No. 635,433. Patented Oct. 24, 1899.

E. EINFELDT.

BENDING MACHINE.

(Application filed June 5, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

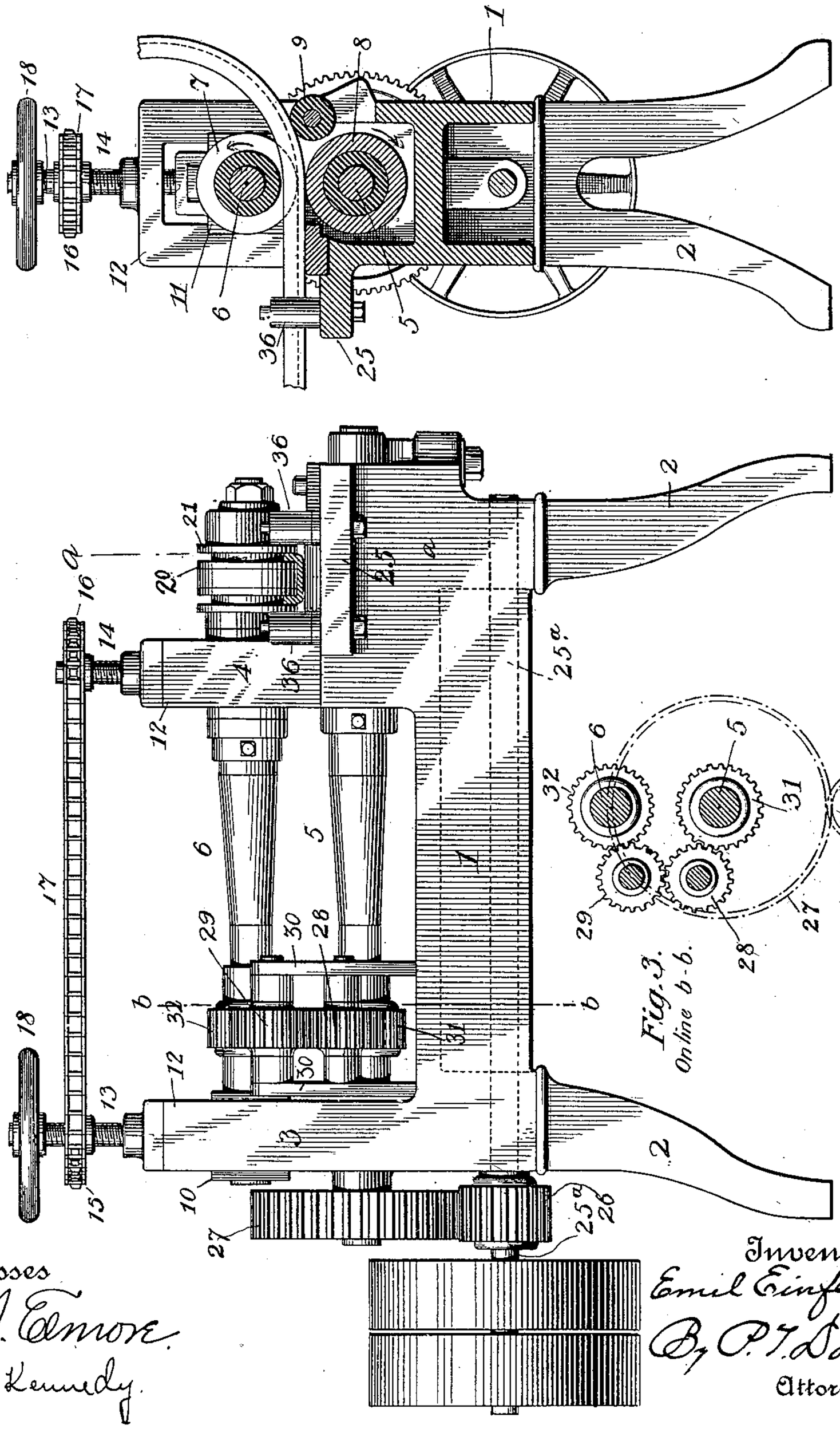

Fig. 2.
On line a-a.

