(No Model.) 2 Sheets—Sheet 1.

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MECHANISM FOR MANUFACTURING CAR AXLES.

No. 570,499. Patented Nov. 3, 1896

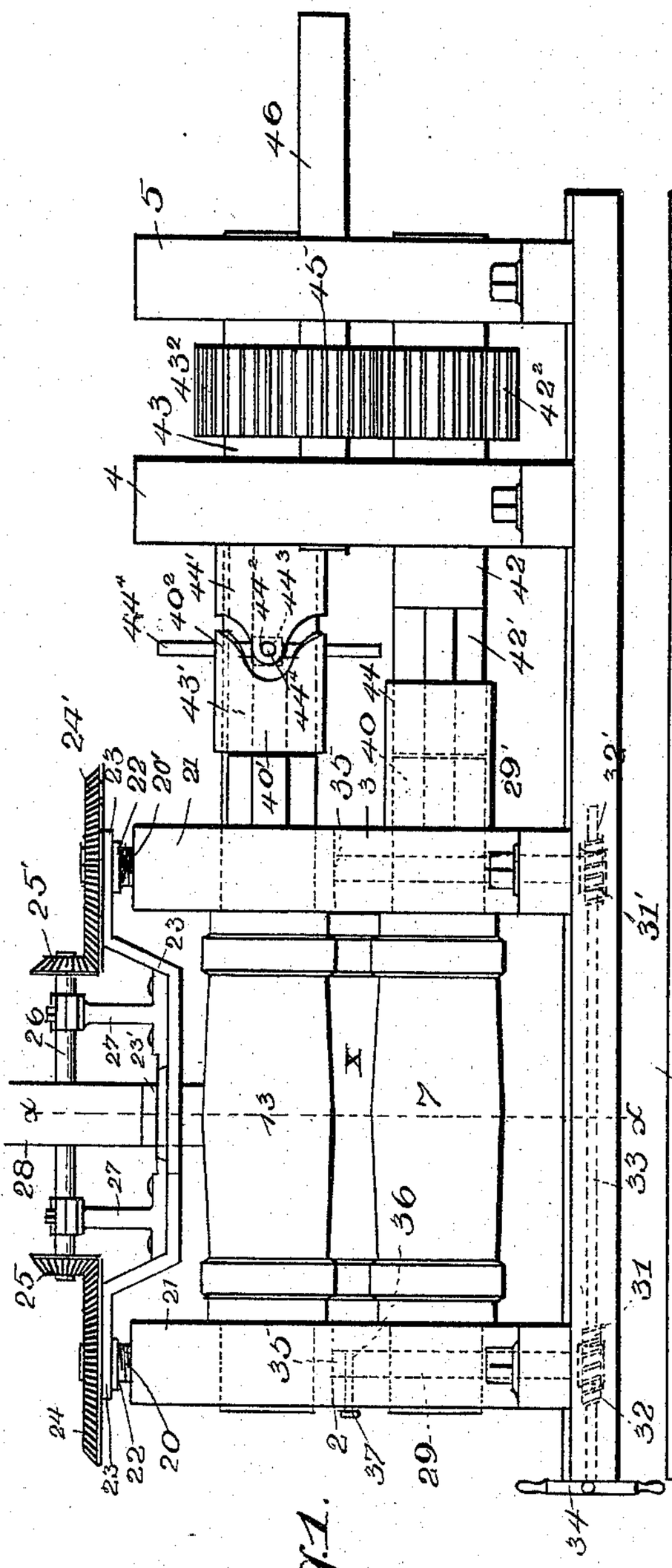

Fig. 1.

