

No. 684,134.

Patented Oct. 8, 1901.

G. THOMPSON.

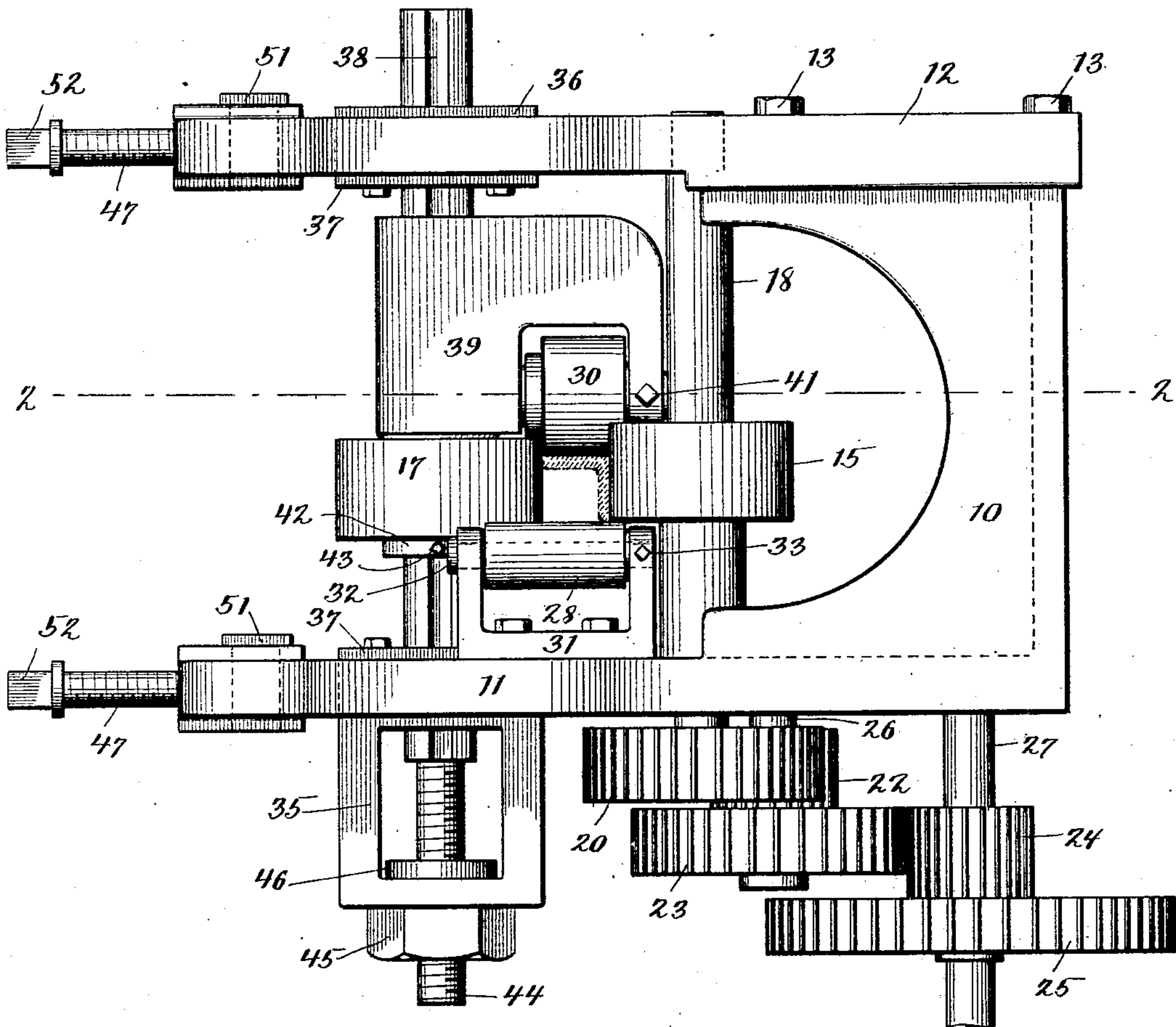
BENDING ROLLS FOR ANGLE BARS OR THE LIKE.

(Application filed June 12, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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3 Sheets—Sheet 2.

Fig. 2.