Fig. 3.
On line b-b.

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Fig. 5.

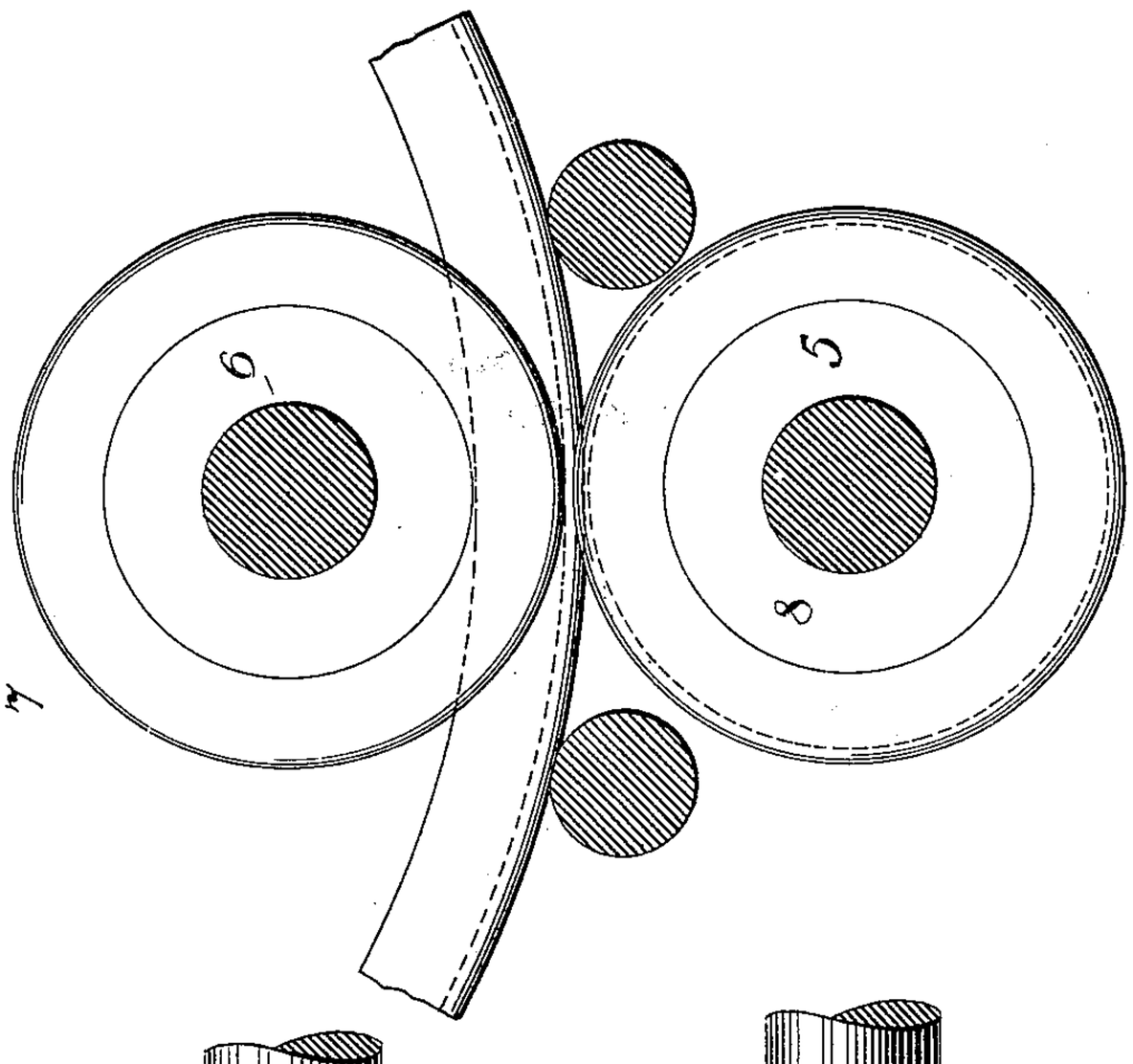

Fig. 4.