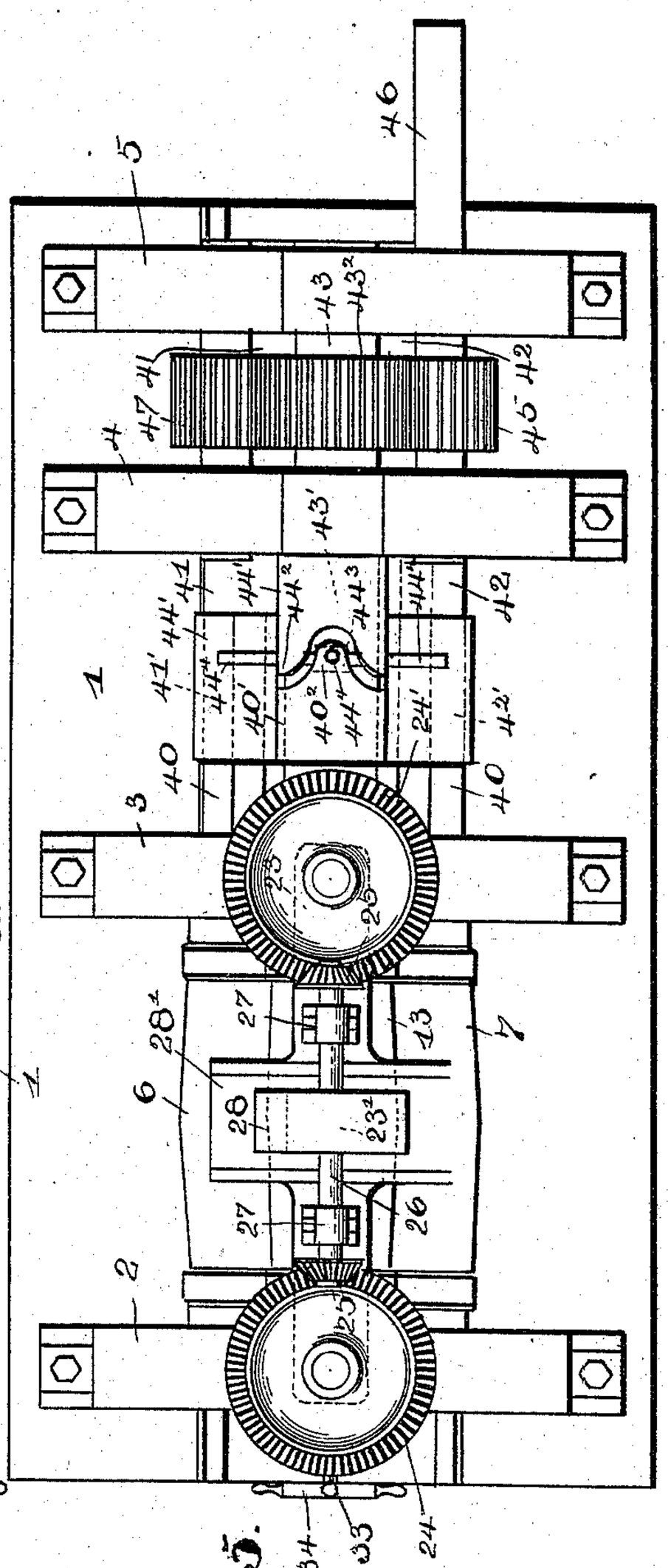

Fig. 2.

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Fig. 6.