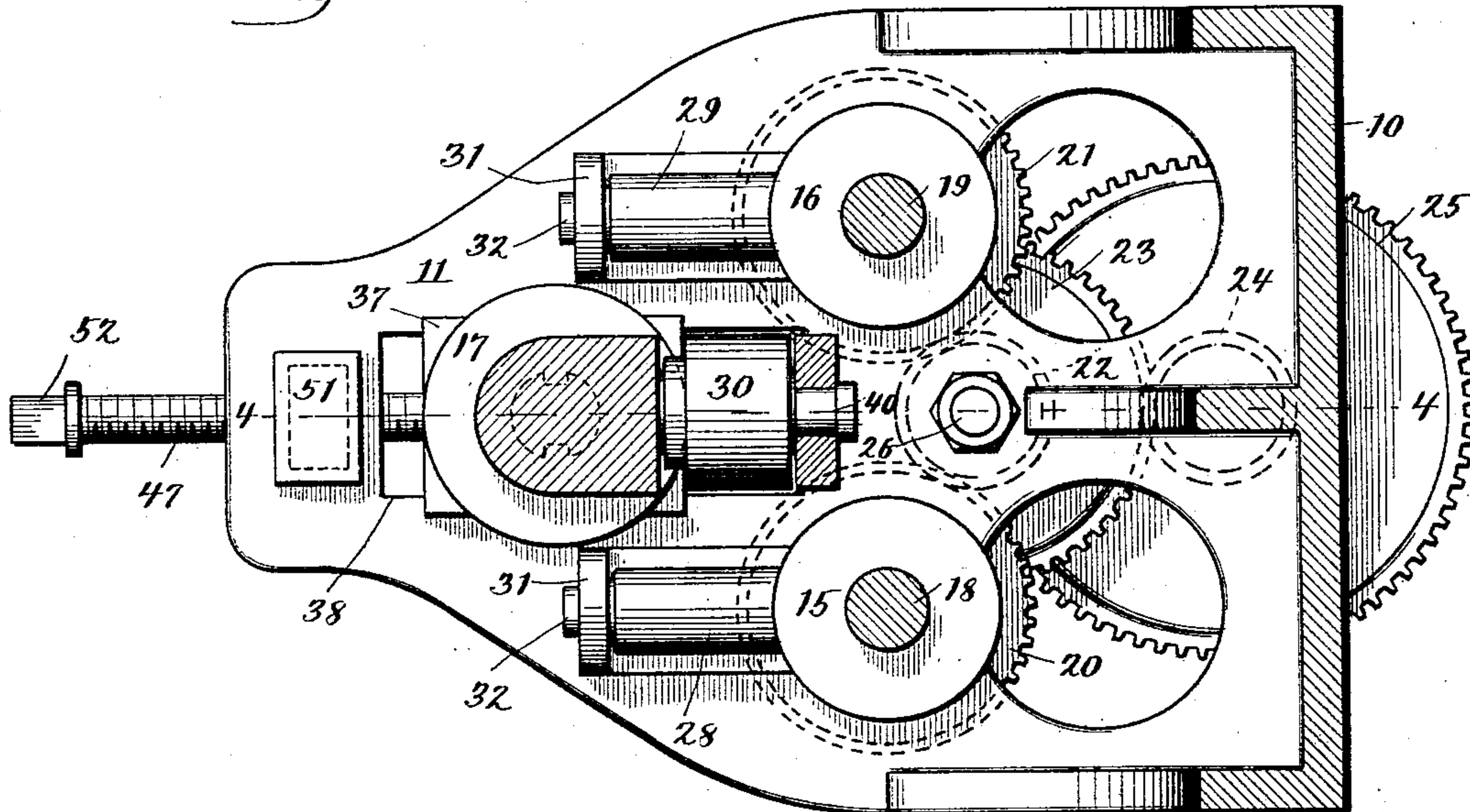
