

No. 702,840.

Patented June 17, 1902.

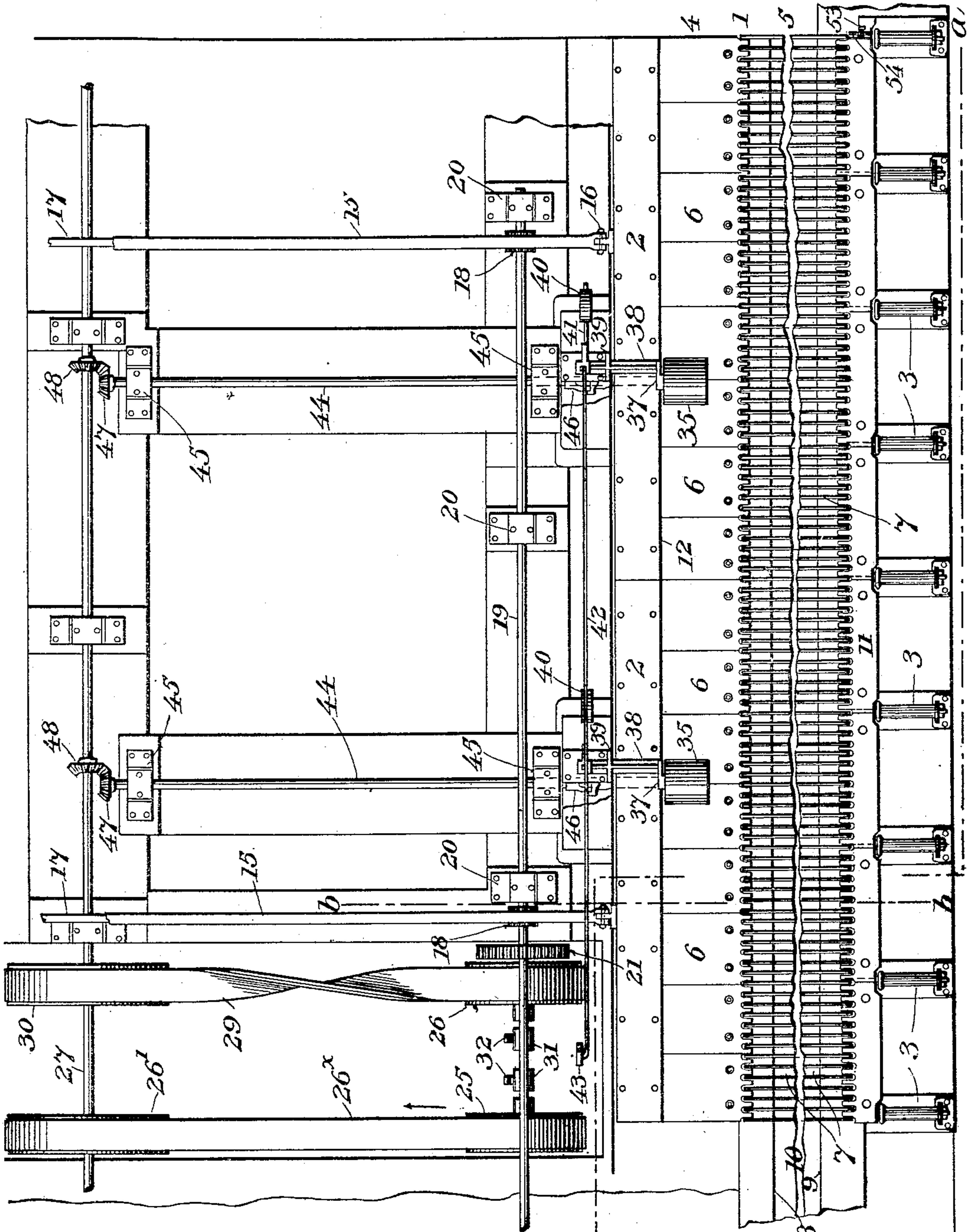
C. E. WHITE.

MECHANISM FOR STRAIGHTENING RAILS, BARS, &c.

(Application filed Feb. 15, 1902.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES

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Fig. 1.