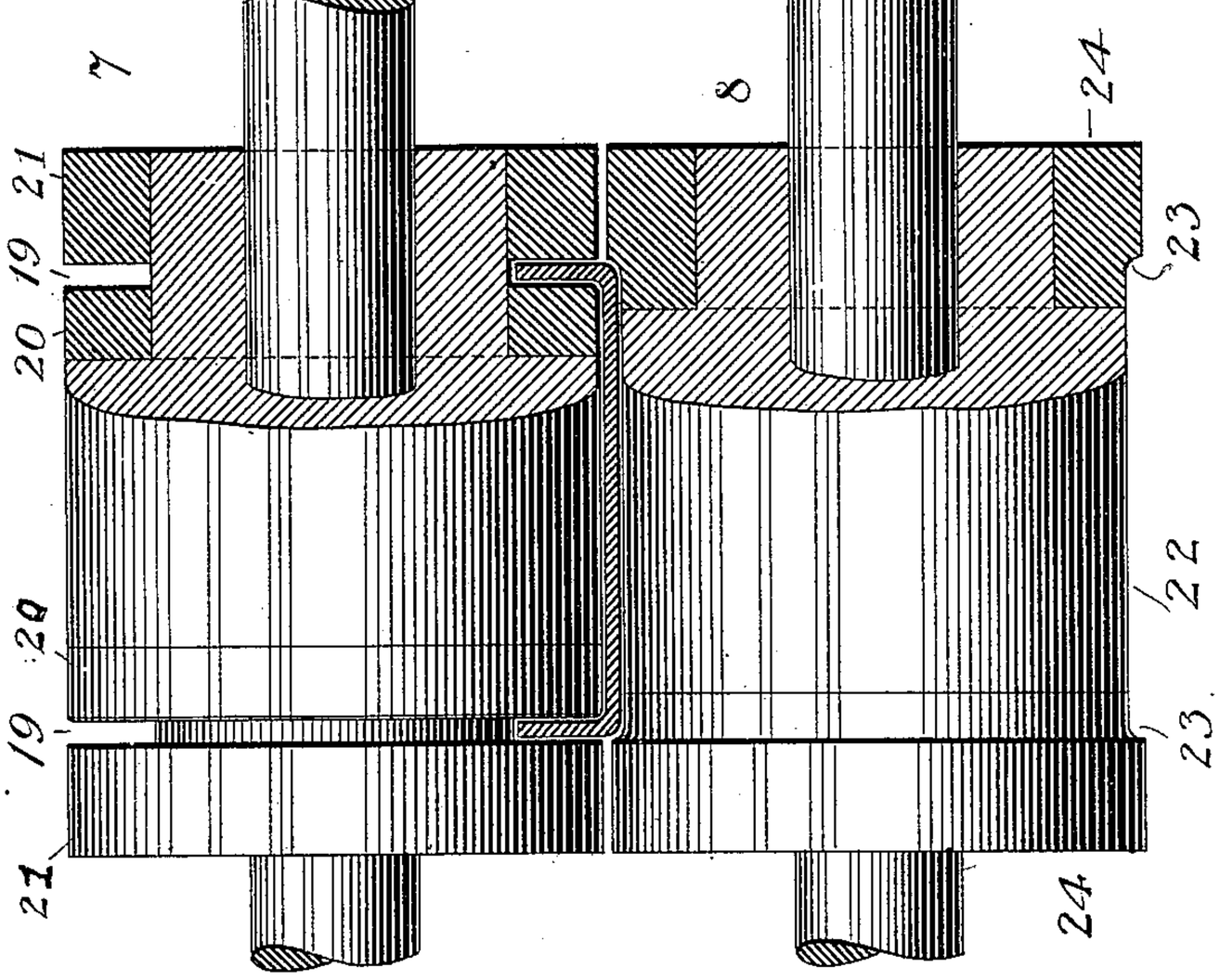

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Fig. 7.

