

No. 673,237.

Patented Apr. 30, 1901.

C. R. BRITTON & W. I. LUDLOW.

C. M. BRITTON, Executrix of C. R. BRITTON, Dec'd.

ROLLING MILL.

(No Model.)

(Application filed June 19, 1899. Renewed Dec. 17, 1900.)

3 Sheets—Sheet 1.

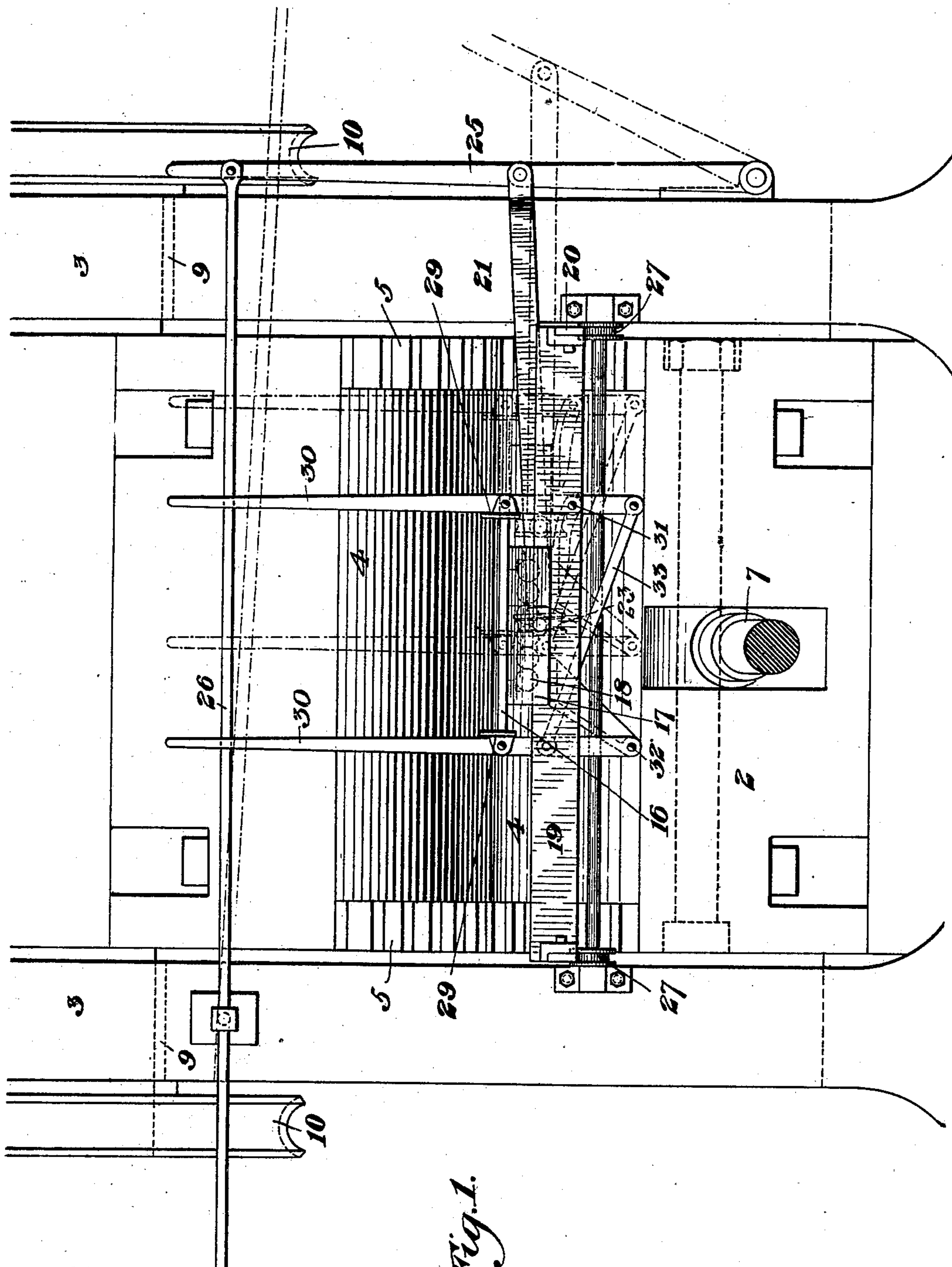


Fig. 1.

