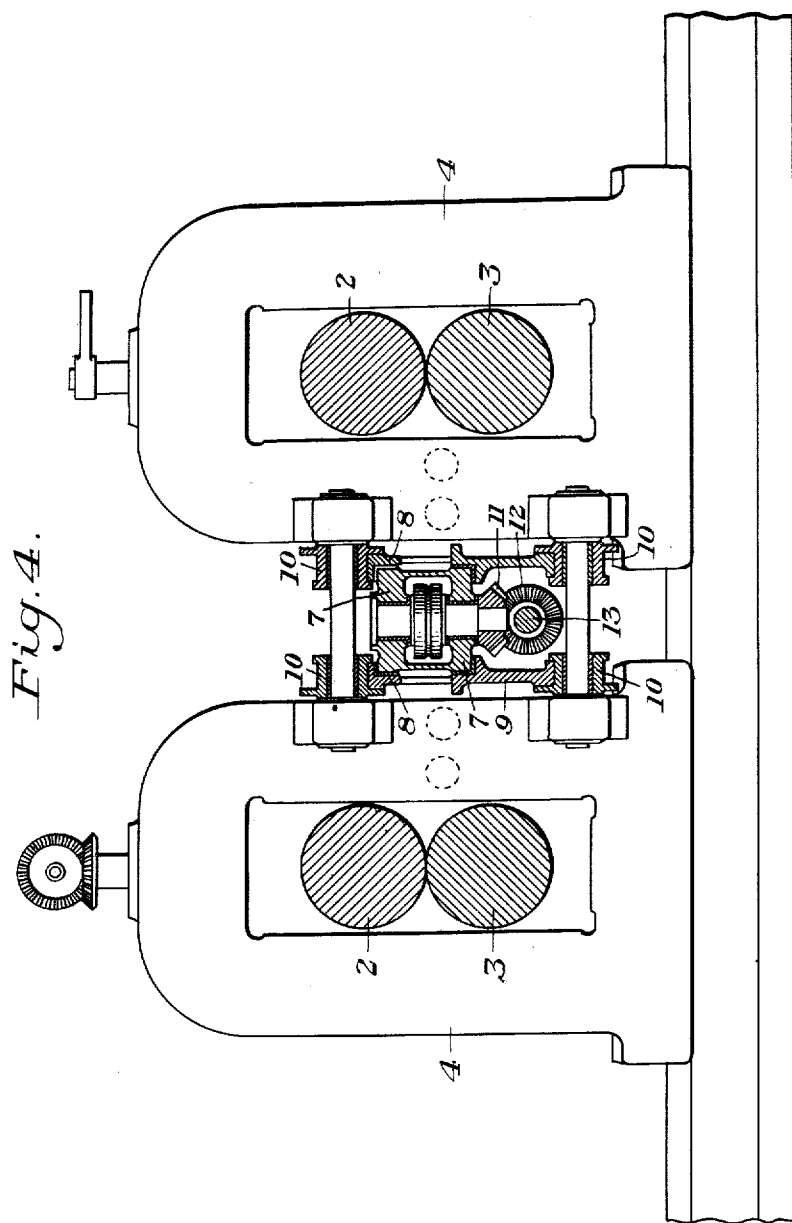
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APPLICATION FILED JULY 28, 1919.

Patented Oct. 5, 1920.
4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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ROLLING-MILL.

1,354,976.

Specification of Letters Patent.

Patented Oct. 5, 1920.

Application filed July 28, 1919. Serial No. 313,783.

To all whom it may concern:

Be it known that I, LLOYD JONES, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolling-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a diagrammatic plan view of a continuous mill, and illustrating the application of my invention thereto.

Fig. 2 is a sectional plan view of a portion of the mill on a larger scale.

Fig. 3 is a transverse vertical section, and

Fig. 4 is a longitudinal vertical section of a portion of the mill.

My invention relates particularly to rolling mills of the continuous type such as are used in rolling metal strips and the like. In this type of mill the horizontal rolls do not have passes but are plain cylinders. Therefore, the strip in passing through the mill has no definite position, but may be either directly on the center line or off to one side. Furthermore, owing to imperfect roll adjustment or roll action, or by reason of differences in the character of the metal being rolled, the strip frequently goes through the mill in a more or less sinuous path.

The object of my invention is to provide a mill of this character having vertical edging rolls for the strips, which rolls are not held rigidly sidewise but are so supported as to be capable of "floating" laterally in order to adjust their position to the position and form of the strip. By the provision of edging rolls of this character, the edges of the strip can be finished and proper width of the strip insured whether its edges be straight or otherwise and irrespective of the position of the center of the strip with respect to the center of the mill.

A further object of my invention is to provide an improved form of drive for the upper rolls of the continuous mill.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown a preferred embodiment thereof and which will

now be described, it being premised, however, that various changes may be made in the details of construction, arrangement and combination of the various parts without departing from the spirit and scope of my invention as defined in the appended claims.

In the accompanying drawings, the numeral 2 designates the upper rolls of the several stands of rolls which form a continuous mill and 3 the lower rolls. 4 indicates the roll housings and 5 a delivery table.