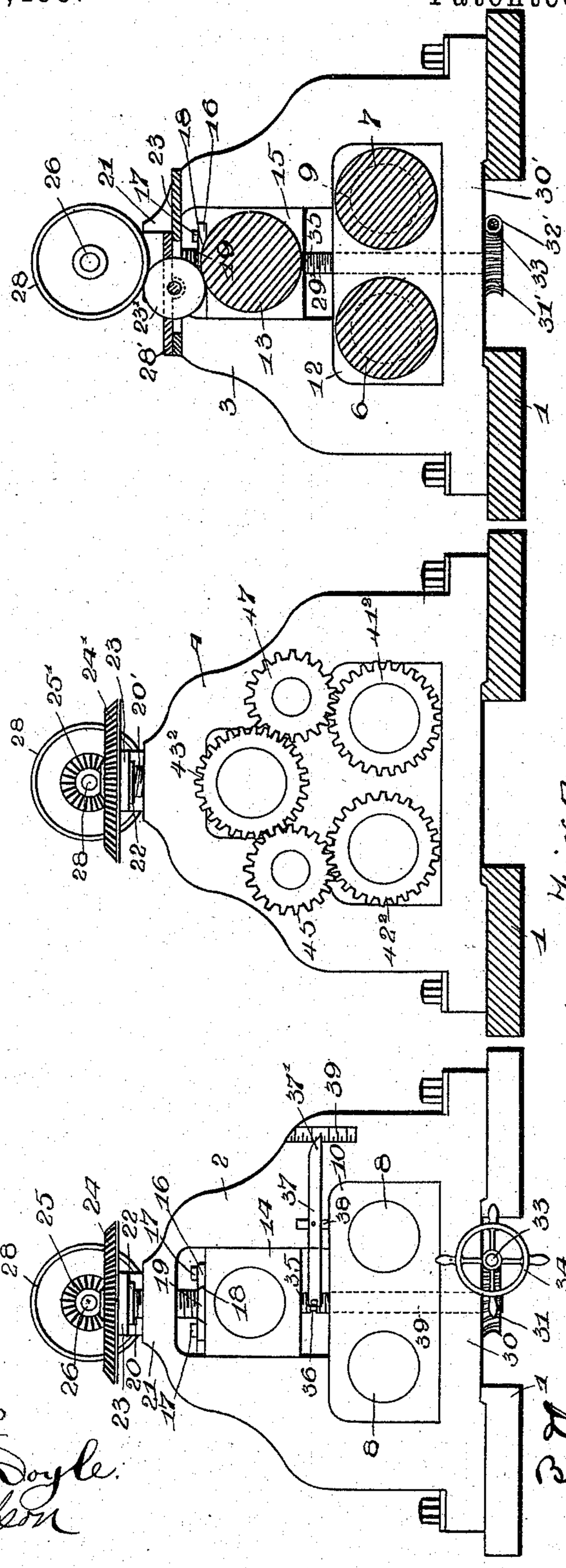

Fig. 3.

Fig. 4.

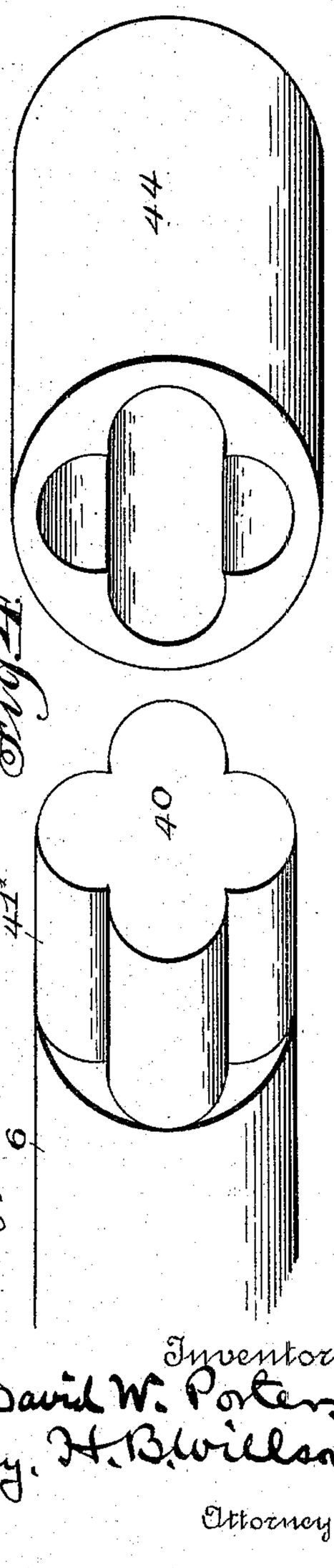

Fig. 2

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UNITED STATES PATENT OFFICE.

DAVID W. PORTER, OF ALLEGHENY, PENNSYLVANIA.

MECHANISM FOR MANUFACTURING CAR-AXLES.

SPECIFICATION forming part of Letters Patent No. 570,499, dated November 3, 1896.

Application filed August 5, 1896. Serial No. 601,739. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. PORTER, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mechanism for Manufacturing Car-Axles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to mechanism for manufacturing car-axles, and the object is to simplify the manufacture of the same and produce the finished axles of a uniform standard size; and to this end the novelty consists in the process of manufacturing railway-car axles and also in the means employed, as will hereinafter be more fully described, and particularly pointed out in the claims.

