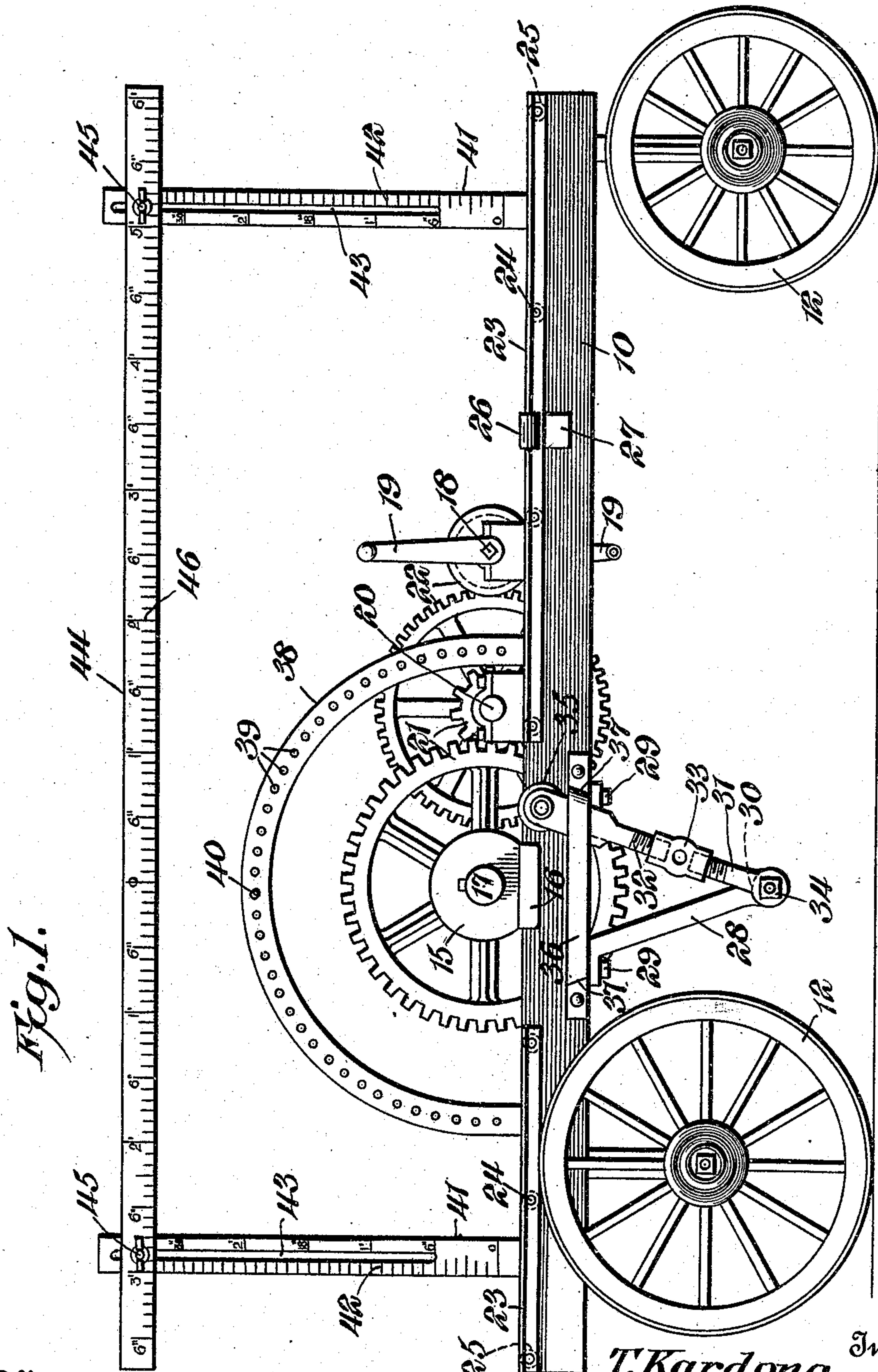


930,969.

Patented Aug. 10, 1909.