WITNESSES

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3 Sheets—Sheet 2.

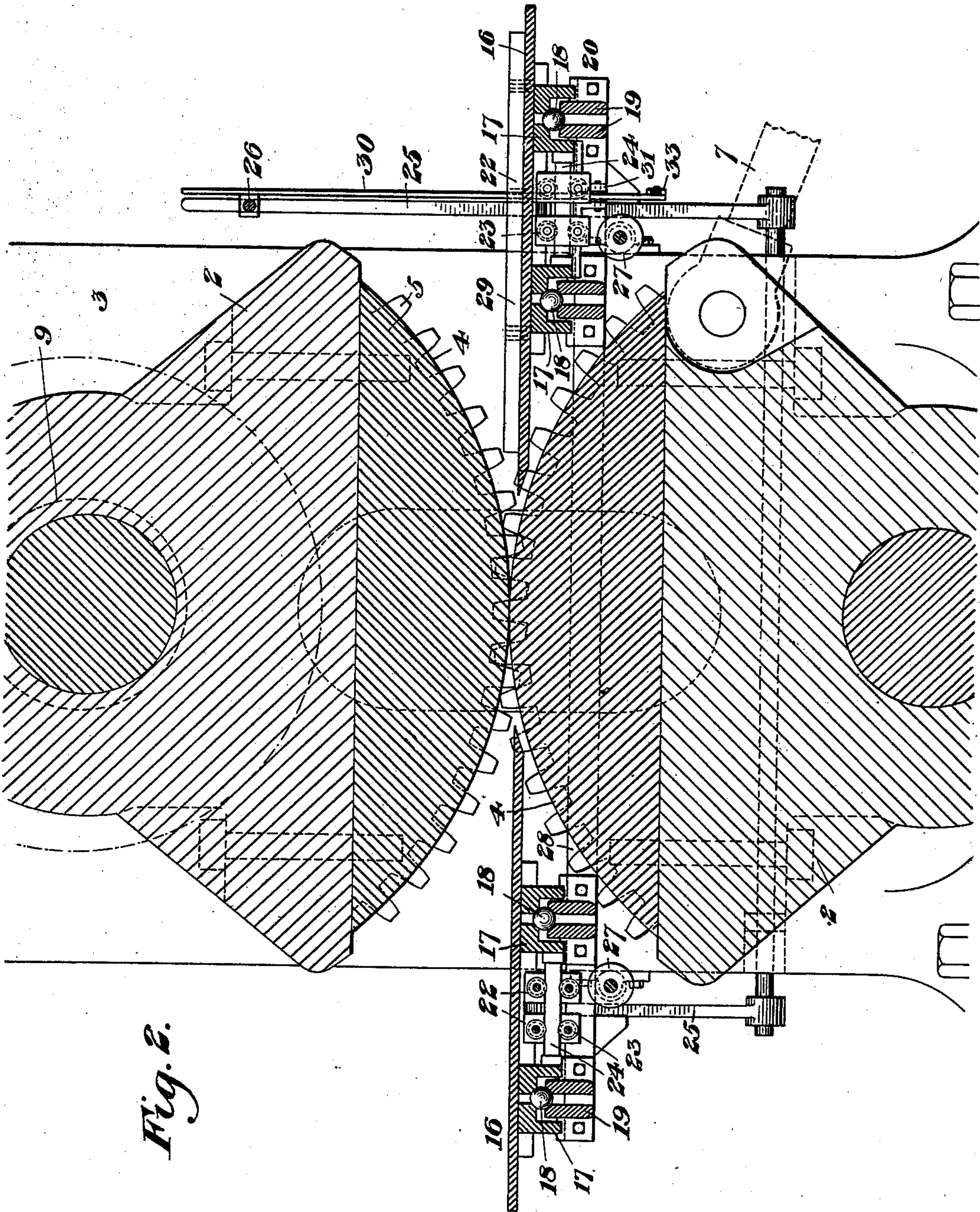


Fig. 2.