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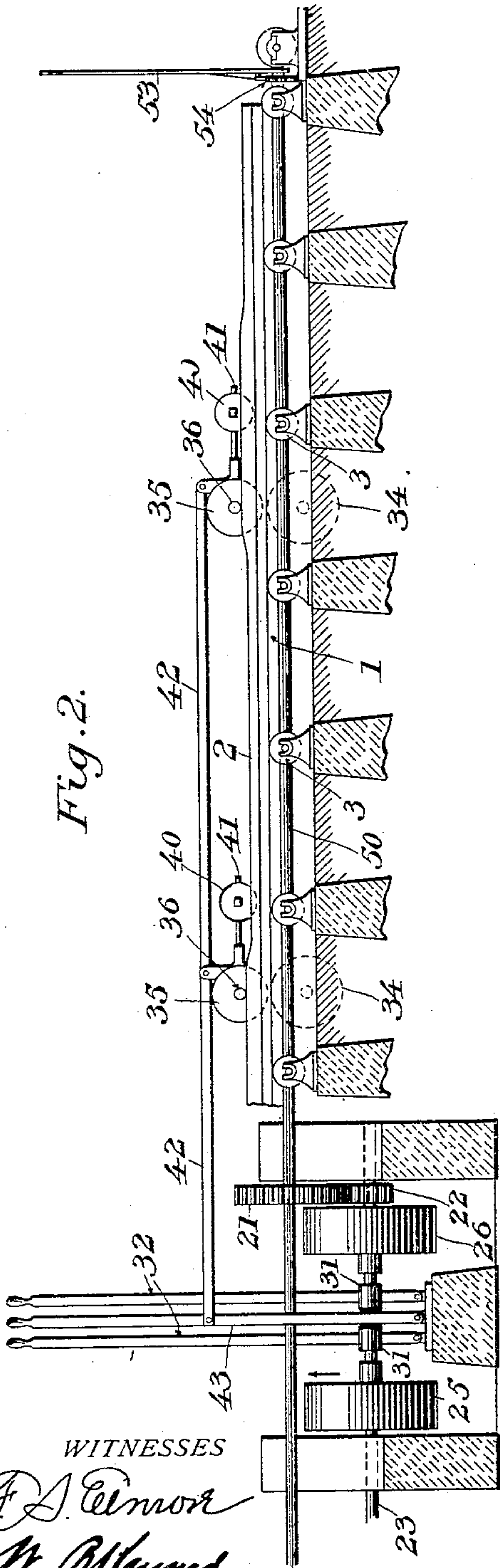
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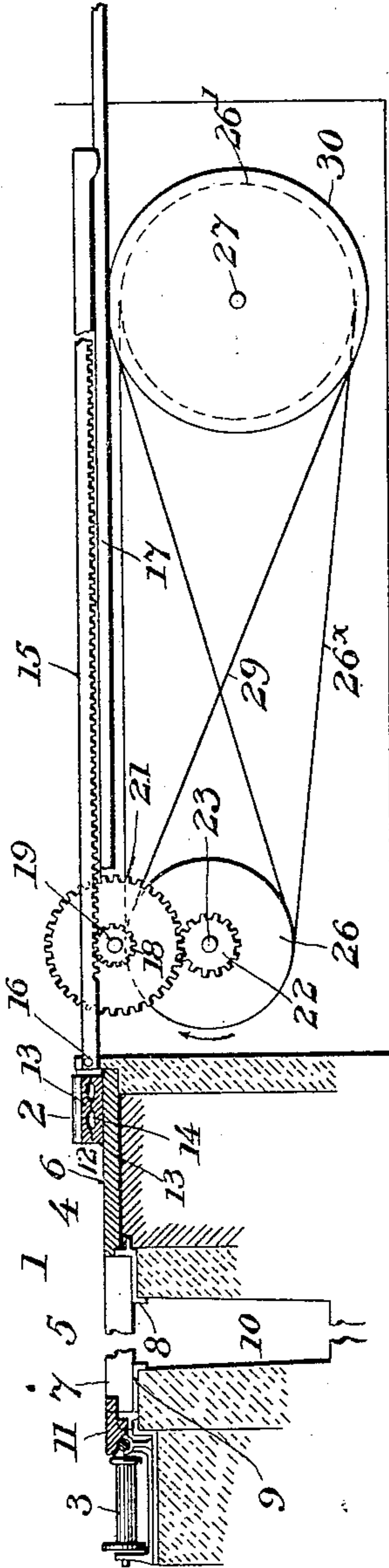
Fig. 2.



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Fig. 3.