In the accompanying drawings the same figures of reference indicate the same parts of the invention.

Figure 1 is a front elevation of a roller-mill embodying my invention. Fig. 2 is a left-hand end elevation of the same. Fig. 3 is a similar view of the right-hand end of the mill, showing the system of gearing employed to operate the rolls. Fig. 4 is a perspective view of the end of one of the roller-journals and the coupling-sleeve. Fig. 5 is a top plan view of the mill, and Fig. 6 is a central cross-section of Fig. 1 on the line *x x*.

1 represents the bed-plate, and 2, 3, 4, and 5 are the standards which form the frame of the machine.

6 and 7 are two rollers located in the same horizontal plane, and their journals 8 and 9 rotate in boxes 10 12 in the standards 2 and 3.

13 is a similar roller mounted in boxes 14 15, which are vertically adjustable in the standards 2 and 3 centrally above the dividing-line between the rollers 6 and 7, and these boxes 14 15 are each provided on their tops with an annular dovetail collar 16, centrally secured thereto by set-screws 17, and in the circular dovetail orifice 18 is located the reversely-shaped circular dovetail end 19 of a vertical adjusting-screw 20 20′, working in the yoke 21 of the standards, and the upper end of this screw is formed with an integral collar 22, which forms a bearing for one end of a longitudinal bracket 23, upon which rests the bevel gear-wheel 24. This wheel is rigidly secured to the upper end of the screw 20 20′, so as to rotate, and at the same time as the screws are raised or lowered the gear-wheel travels up or down with them.

25 25′ is a bevel-pinion meshing with the gear-wheels 24 24′, and one of these pinions is secured to the outer ends of a pulley-shaft 26, journaled in bearings 27, secured to the bracket 23, and it is provided with a driving-pulley 28, by means of which its shaft-pinions and gear-wheels 24 24′ are operated to rotate the screws 20 20′ to raise and lower the bearing-boxes 14 15 and consequently adjust the roller 13 vertically with reference to the bottom rollers 6 and 7.

Immediately below the pulley 28, in a sliding shoe 28′ on the bracket 23, is mounted a friction-roller 23′, the upper face of which is in frictional contact with the lower part of the pulley 28 and the lower face in frictional contact with the upper central portion of the periphery of the roller 13, so that when said roller rotates in one direction it drives the friction-roller 23′, which in turn rotates the pulley 28 and automatically feeds the roller 13 up or down, according to the direction in which it is operated, and when said roller is at its highest point all that is necessary to do is to insert the blank and start the roller revolving in the proper direction. The machine then automatically rotates the blank and compresses it to form the finished axle.

The screw 20 is provided with a right-hand thread and the screw 20′ with a left-hand thread, so that although the screws are turned in opposite directions they will nevertheless simultaneously raise or lower the roller 13 when operated by the driving-pulley 28. When necessary, the shoe 28′ may be slid back out of the way and the pulley 28 operated by hand or power to raise or lower the roller 6.

The size and shape of the three rolls are identically the same, and their peripheries are shaped reversely to that of a car-axle, so that a rod of properly-heated iron or steel introduced longitudinally between the three rolls, as shown in Fig. 3, will be rotated and compressed axially until it assumes the form of a finished axle, as shown at X in Fig. 1.

29 29′ are gage-screws working in a threaded orifice in the integral cross-braces 30 30′ of

the standards 2 and 3, and they are provided with worm-gears 31 31′, the teeth of which mesh with the worm-screws 32 32′, secured to the shaft 33, operated by a hand-wheel 34, which simultaneously rotates the screws 29 29′ so as to elevate the point 35 thereof, which forms a stop for the bottom end of the roller journal-boxes 14 15, thereby limiting the downward play or adjustment of the roller 13 with reference to the bottom rollers 6 and 7, and consequently determining the exact size of the axle formed between them, so that these gage-screws are adjusted so that the boxes of the roller 13 will rest upon them. Then after the finished axle is removed and a heated bar placed in the mill and the roller 13 gradually fed down by the operation of the pulley 28 until the boxes again rest upon the upper ends of the gage-screws the second axle, when finished, will be of the exact size as the first one, and so on *ad infinitum*.