3 SHEETS—SHEET 1.



Witnesses  
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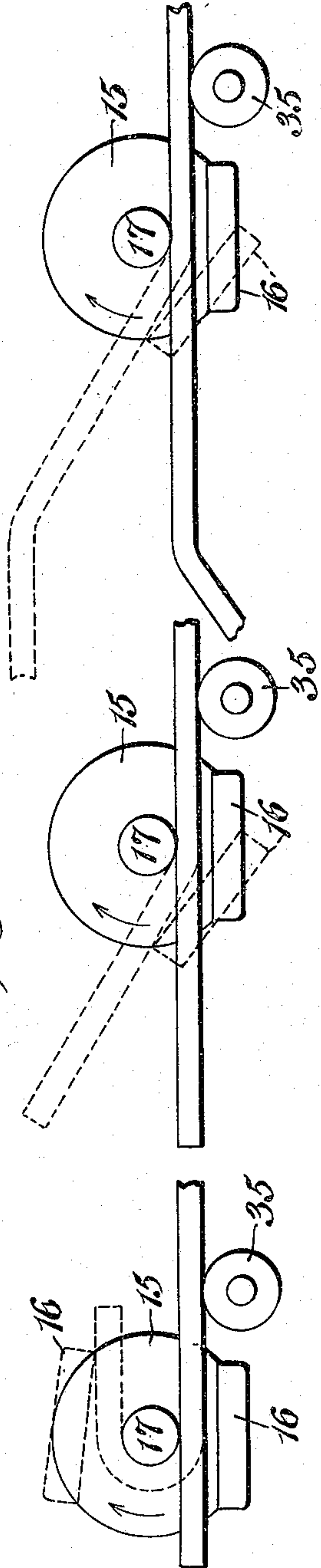
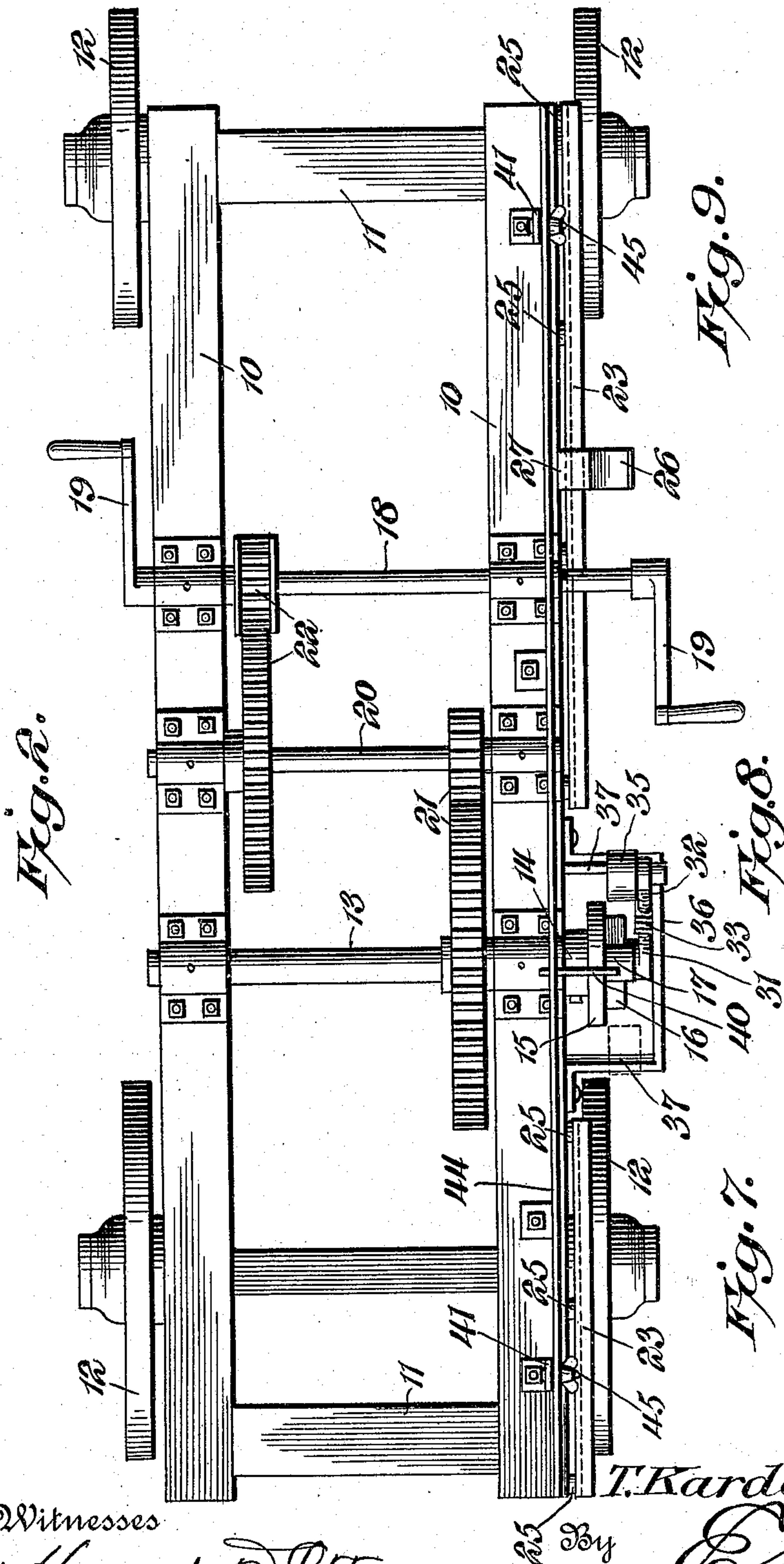
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T. KARDONG.  
METAL BENDING MACHINE.  
APPLICATION FILED JUNE 19, 1908.