In accordance with my invention, I provide a plurality of pairs of vertical edging rolls 6 which are arranged intermediate certain of the roll stands of the mill. In Fig. 1, which shows an eight-stand continuous mill, I have shown three pairs of these edging rolls, the first pair being placed between the second and third stands of the mill, the second pair between the fourth and fifth stands and the third pair between the sixth and seventh stands. It will be readily understood that I do not limit myself to any particular number or particular location of these pairs of edging rolls. The rolls of the successive pairs toward the delivery end of the mill may be of decreasing diameters, as illustrated in Fig. 1.

The edging rolls of each pair are journaled vertically in frames 7 which are capable of transverse adjustment in suitable guides 8 on the transversely movable carriage 9. These parts are best shown in Figs. 3 and 4. Each carriage 9 is mounted for free transverse movement between the adjacent roll housings on suitable guides which may consist of anti-friction rollers 10 at the upper and lower corners thereof. Each of the edging rolls is positively driven through suitable bevel gears 11 and 12, the gears 12 being mounted upon transverse shafts 13 which have a driving connection with the roll driving gears 14. The gears 12 are splined to the shaft 13 in a manner to slide freely thereon so that said gears may freely follow the lateral movements of the carriages 9 and may also follow adjustments given the frame 7 for the purpose of varying the transverse distance between the two rolls of a pair. This adjustment may be

effected in various ways as by means of the adjusting screws 15 (see Fig. 3) which engage said frames.

The driving spindles 16 for the upper 5 rolls 2 are preferably driven as follows:

Each of these spindles is provided with a spur gear 17 meshing with one of the spur gears 14 on the spindle of the adjacent lower roll. The gears 17 are connected with 10 their respective spindles through the medium of friction clutches 18 of any well known character and which can be set so as to readily slip. These clutches are so set that when no work-piece is passing through 15 the mill or through any particular stand of rolls, the upper roll of that stand will be driven through its clutch. As soon, however, as a work-piece enters the rolls of that stand, the clutch 18 will slip and the upper 20 roll will be driven by the lower roll through the work-piece. In this manner the upper roll will be driven sufficiently at all times to insure proper feeding in of the work-piece, but as soon as the work-piece is caught 25 the drive is through said piece from the lower roll.

The operation of the vertical edging rolls will be readily understood.

The carriages 9 for each pair of rolls being 30 freely movable transversely, the said rolls will readily adapt themselves to the sinuous edges of the strip and to off-center positions of the strip, thus insuring proper edging and engaging of the strip independently of 35 its form or position.

The sections 19^a of the table guides 19 may be hinged or pivoted at their ends as shown in Fig. 2, one end of each guide being pivotally connected to the adjacent carriage 40 9, and thus permit said sections to move with and adapt themselves to the varying positions of the edging rolls.

It will be readily understood that the particular manner of mounting, adjusting and 45 driving the edging rolls may be widely varied within the scope of the appended claims.

I claim:

1. A continuous rolling mill having vertical edging rolls mounted for free trans- 50 verse movement under the action of the work-piece, substantially as described.

2. A continuous rolling mill having roll stands and having vertical edging rolls located intermediate adjacent roll stands, said 55 rolls being arranged in pairs at opposite sides of the center of the mill, and transversely movable carriages carrying said rolls whereby each pair of rolls is free to move laterally under the action of the work-piece 60 independently of the other pairs of edging rolls, substantially as described.

3. A continuous rolling mill having roll stands and having a carriage mounted for free transverse movement between two adjacent roll stands, and a pair of vertical edging rolls mounted in said carriage, substantially as described. 65

4. A continuous rolling mill having roll stands and having a carriage mounted for free transverse movement between two adjacent roll stands, and a pair of vertical edging rolls mounted in said carriage, together with means for effecting lateral adjustments of said rolls independently of the 70 movement of the carriage, substantially as described. 75

5. A continuous rolling mill having roll stands and having a carriage mounted for free transverse movement between two adjacent roll stands, and a pair of vertical edging rolls mounted in said carriage, together with means for positively driving 80 said rolls in their different adjusted positions, substantially as described.

6. A continuous rolling mill having roll 85 stands and having transversely extending guideways located between adjacent roll stands, a carriage freely movable transversely in said guideways, and a pair of vertical edging rolls journaled in said carriage, 90 together with means for positively driving said rolls in the different positions of the carriage, substantially as described.

7. A continuous rolling mill having roll stands and having transversely extending 95 guideways located between adjacent roll housings, a carriage mounted for free transverse movement on said guideways, independently adjustable frames seated on said carriage, a vertical edging roll journaled on 100 each of said frames, and means for positively driving said rolls in their different adjusted positions, substantially as described.

8. A continuous rolling mill having roll stands and having a pair of vertical edging 105 rolls located intermediate adjacent roll stands, and mountings for said rolls free to move laterally between said stands, together with guide members movable with said rolls and thereby maintain a proper work-guiding 110 relation to said rolls, substantially as described.

9. A continuous rolling mill having roll stands and having a plurality of pairs of vertical edging rolls located between different roll stands of the mill, each pair of said rolls being mounted for free transverse 115 movement under the action of a work-piece, substantially as described.

In testimony whereof, I have hereunto set 120 my hand.

LLOYD JONES.