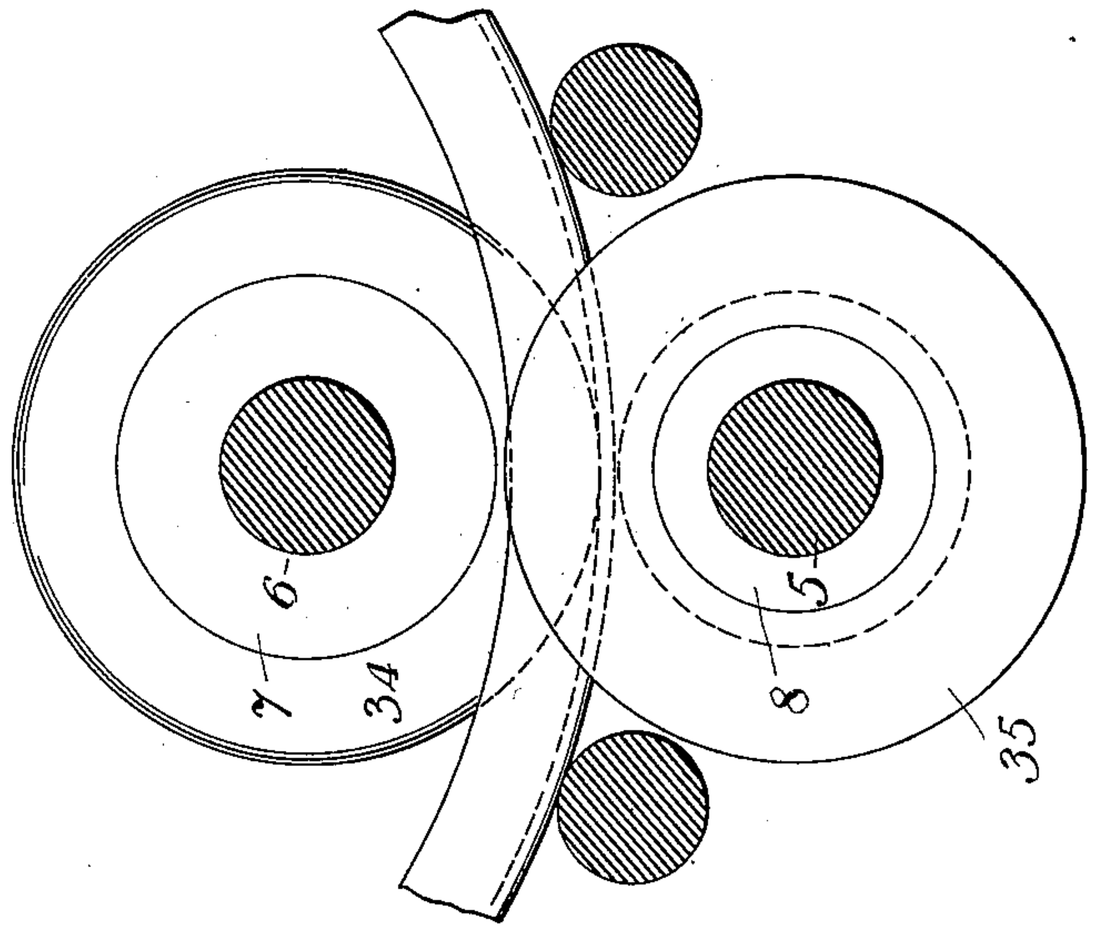