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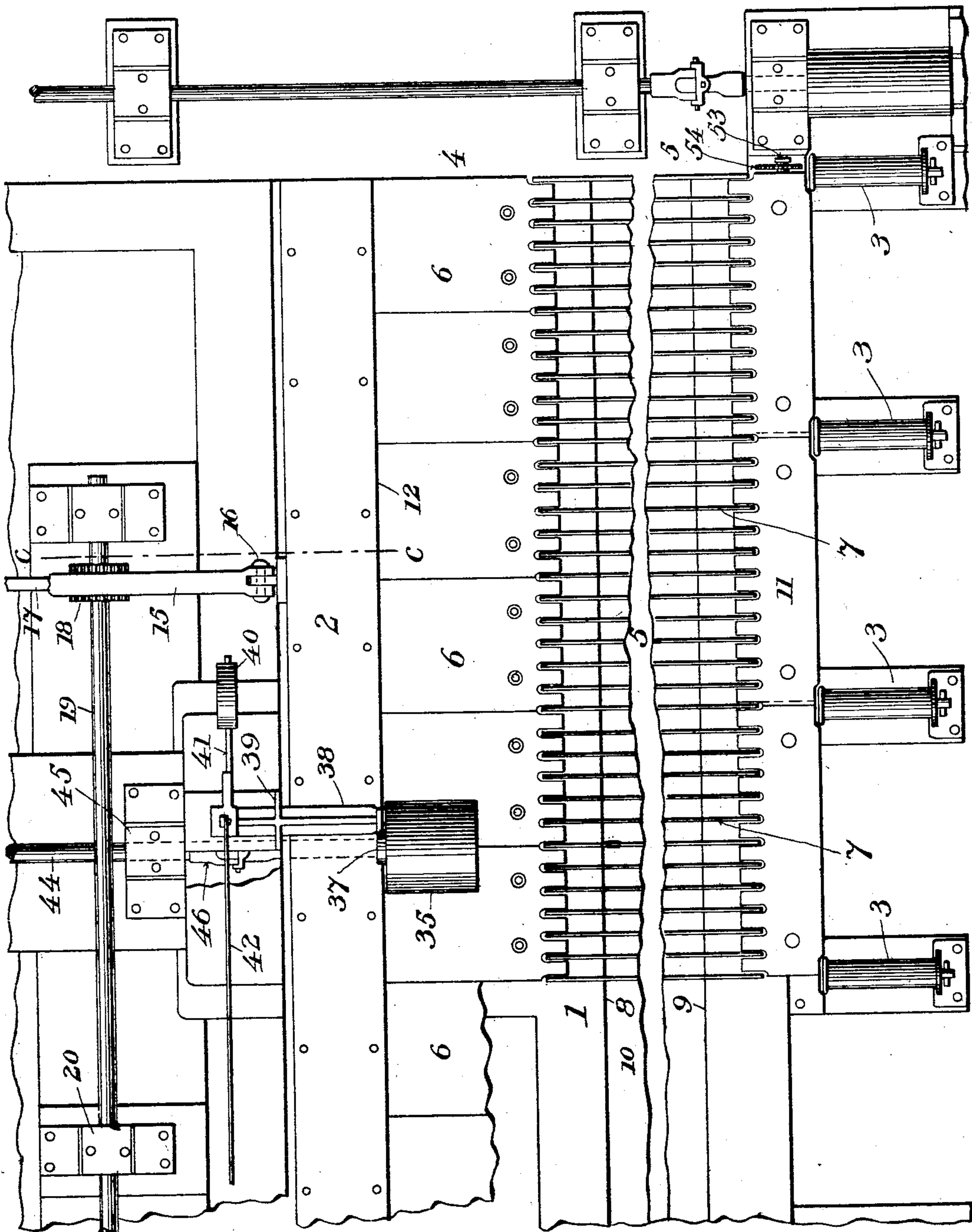
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Fig. 4.