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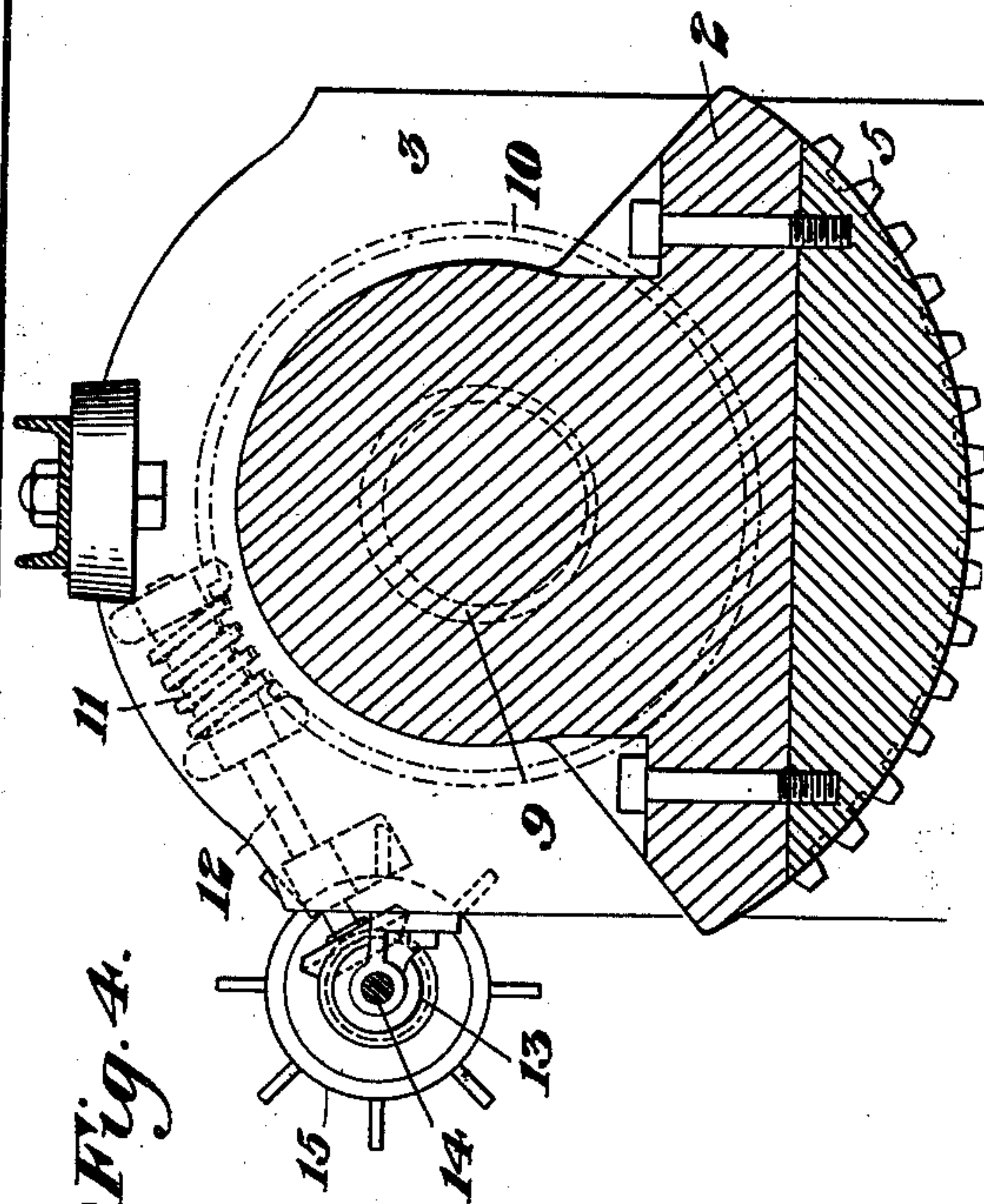
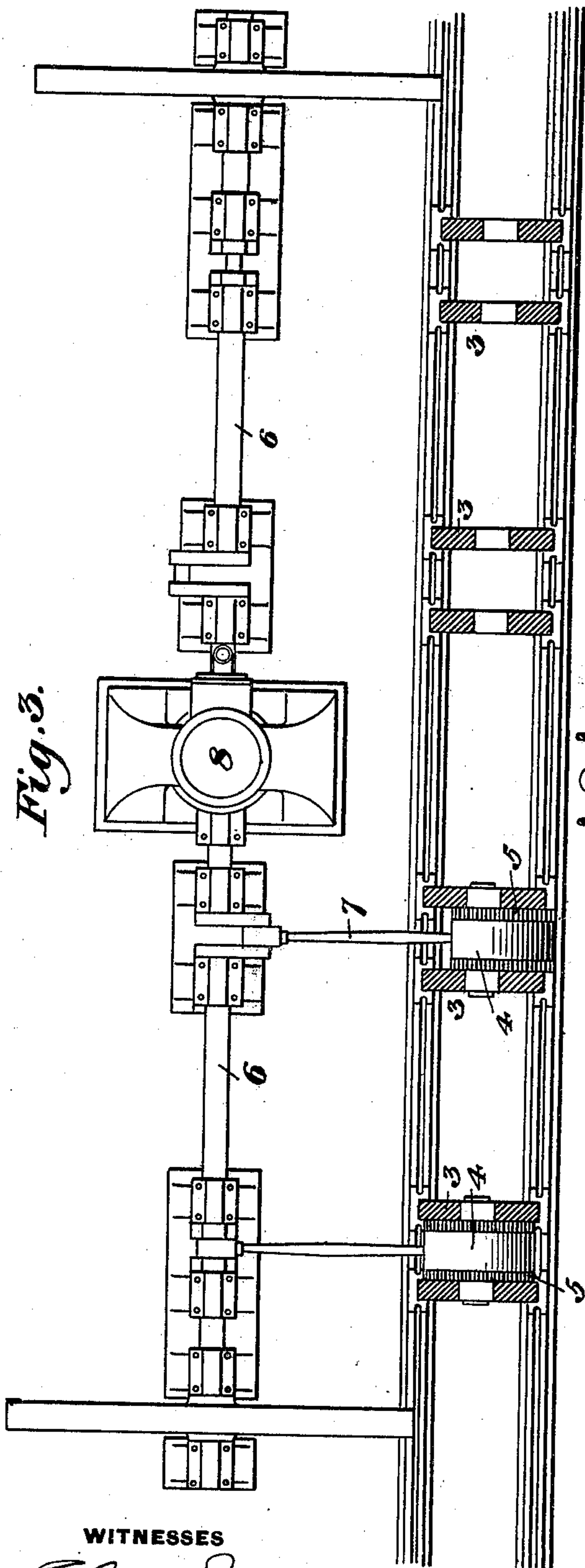
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