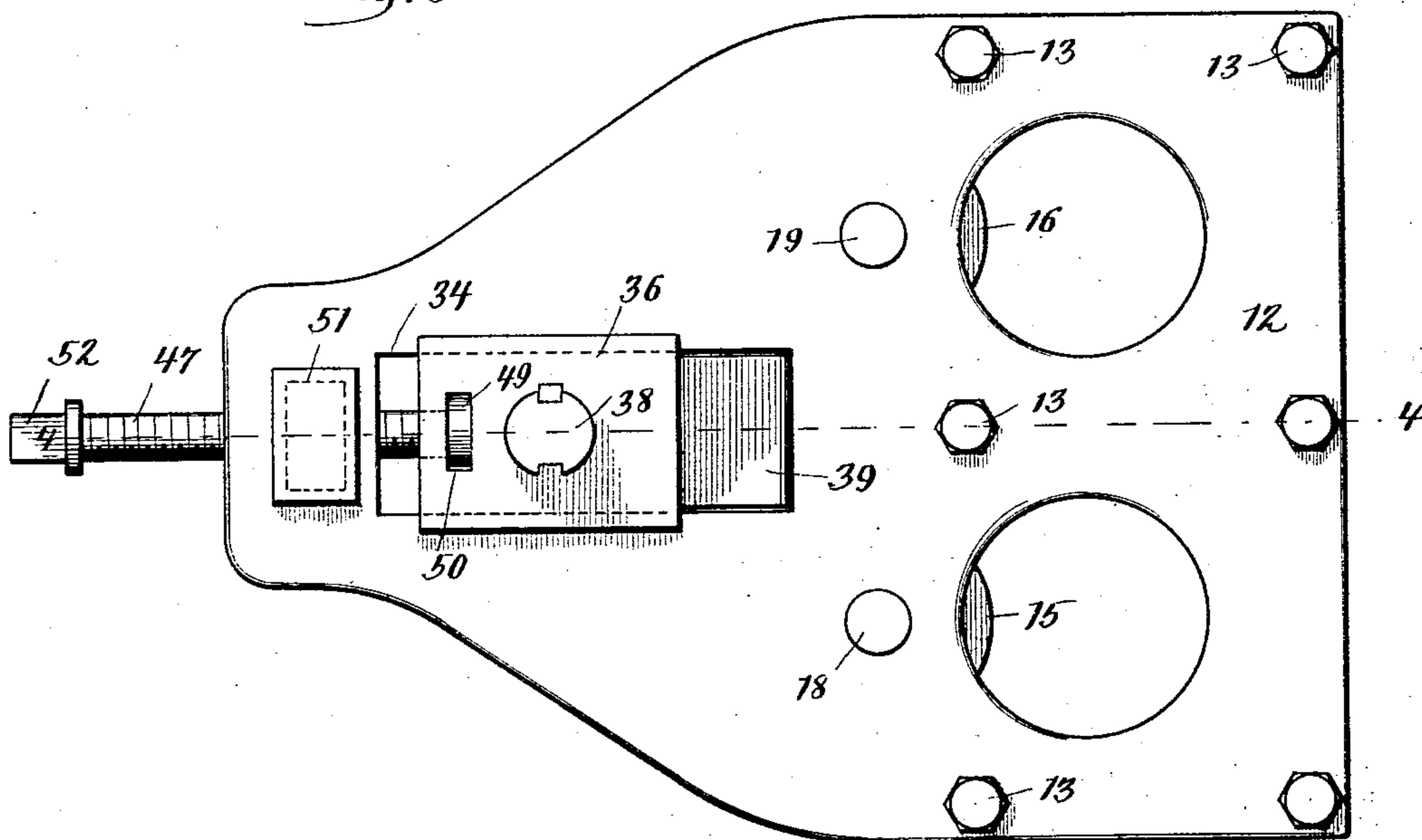