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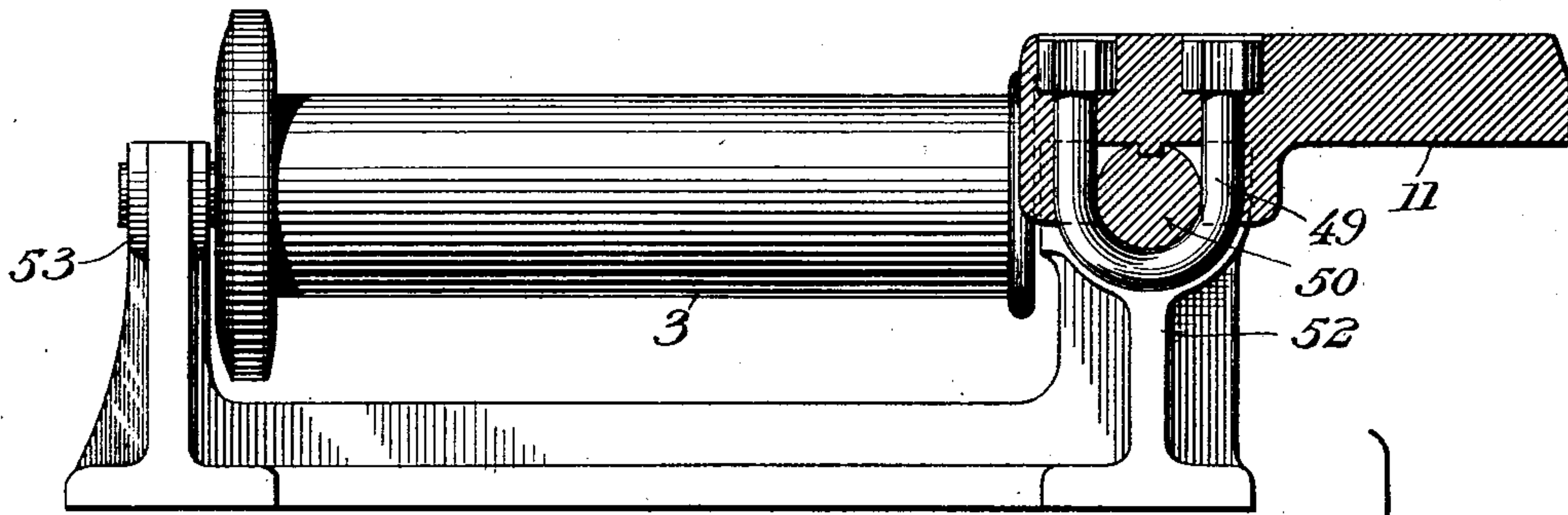
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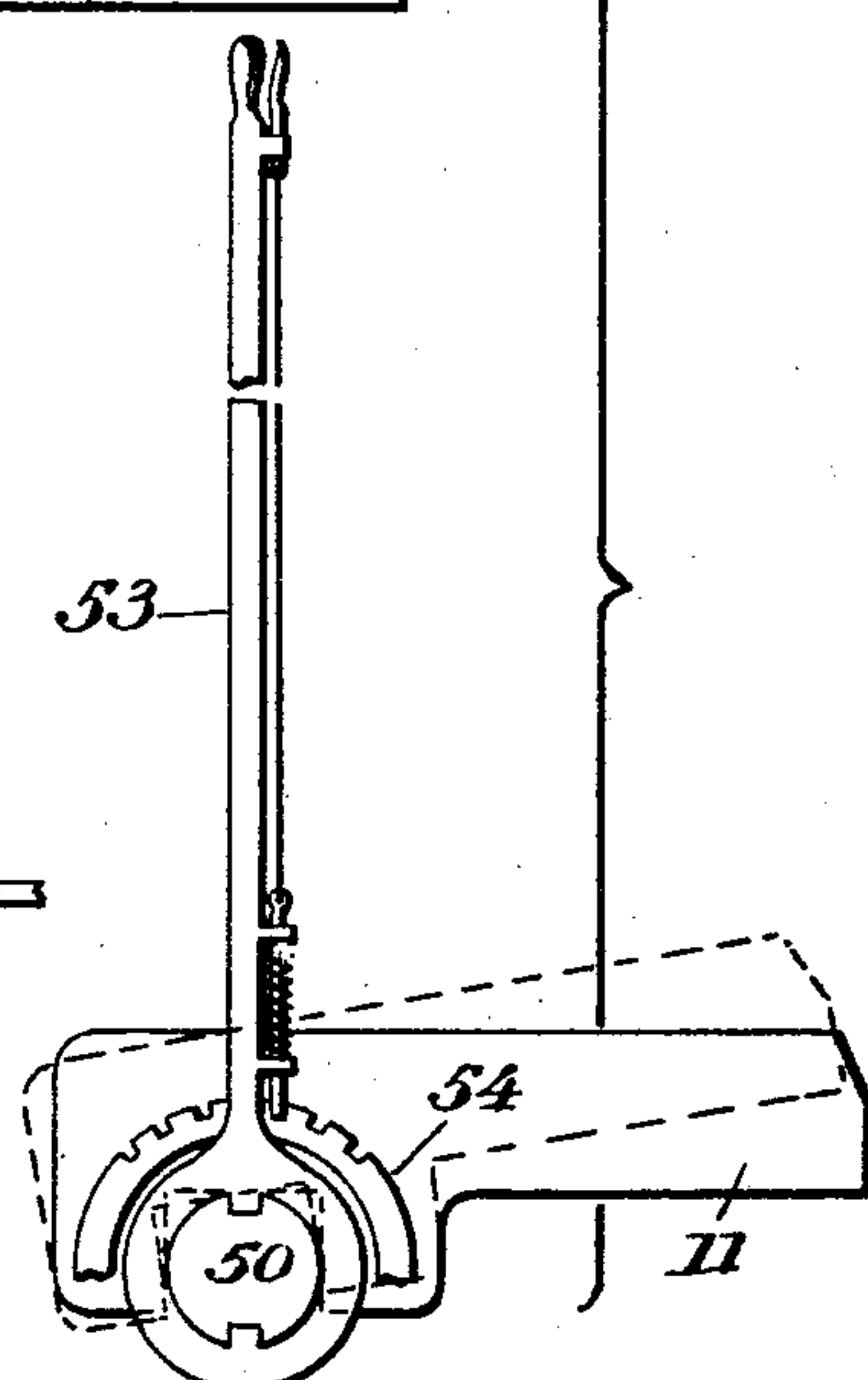