CLARENCE R. BRITTON AND WASHINGTON I. LUDLOW, OF CLEVELAND, OHIO; SAID LUDLOW ASSIGNOR TO SAID BRITTON; CARRIE M. BRITTON EXECUTRIX OF SAID CLARENCE R. BRITTON, DECEASED.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 673,237, dated April 30, 1901.

Application filed June 19, 1899. Renewed December 17, 1900. Serial No. 40,136. (No model.)

To all whom it may concern:

Be it known that we, CLARENCE R. BRITTON and WASHINGTON I. LUDLOW, of Cleveland, in the county of Cuyahoga and State of Ohio, 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 front elevation of rolls constructed in accordance with our invention. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a plan view, partly in section, of four stands of rolls embodying our invention; and Fig. 4 is a section of the upper roll, showing the adjusting mechanism.

Our invention relates to the rolling of metal plates and sheets and is designed to overcome many of the difficulties incident to the mills heretofore employed, wherein the rolls are continuously rotated.

To that end it consists in a new and improved arrangement of oscillatory rolls with suitable feed-tables, whereby sheet or plate metal may be easily and rapidly reduced by back-and-forth motion, as distinguished from a continuous rotation.

It also consists in the above combinations with means for shifting the tables along the length of the rolls, so that the metal will keep the working portions of the rolls at a uniform temperature throughout, and thus preserve the proper contour of them; and it further consists in the construction and arrangement of the parts, as hereinafter more fully described, and set forth in the claims.

In the drawings, 2 2 represent roll-bodies of segmental form which are journaled in housings 3 and are provided with removable working portions 4, having plain faces for rolling sheet metal and removably secured to the bodies by bolts or other mechanism. The rolls are connected by gear-teeth 5, which prevent slipping and keep the rolls in proper relative position to each other. Instead of these gear-teeth other connections may be used between the rolls or their shafts. The lower roll is driven from a crank-shaft 6 by

connecting-rod 7, so that as the shaft is rotated by the engine 8 an oscillating back-and-forth motion is imparted to the rolls.