Fig. 3.



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3 Sheets—Sheet 3.

Fig. 4.

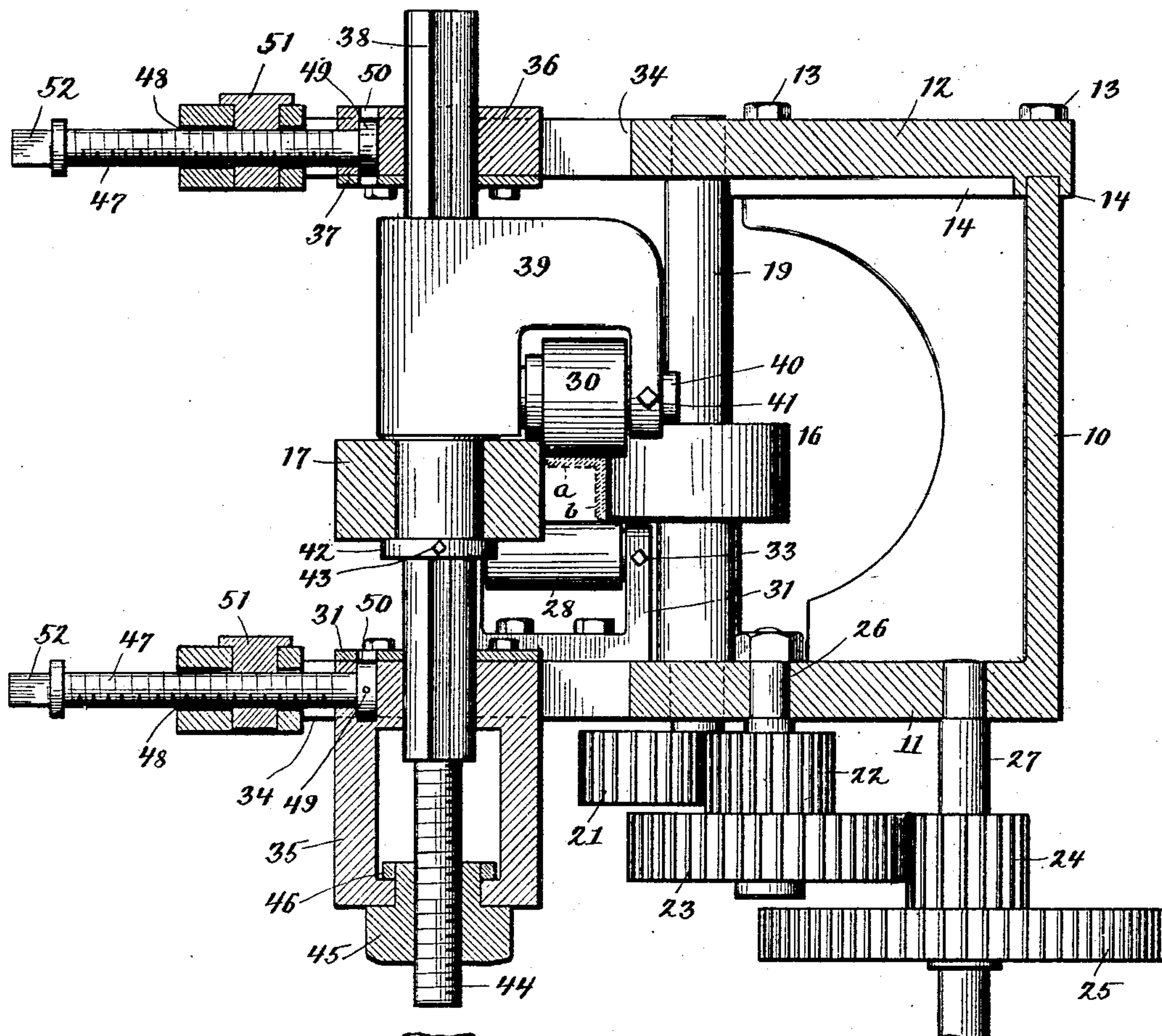
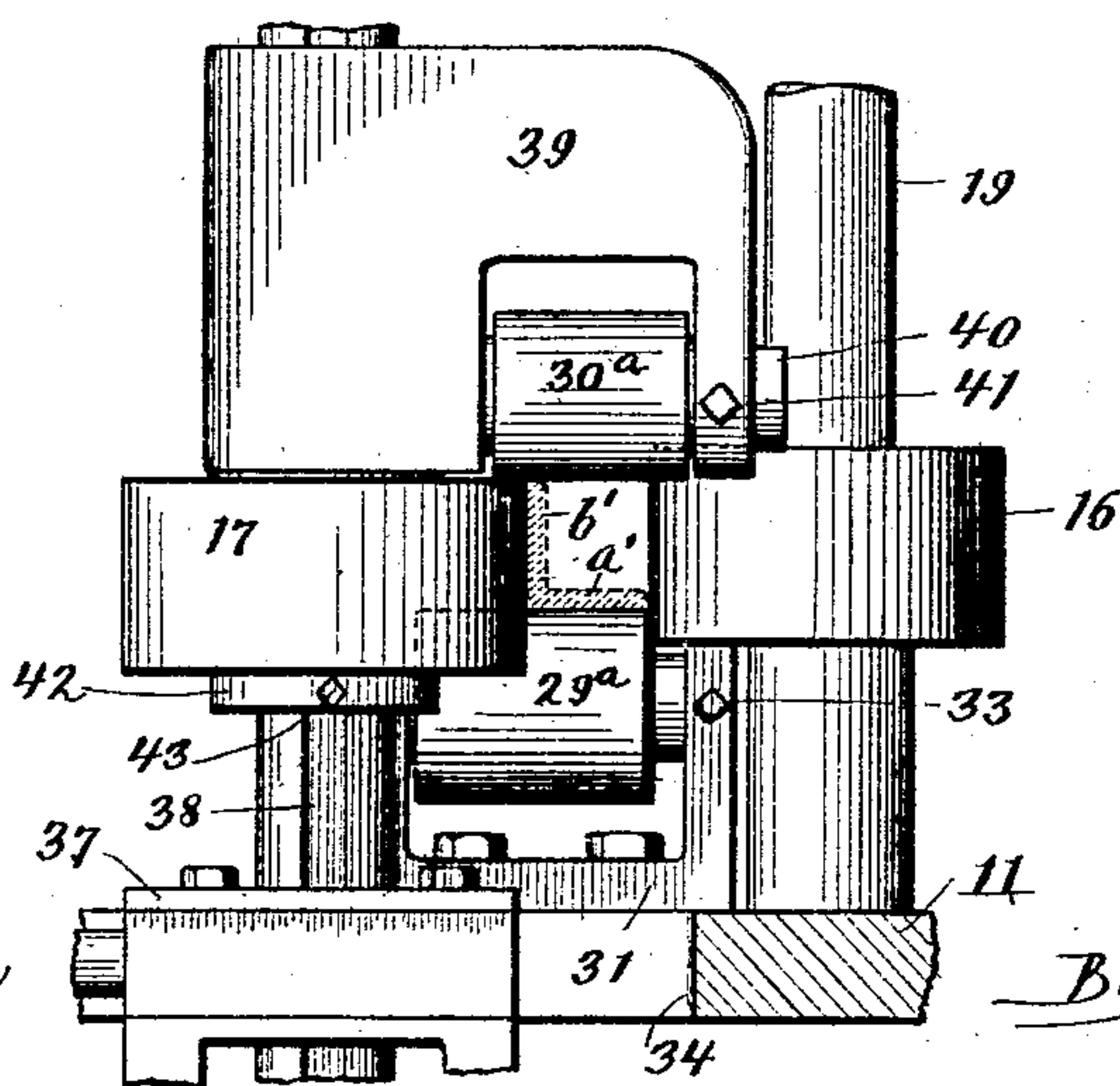