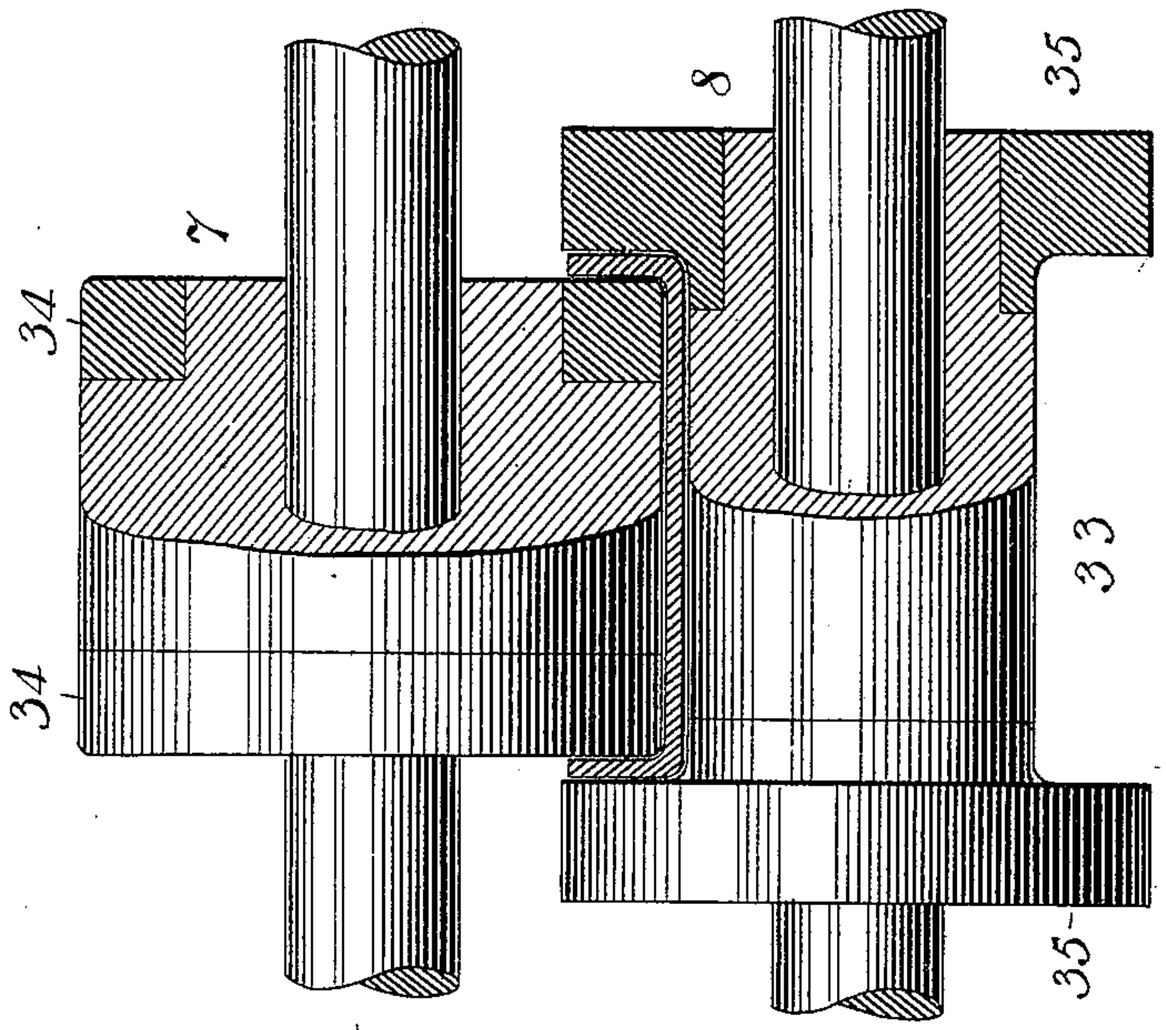