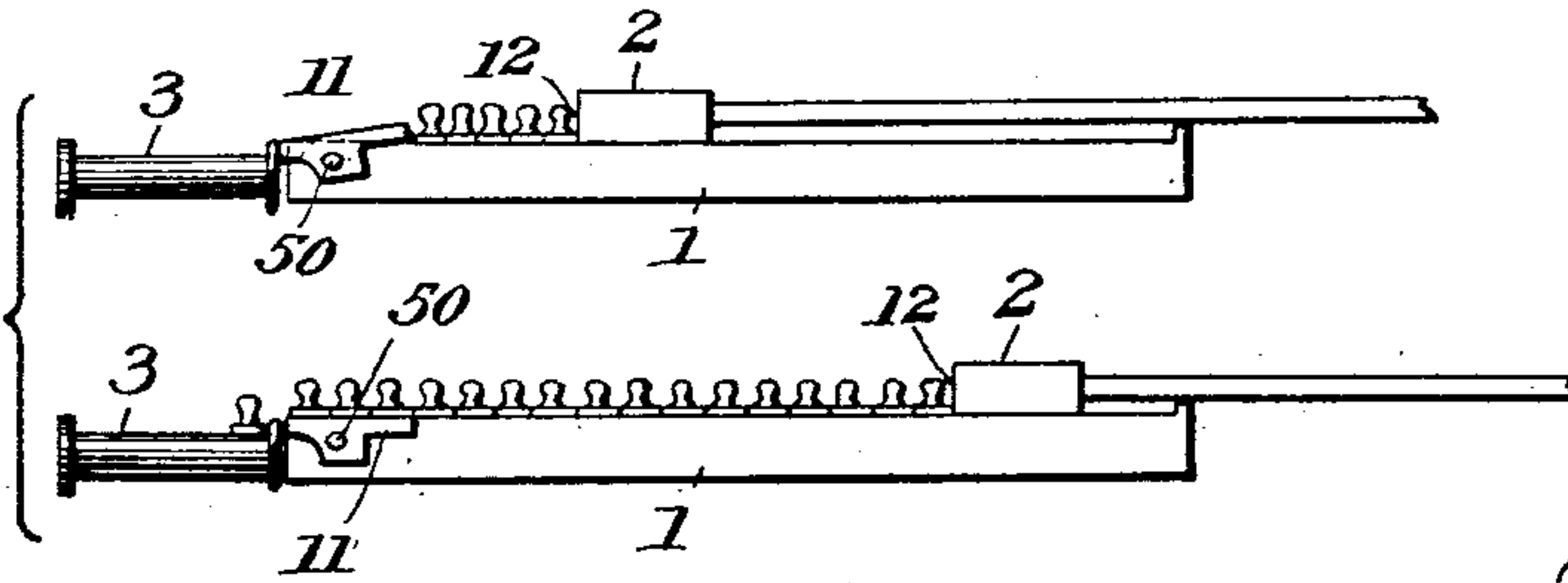
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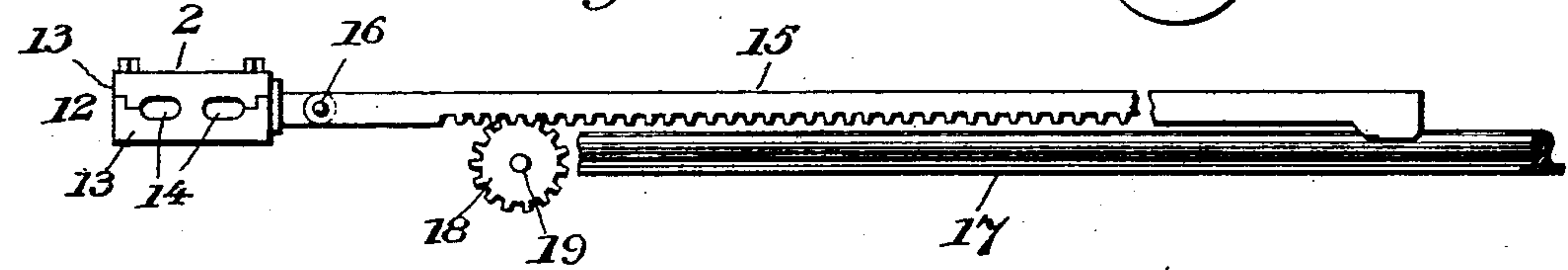
*Fig. 5.*