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BENDING-ROLLS FOR ANGLE-BARS OR THE LIKE.

SPECIFICATION forming part of Letters Patent No. 684,134, dated October 8, 1901.

Application filed June 12, 1901. Serial No. 64,213. (No model.)

To all whom it may concern:

Be it known that I, GEORGE THOMPSON, a citizen of the United States, and a resident of Milwaukee, county of Milwaukee, Wisconsin, have invented certain new and useful Improvements in Bending-Rolls for Angle-Bars or the Like, of which the following is declared to be a full, clear, and exact description.

10 The invention relates to rolls for bending and shaping angle-bars, T-bars, Z-bars, and other structural shapes and seeks to provide a simple and effective construction by which such bars and shapes may be accurately bent
15 without lateral distortion.

The features of the invention are set forth in the following description, illustrated in the accompanying drawings, and most specifically pointed out in the appended claims.

20 Figure 1 is a view in elevation of my improved bending-rolls. Fig. 2 is a view in horizontal section, taken on the line 2 2 of Fig. 1. Fig. 3 is a plan view. Fig. 4 is a view in vertical section, taken on the line 4 4
25 of Fig. 3. Fig. 5 is a detail view in elevation with one set of rolls interchanged.

Metal bars and plates are usually bent and shaped by means of a set of rolls comprising a pair of rolls for engaging one side of the
30 material and a third intermediate roll for engaging the other side thereof; but when such a set of rolls is used for bending angle or T bars or other bars of irregular shape or cross-section the bar will not only be bent in the
35 plane in which the rolls revolve, but will also be distorted laterally. To prevent such lateral distortion, I provide a second similar set of three rolls, which are mounted to revolve in a plane at right angles to the set of main
40 bending-rolls. I also provide means for adjusting the intermediate roll of each set, whereby the degree of curvature effected may be varied. By this means an angle-bar may be accurately bent with one of its flanges extending either inwardly or outwardly in the
45 plane of its curvature, or both sets of rolls may be adjusted to bend the angle-bar so that both of its flanges will extend either inwardly or outwardly at an angle to the plane
50 of its curvature. Similar results may be obtained with T-bars, Z-bars, and other irregular shapes.

The machine comprises a frame 10, by which it is preferably secured in position against a wall of the building. The upper
55 and lower ends 11 and 12 of the frame, between which the rolls and driving mechanism are mounted, are of irregular outline, as clearly indicated in Figs. 2 and 3, and the upper end 12 is preferably removably secured
60 in position by the bolts 13, so that the parts may be easily assembled. The underface of the end 12 is also provided with the projecting ribs 14, which serve to engage the upper edge of the frame 10, as shown in Fig. 4. 65

The main set of bending-rolls comprises the pair of rolls 15 and 16 and the oppositely-disposed intermediate roll 17. The pair of rolls 15 and 16 are fixed upon the supporting-shafts 18 and 19, which are provided with
70 shouldered ends, by which they are suitably journaled within the ends of the frame. The lower ends of these shafts are provided with the driving-gears 20 and 21, both of which intermesh with the pinion 22. The pinion 22
75 is driven by the train of gears 23, 24, and 25. Pinion 22 and gear 23 are mounted to revolve together upon a stud-shaft 26, secured to the end 11 of the frame, and pinion 24 and gear 25 are mounted to revolve together upon a
80 shaft 27, mounted in suitable bearings. The gear 25 is driven from any suitable mechanism by which the rolls may be thrown into and out of operation.

The supplemental set of bending-rolls are
85 arranged to revolve in a plane at right angles to that of the main set of rolls and comprises the pair of rolls 28 and 29 for engaging one side of the material and the oppositely-disposed intermediate roll 30 for engaging the
90 opposite side of the material. The pair of rolls 28 and 29, as shown, are arranged adjacent the pair of rolls 15 and 16 and are revolvably mounted in the U-shaped frames 31 by means of the headed bolts or shafts 32, removably held within the U-shaped frames by means of the set-screws 33. The U-shaped
95 frames are, as shown, bolted in position upon the inner face of the lower end 11.

The intermediate rolls of each set are
100 mounted upon a common adjustable support constructed as follows: Rectangular openings 34 are provided, as shown, in the outer ends of the upper and lower parts of the frame,

within which are movably mounted boxes 35 and 36, which are held in place therein by plates 37, bolted thereto, which plates overlap the edges of the openings 34. A longitudinal shaft or support 38 is carried by the boxes 35 and 36 and is keyed therein to be held against revolution, but so as to be longitudinally adjustable. A U-shaped frame or support 39 is formed in piece with or is keyed to the shaft 38 and projects at right angles to one side thereof. The intermediate roll 30 of the supplemental set of rolls is revolvably mounted within the U-shaped support 39 by means of a headed bolt or stud-axle 40, which is removably held in place in the frame by means of a set-screw 41. The intermediate roll 17 of the main set of rolls is revolvably mounted upon the support 38, adjacent the roll 30, and is held in place by means of a collar 42, having a set-screw 43.