Fig. 6.



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UNITED STATES PATENT OFFICE.

EMIL EINFELDT, OF DAVENPORT, IOWA, ASSIGNOR TO THE BETTENDORF METAL WHEEL COMPANY, OF IOWA.

BENDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 635,433, dated October 24, 1899.

Application filed June 5, 1899. Serial No. 719,382. (No model.)

To all whom it may concern:

Be it known that I, EMIL EINFELDT, of Davenport, county of Scott, and State of Iowa, have invented a new and useful Improvement in Bending-Machines, of which the following is a specification.

This invention relates to a bending-machine designed more particularly for bending previously-flanged strips to form wheel-tires, &c.; and the invention consists of coöperating guide-rolls of improved form and construction to receive between them the flanged strip, in combination with a bending device adapted to be engaged by the strip as it passes between the rolls and serving to deflect the same from its original flat form.

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

In the accompanying drawings, Figure 1 is a front elevation of the machine. Fig. 2 is a transverse sectional elevation on the line *a a* of Fig. 1. Fig. 3 is a similar view on the line *b b* of Fig. 1, showing the manner in which motion is imparted from the lower guide-roll shaft to the upper shaft. Fig. 4 is a vertical longitudinal section, on an enlarged scale, of the guide-rolls in their preferred form. Fig. 5 is and end elevation of the same. Fig. 6 is a vertical longitudinal section through the guide-rolls in modified form. Fig. 7 is an end elevation of the same.

Referring to the drawings, 1 represents a casting or bed-frame sustained by legs 2 and having at opposite ends two standards 3 and 4, in which are mounted, one above the other, two shafts 5 and 6, having fixed to their ends at one side, beyond the standard 4, upper and lower guide-rolls 7 and 8.

9 represents a bending device situated with reference to the guide-rolls to be engaged by the flanged strip as it issues from between the rolls and serving to deflect and bend the same into circular form.

The lower shaft 5 is mounted in fixed bearings, while the upper shaft is mounted in vertically-adjustable bearings carried, respectively by blocks 10 and 11, mounted between vertical guides 12, forming a part of the standards, as shown in Fig. 2. These blocks are adjusted vertically by means of two adjusting-screws 13 and 14, tapped through the upper ends of the standards and swiveled at their lower ends in the blocks. At their upper ends these screws have fixed to them sprocket-wheels 15 and 16, connected by sprocket-chains 17, so that when one of the screws is turned by the hand-wheel 18 to adjust the bearing at one end of the shaft the other screw will be simultaneously and uniformly turned and will cause the bearings to move together. The purpose of the adjustment of these bearings is to vary the distance between the guide-rolls to accommodate strips differing in thickness and to vary the pressure on the strip according to the conditions encountered in practice.

The two guide-rolls are formed to conjointly receive between them the flanged strip, and where the flanges of the strip engage or are received by the rolls the latter are provided with hard-wearing facings preferably in the form of steel rings securely fastened to the rolls.

In the form of rolls represented in Figs. 1, 2, 4, and 5 the upper roll is formed near its opposite ends with open peripheral slots 19, formed each by inner and outer steel rings 20 and 21 encircling the reduced ends of the roll, with a space between them. The inner rings are rounded at their corners adjacent to the outer rings, so as to fit snugly in the inner angles of the flanged strip at the junction of the body and flanges, as clearly shown in Fig. 4. The lower roll has in its outer face between its ends an annular concavity 22, which in conjuction with the upper roll forms a pass for the body of the flanged strip. The ends of this concavity are rounded, as shown at 23, to form a bearing for the outer angle of the flanged strip, and these rounded ends are formed by two steel rings 24 encircling, respectively, the opposite reduced ends of the roll, which rings are curved inward at their inner corners, forming a continuation of the concave surface of the roll.