*Fig. 7.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

CHARLES E. WHITE, OF MOLINE, ILLINOIS.

## MECHANISM FOR STRAIGHTENING RAILS, BARS, &c.

SPECIFICATION forming part of Letters Patent No. 702,840, dated June 17, 1902.

Application filed February 15, 1902. Serial No. 94,286. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. WHITE, of Moline, county of Rock Island, and State of Illinois, have invented a new and useful Improvement in Mechanism for Straightening Rails, Bars, &c., of which the following is a specification.

This invention has reference to mechanism for handling bars or rails as they are received from the finishing-rolls and before they are delivered to the shearer, the object being to straighten and free them of kinks or other irregularities.

The mechanism constituting my invention is designed to act on the bars to be straightened while they are on the cooling-bed, and it operates to advance them over the bed as they are received from the finishing-rolls and to straighten them and finally deliver the straightened bars to be subsequently divided into lengths.

The invention comprehends, mainly, a straightening device movable across the cooling-bed and adapted to successively engage the bars as they come from the finishing-rolls and advance them side by side in a body across the bed, the pressure of the device on the bars due to the resistance offered by the mass of them serving to effectually straighten them and remove the kinks.

The invention comprehends, also, in combining with this device a movable bar arranged to be temporarily adjusted in front of the bars, so that during the accumulation of the bars on the bed the first delivered may receive the proper degree of pressure.

The invention consists also in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a top plan view of my improved apparatus. Fig. 2 is a vertical longitudinal sectional elevation on the line *a a* of the preceding figure. Fig. 3 is a transverse vertical sectional elevation on the line *b b*. Fig. 4 is a plan view, on an enlarged scale, of a portion of the apparatus. Fig. 5 is an enlarged view, partly in section, of a detail. Fig. 6 is an enlarged vertical section through the straightening-bar on the line *c c* of Fig. 4. Fig. 7 is a vertical transverse sectional elevation, on an enlarged scale, on the line *d d* of Fig. 4, show-

ing the rack mechanism for operating the straightening-bar.

Referring to the drawings, 1 represents a cooling-bed on which the bars to be cooled and straightened are received from the finishing-rolls (not shown) and over which they are pushed by a pushing or straightening device 2, by which they are delivered, one at a time, over the edge of the bed onto a series of transverse rolls 3, whence they are conveyed to the shearer to be severed into the proper lengths. The cooling-bed may be of any appropriate construction; but I prefer, as shown, to construct the same of a solid portion 4 to receive the bars from the finishing-rolls and an adjoining slatted portion 5 to support the bars as they are advanced by the straightening device to permit of the air having a free circulation around them. The solid portion of the bed is composed of a series of plates 6, set horizontally and firmly in place side by side, with their outer edges notched at intervals, in which notches are extended the ends of a series of flat bars 7, set vertically on edge a slight distance apart and parallel to each other and resting at opposite ends on castings or supports 8 and 9 at the opposite edges of a pit 10, the construction being such that the bars bridge the pit, as shown in Fig. 3. The outer ends of these parallel bars terminate at the edge of a longitudinal vertically-rocking plate 11, which is adapted to be adjusted above the surface of the bars to form a stop or abutment or set flush with the surface of the bars to form a continuation of the same for a purpose presently to be described.

The straightening device 2 consists of a longitudinal bar which for convenience of description I term the "straightening-bar," rectangular in cross-section, with a front "straight edge" 12, adapted to engage with the successive bars as they are delivered onto the cooling-bed. As shown in Fig. 6, this bar consists of two cast-iron sections 13, provided in their adjacent faces with cavities 14, which when the sections are firmly secured face to face form a longitudinal chamber through which a cooling medium, such as air or water, may be circulated to counteract the injurious effects of intense heat. The straightening-bar rests normally at the inner edge of



the cooling-bed in such position that the bars from the finishing-rolls will be delivered in front of it onto the solid portion of the bed, and at the proper times the straightening-bar 5 is advanced across the bed, pushing the bars to be straightened before it and subjecting the same to pressure in the manner more fully described hereinafter. The movement of the straightening-bar across the bed is effected by a series of rack-bars 15, jointed at 10 their front ends on horizontal axes 16 to the rear edge of the straightening-bar and extending rearwardly transversely, with their opposite ends forked and embracing transverse supporting guides or rails 17. These 15 rack-bars have their rack-teeth on the under side and are engaged by pinions 18 on a transverse horizontal shaft 19, mounted in bearings 20, as shown in Figs. 1 and 7. This 20 shaft is adapted to be rotated in opposite directions to advance the straightening-bar and retract the same, as desired, and it has fixed to it a gear-wheel 21, Fig. 2, engaged by a pinion 22 on a horizontal shaft 23, arranged 25 below shaft 19 and mounted in bearings 24. On the shaft 23 are two loose pulleys 25 and 26. The pulley 25 is driven in one direction, as indicated by the arrow in Fig. 1, by a belt 26' from a pulley 26' on a main driving-shaft 30 27, extending transversely in rear of the shaft 19. The pulley 26 is driven in the opposite direction by a cross-belt 29 from a second pulley 30 on the main driving-shaft. Clutch-blocks 31 are splined to shaft 23 and are 35 adapted by the operation of the vertical levers 32 to be engaged with either of the two loose pulleys 25 and 26 or adjusted to a medial position out of engagement with both. The engagement of the blocks with pulley 25 40 will rotate the pinions 18 in one direction and advance the straightening-bar, while the engagement of the clutch-blocks with the other pulley will reverse the motion of the pinion and retract the straightening-bar, while the 45 adjustment of the clutch-blocks centrally, free of both pulleys, will bring the straightening-bar to a rest. By this means the operator has full control over the straightening-bar, being enabled to move the same in either 50 direction, as desired, or render the same inoperative.