The lower end 44 of the shaft or support 38 is threaded and is engaged by a shouldered adjustable nut 45, revolvably mounted within a flanged opening in the lower end of the box 35. A nut 45 is held against longitudinal movement by means of a collar or washer 46, fixed to the inner end thereof, and which engages the inner face of the lower side of the box, as clearly shown in Fig. 4. Adjusting-screws 47 extend through openings 48 in the outer ends of the upper and lower parts of the frame into the rectangular openings 34 and through openings in the sides of the boxes 35 and 36. Collars 49, located within slots 50 in boxes 35 and 36, are fixed to the inner ends of the screws 47, by which the screws are swiveled to the boxes. Flanged nuts 51, through which the screws 47 are threaded, are held in place in the outer ends of the upper and lower parts of the frame, as clearly indicated in Fig. 4. The outer ends of the screws 47 are provided with square portions 52, by which they may be turned to adjust the sliding boxes 35 and 36. By the adjusting-screws 47 and the adjusting-nut 45 the support for the intermediate rolls 17 and 30 may be adjusted in different directions at right angles to each other to bring the separate intermediate rolls nearer to or farther away from the pair of rolls cooperating with each, so that the degree of bending effected by the main and supplemental sets of rolls may be adjusted as desired—that is to say, the main set of rolls may be adjusted to bend the angle-bar to the desired curve and the supplemental set adjusted to exactly counteract the lateral distortion, so that the angle-bar will be bent with one of its flanges in the plane of curvature, or both sets of rolls may be adjusted to bend the bar, so that both of its flanges will be at an angle to the plane of curvature.

As shown in the drawings, the rolls in each set are arranged adjacent the corresponding roll in the other set, and in order that the adjacent rolls shall have a proper bearing upon the angle-bar and still not interfere or

rub against one another it is necessary that the periphery of the rolls bearing on the edges of the flanges should extend past the face of the adjacent rolls which bear upon the sides of the flanges. For this reason when the angle-bar is to be bent with its flanges extending inwardly the supplemental set of rolls will comprise the large intermediate roll 30, shouldered at its outer end, and the small rolls 28 and 29, so that the roll 17 may bear upon the edge of flange *a* without coming in contact with the roll 30, bearing against the side of the flange, and the rolls 28 and 29 may bear against the edge of flange *b* without interfering with the rolls 15 and 16, as shown in Figs. 1 and 2. When, however, the angle-bar is to be bent with its flange extending outwardly, the supplemental set will consist of the small intermediate roll 30^a and a pair of large rolls cooperating therewith and shouldered at their inner end, one of which, 29^a, is shown in Fig. 5, so that the roll 30^a may bear upon the edge of flange *b'* and the rolls 29^a may bear upon the edge of flange *a'*. As already stated, the bolts or shafts 32 and 40, carrying the set of supplemental rolls, are removably held in place, so that this change may be readily effected.

Although primarily designed for bending angle-bars, the supplemental set of rolls may be adapted for bending T-bars, Z-bars, and other shapes.

It is obvious that the details of construction may be varied by the skill of the mechanic without departure from the details of the invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In bending-rolls for angle-bars or the like, the combination with a main set of bending-rolls, of a supplemental set of rolls mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, each roll in one set being arranged adjacent the corresponding roll in the other set, and means for adjusting both of said adjacent intermediate rolls to and from each pair of rolls.

2. In bending-rolls for angle-bars or the like, the combination with a main set of bending-rolls, of a supplemental set of rolls mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, each roll in one set being arranged adjacent the corresponding roll in the other set, a common support for said adjacent intermediate rolls, and means for adjusting said support in different directions to and from each pair of rolls.

3. In bending-rolls for angle-bars and the like, the combination with a main set of bend-

ing-rolls, of a supplemental set of rolls for preventing lateral distortion of the material mounted to revolve in a plane at right angles to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, a common support for the intermediate rolls of each set and means for adjusting said supports in planes at right angles to each other.

4. In bending-rolls for angle-bars and the like, the combination with the main frame and with the main set of bending-rolls, of a supplemental set of rolls for preventing the lateral distortion of the material mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, a common support for said intermediate rolls, boxes movably mounted in said frame for carrying said support, means for adjusting said boxes laterally and means for adjusting said support longitudinally within said boxes.