36 is an annular recess in the gage-screw 29, and it engages the inner end of a lever 37, fulcrumed on an arm 38, secured to the standard 2. The outer end of said lever terminates in a pointer 37′, which travels a stationary index-scale 39 on the side of the standard, so as to indicate definitely the exact position at which the gage-screws stand and to facilitate their adjustment after they have been temporarily changed to another point.

The right-hand ends of the rollers 6 and 7 beyond their journals are formed with integral ribbed ends 40, as shown in Fig. 4, and counter-shafts 41 and 42 have their alined inner ends 41′, 42′, and 43′ ribbed to correspond, and an internally-ribbed sliding coupling-sleeve 44 is located on these ends, and they may be moved or slid longitudinally to the left to couple the rollers 6 and 7 and their alined counter-shafts, one these coupling-sleeves 44 being so shown to couple the roller 7 and the counter-shaft 42 in the lower right-hand end of Fig. 1. The right-hand end of the roller 13 is similarly ribbed and so is the contiguous end of the counter-shaft 43, and the sleeves 40′ and 44′, sliding on these ends, are each provided with integral ears 40^2 and 44^2, between which is located a spider 44^3, the radial arms 44^4 of which slide through the ears, as shown, and produce a universal joint, so that the shaft 43′ will rotate the roller 6 through the medium of said joint as it is being raised or lowered. These counter-shafts 41, 42, and 43 are journaled in the standards 4 and 5, secured to the bed-plate 1, and each is provided with a suitable gear-wheel 41^2, 42^2, and 43^2, 42^2 and 43^2 of which mesh with a similar gear 45 on the main driving-shaft 46, and an idler 47 connects gear 43^2 with the gear 41^2, so that all three of the forming-rollers 6, 7, and 13 rotate in the same direction.

In operation the roller 13 is raised, as above described, and a heated blank is dropped in on the lower rollers 6 and 7 and the roller 13 gradually, continuously, and automatically forced down by the pulley 28, the rollers meantime rolling and compressing the blank until the bearing-blocks 14 15 rest upon the ends of the gage-screws 29 29′, at which point the axle is finished and ready for the wheels, and this rolling finish given to the axle is far superior to the ordinary way of finishing them by hand with a hammer, as the rolling operation removes all scale formed by the fire and compresses and condenses the outer skin to a density not attainable by hand. Moreover, it leaves the journals perfectly smooth and true, requiring no lathework, as is required in the case of those finished by hand, and, again, the time consumed is but a fraction of that required the other way.

Although I have specifically described the construction and relative arrangement of the several elements of my invention, I do not desire to be confined to the same, as such changes or modifications may be made as clearly fall within the scope of my invention without departing from the spirit thereof.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

1. In a car-axle rolling-mill, the standards 2 and 3, the stationary rollers 6 and 7 and the vertically-adjustable roller 13 journaled therein, in combination with the adjusting-screws 20—20′ mounted in said standards and provided with gear-wheels 24—24′, the pinions 25—25′ mounted on the shaft 26 and connecting said gear-wheels, the pulley 28 and the friction-pulley 23′ intermediate the roller 13 and the pulley 28, and the gage-screws 29—29′ mounted in the standards below the roller 13, substantially as and for the purpose set forth.

2. A car-axle rolling-mill, comprising a frame provided with standards in which are journaled the stationary rollers 6 and 7 and the adjustable roller 13, in combination with the gage-screws 29—29′ adapted to limit the adjustment of said roller, and mechanism for adjusting said gage-screws, substantially as and for the purpose set forth.

3. A car-axle rolling-mill, comprising a frame provided with standards 2 and 3 in which are journaled the stationary rollers 6 and 7, the adjustable roller 13, the adjusting-screws 20—20′, gear-wheels 24—24′, pinions 25—25′, pulley 28 and friction-pulley 23′ in combination with the gage-screws 29, 29′ provided with the worm-gears 31, 31′ and the worm-screws 32, 32′ mounted on the shaft 33 connecting said gears 31, 31′ so as to simultaneously operate them, substantially as and for the purpose set forth.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

DAVID W. PORTER.

Witnesses:
G. H. MILLER,
ED. GEFFMER.