In order that the bars to be straightened may be delivered with certainty onto the cooling-bed and at the proper point in front of 55 the straightening-bar, I provide the bed with one or more sets of feeding-rolls in position to act on the bars as they leave the finishing-rolls and adapted to pull them downward onto the bed. Where the bars to be straightened 60 are long and of uniform length, but one set of these feeding-rolls will be necessary; but where there are short lengths a second or a third set may be essential in order to successively handle the short bars and advance 65 them longitudinally to the proper position. As shown in Figs. 2 and 4, these feeding-rolls consist of an under constantly-rotating roller

34, mounted on a transverse horizontal axis beneath the solid portion of the cooling-bed, with its periphery exposed through an opening 70 therein, and an upper idler-roller 35, arranged with its axis parallel to that of the lower roller. The upper idler is mounted on a spindle 36 on the end of an arm 37, extending laterally over a rock-shaft 38, mounted in 75 an overhanging bearing 39, extending upward from the rear edge of the cooling-bed in rear of the straightening-bar. A counterweight 40 is fixed to an arm 41 on the rear end of the rock-shaft 38 and serves to hold 80 the idler-pulley in an elevated position free of its companion roll. Pivoted to the arm 41 is a rod 42, which extends longitudinally and terminates adjacent to the clutch mechanism, at which point the rod is jointed to a vertical 85 operating-lever 43, by which the idler-pulley may be moved to and from the companion roller to act frictionally on the bar between them.

By means of the apparatus described the 90 bars to be straightened as they leave the finishing-rolls enter between the feed-rolls, and the operator shifting lever 43 lowers the idler-pulley onto the bar and presses the same against the constantly-rotating roller, which 95 latter will advance the bar, and when it arrives at the proper point the lever 43 is again shifted, the idler raised, and the motion of the bar arrested. Where there are a number of these feeding-rolls, a short bar may be ad- 100 vanced from one end of the bed to the other, being grasped by one set of rolls as it leaves the other and in this way moved to the proper point.

The constantly-rotating roller 34 is driven 105 by horizontal transverse shaft 44, mounted in bearings 45, with its forward end coupled to the roll by universal joint 46 and its opposite end provided with a beveled gear 47, driven by a beveled pinion 48 on the main driving- 110 shaft 27, before alluded to.

The rocking plate 11, before alluded to, at the outer edge of the cooling-bed, comprises a series of flat plates or sections placed end 115 to end and firmly secured by means of staple bolts 49, Fig. 5, to a transverse rock-shaft 50, mounted in bearings 51 in castings 52. These castings are extended outwardly and are formed with bearings 53, in which the series of transverse rolls 3 are mounted in position 120 to receive the bars as they are delivered over the edge of the bed. The plate 11 is adapted to be rocked up and down on the shaft 50 as an axis, and it is controlled by hand-lever 53, fixed to its end and provided with a locking- 125 dog adapted to engage a segment-plate 54, whereby the lever may be locked to hold the plate in the position desired. When the plate is adjusted in a horizontal position flush with the upper surface of the bed, as shown in 130 Figs. 3 and 5, it forms a continuation of the slatted portion of the same, the edge of the plate being notched, as shown, to permit it to work past the ends of the parallel bars on



the bed. In this position there will be no obstruction offered to the passage of the bars over the bed and their delivery onto the transverse rolls 3. When, however, the shaft is 5 rocked, the edge of the plate will be elevated above the upper face of the bed, as shown in Fig. 5, dotted lines, and will form a stop or abutment against which the bars may be accumulated as they are pushed across the bed 10 by the straightening-bar.