As shown in Fig. 3, a series of sets or stands of rolls are connected independently to the common driving-shaft 6, and the cranks thereon are set at different angles, so as to equalize the distribution of power and make more uniform the strain upon the shaft and the engine. By connecting the rolls individually to the driving-shaft any one set of rolls may be disconnected for repair by disconnecting the driving bar or pitman without affecting the operation of the other sets of rolls. Only one crew of workmen is thus rendered idle and the general work in the mill is not stopped.

The adjusting mechanism which we employ comprises eccentrics 9, which fit around the necks of one of the rolls, preferably the upper roll, and are fixed to or connected with worm-wheels 10 at each end of the roll, with which intermesh worms 11 on shafts 12, having bevel-gear connection 13 with a shaft 14, provided with hand-wheel 15, by which the collars 9 may be turned simultaneously, so as to adjust the rolls with great accuracy.

To feed the metal to the rolls and receive it therefrom, we provide tables 16, having lower ball races or guides 17, containing balls 18, which rest on tracks 19, supported on a frame 20. Each table is moved longitudinally of the roll-bodies by a link 21, terminating in a yoke or double plate 22, in which are pivoted rollers 23, which bear upon a rod 24, which extends between the rollers and is secured to the table, thus giving a loose connection between the link and the table. The link is actuated by a lever 25, pivoted to the housing, and to which is connected a rod 26, which extends across the other housings, so that the table may be moved along the rolls by the workmen standing at either side or in front.

The frames or platforms 20, carrying the tracks 19, are carried on grooved pulleys 27, engaging the end members, and these frames are connected by bars 28, as shown in Fig. 2, so that they move together, one frame and table moving into the bite of the rolls as the

other moves out. This enables the workman to enter the metal either on the side where he is standing or on the other side.

To square up the sheets or packs on the table, we provide guides 29, secured to levers 30, one of which is pivoted at 31 and the other at 32 to brackets secured to the movable table. A link 33 connects the levers in such a way that movement of either lever causes them both to simultaneously move toward or from each other.

In operating the mill the metal piece or pack is placed upon the table, which is moved along to any desired point in the length of the roll-bodies. The platform carrying the table is then moved in, so as to enter the piece or pack. The passing of the metal back and forth may be continued as many times as is necessary or desirable, the adjustment of the rolls being varied from time to time, as desired. As the sheet or pack is passed in this manner through the roll the tables are moved to different points of the roll-bodies, so as to keep these bodies at a practically uniform temperature and wear them down uniformly in their different portions. Their contour is thus preserved of uniform shape, and much of the difficulty resulting from unequal heating and wearing of the rolls is avoided.

The rolls may be made of the form of complete cylinders, they may be oscillated by other driving mechanism, such as worm-gear, and many other variations may be made without departing from our invention, since

We claim—

1. The combination with a pair of rolls, of a feed-table of less width than the length of their working faces, said table being movable longitudinally of the roll-bodies, and to and from the bite of the rolls; substantially as described.

2. The combination with a pair of rolls, of feed-tables on opposite sides thereof and connected together, said tables being of less

width than the length of the working face of the rolls and being movable longitudinally of the roll-body and to and from the bite of the rolls; substantially as described.

3. Rolls having plain working faces for plate or sheet metal reduction, and tables on each side thereof, said tables having rigid connections below the axis of the upper roll, and movable toward and from the bite of the rolls; substantially as described.

4. Rolls for reducing plates or sheets, having plain working faces, means for oscillating the rolls, a movable feed-table, and squaring-up devices carried on the table; substantially as described.

5. Rolls having plain working faces for plate or sheet metal reduction, having gear connections with each other, means for oscillating the rolls, and a table movable longitudinally of the roll-bodies, and to and from the bite of the rolls, said table being of less width than the length of the working faces of the rolls; substantially as described.

6. In apparatus for reducing sheets or plates, a series of stands of oscillatory rolls having plain working faces, and a common driving-shaft having connections to the several sets of rolls, the connections being arranged to equalize the strain upon the shaft; substantially as described.

7. In apparatus for reducing plates or sheets, a series of sets of oscillatory rolls, each set having independent driving connections with a common shaft, whereby one set may be disconnected without affecting the operation of the other sets; substantially as described.

In testimony whereof we have hereunto set our hands.

CLARENCE R. BRITTON.
WASHINGTON I. LUDLOW.

Witnesses:

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ARTHUR C. ROGERS.