5. In bending-rolls for angle-bars and the like, the combination with the main frame and with the main set of bending-rolls, of a supplemental set of rolls for preventing the lateral distortion of the material mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, a pair of boxes mounted to slide in ways in the ends of said frame, a longitudinal support mounted in said boxes so as to be longitudinally movable therein but held against rotation, means for revolubly mounting the intermediate rolls of each set upon said support and screws for adjusting said boxes laterally and for adjusting said support longitudinally within said boxes.

6. In bending-rolls for angle-bars and the like, the combination with the main frame and with the main set of bending-rolls, of a supplemental set of rolls for preventing the lateral distortion of the material mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, a pair of boxes mounted to slide in guideways in the ends of said frame, a shaft keyed into said boxes but longitudinally movable therethrough, upon which shaft one of the said intermediate rolls is revolubly mounted, a U-shaped support upon said shaft into which the other of said intermediate rolls is revolubly mounted, means for adjusting said boxes laterally and means for adjusting said shaft longitudinally through said boxes.

7. In bending-rolls for angle-bars and the like, the combination with the main frame and with the main set of bending-rolls, of a

supplemental set of rolls for preventing the lateral distortion of the material, mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, a pair of boxes mounted to slide in guideways in the ends of said frame, a longitudinal support keyed into said boxes but longitudinally movable there-through, upon which support the intermediate rolls of each set are revolubly mounted, a screw-threaded end on said support, a nut engaging said threaded end and held against longitudinal movement in one of said boxes, adjusting-screws swiveled to said boxes and cooperating nuts for said screws held against movement in the ends of said frame.

8. In bending-rolls for angle-bars or the like, the combination with a main set of bending-rolls, of a supplemental set of rolls mounted to revolve in a plane at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, each roll in one set being arranged adjacent the corresponding roll in the other set, means for adjusting the rolls of each set and gearing for driving said rolls, substantially as described.

9. In bending-rolls for angle-bars or the like, the combination with a main set of bending-rolls having cylindrical peripheral surfaces, of the supplemental set of rolls having cylindrical peripheral surfaces mounted to revolve at an angle to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, each roll in one set being arranged adjacent the corresponding roll in the other set, means for adjusting each of said intermediate third rolls to and from the pair of rolls cooperating therewith and gearing for driving said rolls.

10. In bending-rolls for angle-bars and the like, the combination with the main set of bending-rolls having cylindrical peripheral surfaces, of the supplemental set of rolls having cylindrical peripheral surfaces mounted to revolve at an angle to the plane of said main rolls, each roll in one set being arranged adjacent the corresponding roll in the other set with the periphery of the one of each pair of adjacent rolls arranged to engage the edge of the angle-bar flange extending past the face of the corresponding roll in the other set.

11. In bending-rolls for angle-bars and the like, the combination with a main set of bending-rolls having cylindrical peripheral surfaces, of a supplemental set of rolls having cylindrical peripheral surfaces for preventing lateral distortion of the material, mounted to revolve in a plane at right angles to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll

for engaging the opposite side thereof, and each roll in one set being arranged adjacent the corresponding roll in the other set.

12. In bending-rolls for angle-bars and the like, the combination with a main set of bending-rolls, of a supplemental set of rolls for preventing lateral distortion of the material, mounted to revolve in a plane at right angles to the plane of said main rolls, each set comprising a pair of rolls for engaging one side of the material and an intermediate third roll for engaging the opposite side thereof, each roll in one set being arranged adjacent the corresponding roll in the other set with the periphery of the one of each pair of adjacent rolls arranged to engage the edge of the angle-bar flange extending past the face of the corresponding roll in the other set, whereby the edges and sides of the flanges of an angle-bar may be properly engaged by both sets of rolls.

13. In bending-rolls for angle-bars and the like, the combination with a main set of bending-rolls, of a supplemental set of rolls for preventing the lateral distortion of the material, mounted to revolve in a plane at an angle to the plane of said main rolls, the rolls of the supplemental set being interchangeably held in place.

14. In bending-rolls for angle-bars and the like, the combination with a main set of bending-rolls, of a supplemental set of rolls for preventing the lateral distortion of the material, mounted to revolve in a plane at an angle to the plane of said main rolls, the rolls of the supplemental set being interchangeably held in place and provided with shouldered ends, substantially as described.

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