In the operation of the device motion from any suitable source is imparted to the main driving-shaft which will rotate the lower feed-rolls and the two loose pulleys on the shaft 15 23. The bars from the finishing-rollers as they are delivered onto the cooling-bed endwise pass over the exposed surface of the lower feed-roll, and the operator shifting lever 43 lowers the idler and forces the bar into 20 frictional contact with the lower feed-roll, and the latter by its rotation will positively advance the bar endwise until it arrives at the proper point, when the operator elevates the idler-pulley and brings the bar to a rest in front 25 of the straightening-bar. Hand-lever 53 is now operated and the edge of the rocking bar 11 elevated above the face of the cooling-bed to form a stop, after which the operator shifts clutch-levers 31 to connect pulley 25 with shaft 23 30 and bring into action the mechanism for operating the straightening-bar. This action will cause the straightening-bar to advance, pushing the bar to be straightened before it and against the stop-bar 11, and thereby subjecting the same to pressure and straightening it and removing the kinks. The clutch-levers are now shifted to connect the other 35 oppositely-moving pulley and the straightening-bar is retracted to its former position. On the delivery of the second bar from the finishing-rolls to the bed it is advanced, as its predecessor, to the proper point and is in turn pushed across the bed and forced against the first bar and straightened, and these operations are continued until a sufficient number 45 of bars have been accumulated on the bed, after which lever 53 is operated to lower the rocking bar 11 flush with the bed and the delivery of the bars to rollers 3 begins. This 50 delivery of the bars is effected by the straightening-bar acting successively on the bars from the finishing-rolls, each forward movement of the straightening-bar pushing the last bar delivered against the mass of bars and advancing the former step by step, one 55 bar on the outer edge of the mass dropping over onto the rolls 3 as the mass is thus advanced intermittently. The weight of the body of bars is such as to offer a considerable 60 resistance to their advance over the bed, so that the successive bars as they are pressed against their predecessors are subjected to a sufficient degree of pressure to straighten them out and remove all kinks and irregularities. It is seen, therefore, that after a 65 sufficient number of bars have been accumulated on the bed by the stop-bar in order to

initiate the operation the stop-bar is thrown out of action and the delivery of the bars to the receiving-rolls in a straight condition begins and is continued, one bar being delivered 70 over the edge of the bed as a new one is delivered onto the bed from the finishing-rolls. A single operator handling the clutch and feed roll levers is enabled, therefore, to continuously draw the bars onto the bed, 75 straighten them, advance the same across the bed, and finally deliver them one at a time free from kinks to the shearer.

Having thus described my invention, what I claim is— 80

1. In combination with a cooling-bed, means for pushing the bars to be straightened across the same, and a removable stop device adapted to temporarily arrest the advance 85 of the bars.

2. In combination with a cooling-bed, means for pushing the bars to be straightened across the same, a removable stop device and means for setting the same in front of the 90 bars.

3. In combination with a cooling-bed, means for successively advancing the bars to be straightened across the same, and means at or near the outer end of the bed for arresting temporarily the advance of the first bars 95 delivered; whereby a number of bars may be accumulated and pressed against each other by the advancing means, and the accumulated bars thereafter advanced *en masse* and discharged from the bed. 100

4. In combination with a cooling-bed, means for delivering on the same the bars to be straightened, means for pushing the bars across the bed, a removable stop device adapted to be adjusted in front of the bars, whereby the bars are accumulated against the stop 105 device, and means for removing the stop device to permit the accumulated bars to be advanced across the bed in a body. 110

5. In combination with a cooling-bed, a longitudinal straightening-bar movable thereover, means for controlling the operation of the same, a vertically-movable bar at the outer edge of the bed, and means for setting the said bar above the level of the bed. 115

6. In combination with a cooling-bed, a longitudinal straightening-bar movable from the inner end of the bed across the same, a longitudinal rocking bar at the opposite end of the bed, means for setting said 120 rocking bar flush with the bed to form a continuation of the same, and means for setting the bar above the bed to form a stop.

7. In combination with a cooling-bed, a rotary feed-roller below the same with its surface exposed through the bed, means for engaging the bars to be straightened with the exposed surface of the roller, a pushing or straightening bar in rear of the roller and 125 movable thereover, and means for controlling the operation of said bar. 130

8. In combination with a cooling-bed, a pushing or straightening bar at one edge of



the same and movable thereacross, a series of feeding devices in front of the bar adapted to successively engage the bars to be straightened and to advance the same end-  
5 wise along the bed, and means for operating the pushing-bar to push the bars to be straightened across the bed.

9. In an apparatus of the type described the combination with a cooling-bed of a lon-  
10 gitudinal bar movable thereacross and adapted to act on heated bars delivered to the bed, said longitudinal bar being composed of two sections provided in adjacent faces with lon-

gitudinal continuous channels and secured fixedly together face to face; whereby the bar 15 as a whole will contain continuous longitudinal chambers made up of the channels in the opposing sections.

In testimony whereof I hereunto set my hand, this 7th day of February, 1902, in the 20 presence of two attesting witnesses.

CHARLES E. WHITE.

Witnesses:

E. M. MITCHELL,  
GRACE BROWN.