At the entrance of the guide-rolls, as shown in Figs. 1 and 2, the frame of the machine is provided with a horizontal feed-table 25 on a level with the pass between the rolls, on which table the strip is supported in its passage between the guide-rolls and during the bending

operation. On the other side of the guide-rolls, where the flanged strip issues, is situated the bending device 9 before alluded to, which is in the form, preferably, of a horizontal friction-roller mounted in bearings sustained by the frame. This roller is situated with its surface above the surface of the lower guide-roll, so that the strip after passing between the guide-rolls will engage the bending-roll and be deflected upward, whereby it will be curved uniformly and progressively in circular form.

The guide-rolls are rotated in opposite directions, as indicated in Fig. 2, to feed the strip between them, the lower shaft 5, carrying the lower roll, receiving motion from a main driving-shaft 25^a thereunder by intermeshing gears 26 and 27, fixed, respectively, to said shafts. From the lower shaft motion is imparted to the upper shaft 6, carrying the upper guide-roll, by two intermeshing idler-pinions 28 and 29, mounted one above the other in a frame 30, sustained by the casting 1. The lower idler is engaged by a pinion 31 on the lower shaft 5 and rotates the upper idler 29, which latter engages a pinion 32 on the upper shaft. By means of this train of gearing the vertical adjustment of the upper shaft may be effected without disengaging the same from its driving-pinion.

In the form of rolls in Figs. 6 and 7 the lower roll is formed with a deep peripheral concavity 33, which receives the upper roll, the two thus forming a pass of the form of the flanged strip. The rolls where they receive the flanges are, like in the first case described, provided with hardened facings, the upper roll having its ends reduced and encircled by steel rings 34, with their outer corners rounded to fit within the inner angles of the strip. The ends of the deep concavity in the lower roll are formed by two steel rings 35 encircling the reduced ends of the roll and curved where they join the base of the concavity to fit the outer angles of the strip.

In both cases described it will be seen that the rolls conjointly constitute a pass of the form of the flanged strip, in which pass the body and two flanges of the strip are received. It will be seen also that where the flanges are received the two rolls are formed with hardened facings bearing at opposite sides of the flanges and at the inner and outer angles formed by the junction of the flanges with the body of the strip. These points are where the greatest strain is received when the strip is deflected to form a curve, and being reinforced by the steel facings the flanges and body are maintained at their proper relative angles and effectually prevented from bending outward or buckling.

In order to afford a guiding-passage for the strip in its passage between the guide-rolls, I apply to the feed-table 25 two vertical friction-rollers 36, mounted on vertical journals extending downward through a longitudinal slot in the table and adjustably secured by nuts applied to the lower ends of the journals and bearing against the under side of the table. By means of these connections the rollers may be adjusted longitudinally of the table across the face of the guide-rolls to bear at opposite sides of the flanged strip and insure its being guided properly and accurately between the guide-rolls.

Having thus described my invention, what I claim is—

1. In a machine for bending into circular form strips with right-angular flanges on their edges, the combination of two guide-rolls, one having its two ends reduced and the reduced portions encircled by hardened rings adapted to bear at the inner angles of the strip, and the second roll having its two ends reduced and the reduced ends encircled by hardened rings, each provided at its inner edge with a peripheral concavity to receive the outer angles of the strip.

2. In a bending-machine the combination of two coöperating guide-rolls, one formed with rounded edges to bear at the inner angles of the strip, and the other with a peripheral concavity rounded at its ends to bear at the outer angles of the strip.

3. In a bending-machine the combination with a shaft provided with a guide-roll, of a second shaft also provided with a guide-roll and adjustable to and from the first-named shaft, means for driving the latter, a gear-wheel thereon, a gear-wheel on the movable shaft, and intermeshing idler-pinions one engaged by the gear-wheel on the fixed shaft and the other engaging the gear-wheel on the movable shaft; whereby the movable shaft may be adjusted without disengaging its driving-pinion.

In testimony whereof I hereunto set my hand, this 13th day of May, 1899, in the presence of two attesting witnesses.

EMIL EINFELDT.

Witnesses:
NATH. FRENCH,
MAY L. DODGE.