930,969.

Patented Aug. 10, 1909.

3 SHEETS—SHEET 2.



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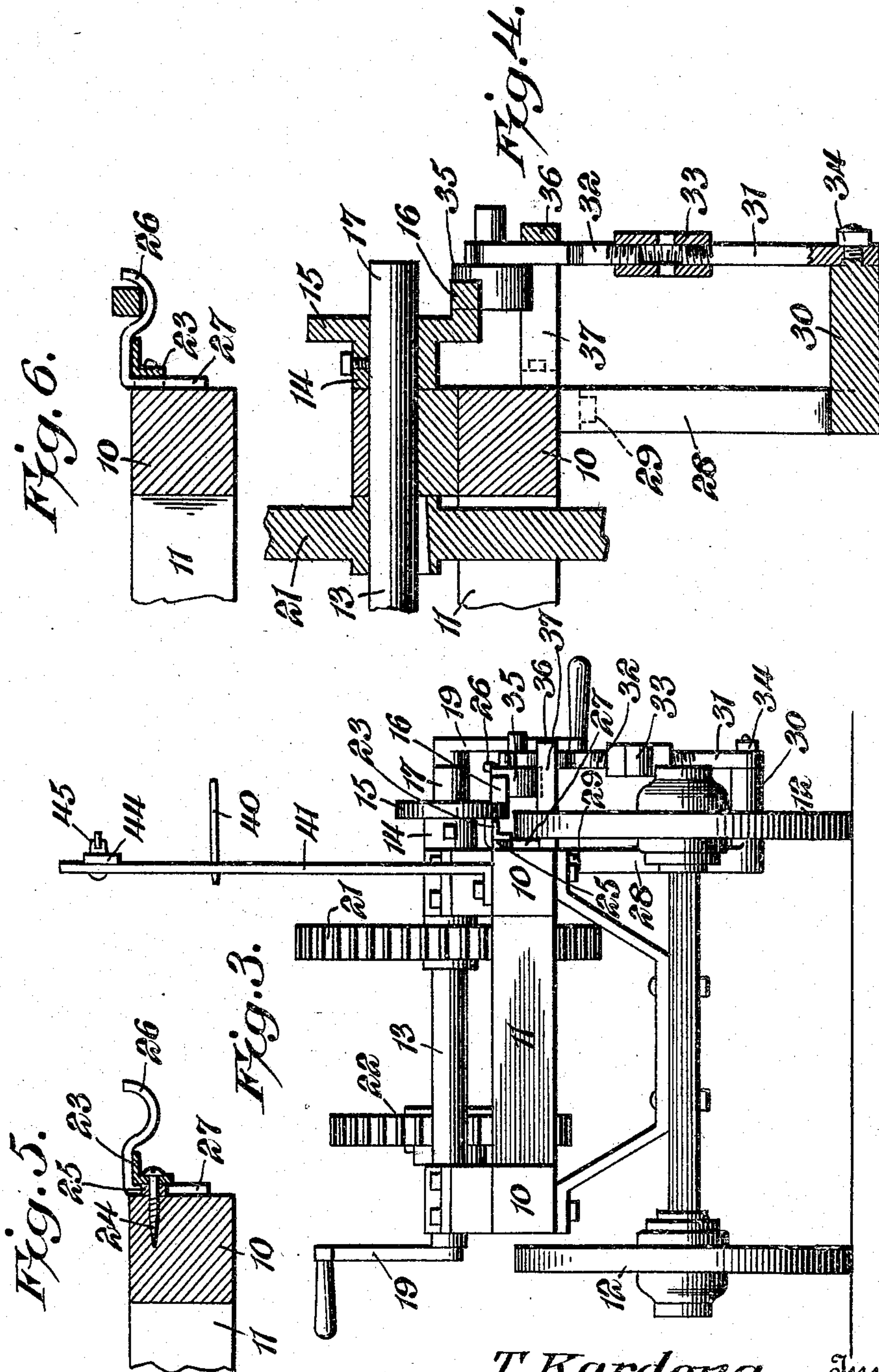


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

THEODORE KARDONG, OF MINNEAPOLIS, MINNESOTA.

## METAL-BENDING MACHINE.

No. 930,969.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed June 19, 1908. Serial No. 439,344.

*To all whom it may concern:*

Be it known that I, THEODORE KARDONG, a citizen of the United States, residing at 1211 James avenue north, Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and useful Metal-Bending Machine, of which the following is a specification.

The present invention relates to means for bending metallic bars, rods or the like, and the primary object is to provide simple mechanism of a powerful nature, whereby articles can be readily formed into various shapes.

A further object is to provide a machine that is reversible so that different bends can be made without the necessity of reversing the article being operated upon, and a still further and important object is to provide means whereby the shapes can be accurately determined.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the bending machine. Fig. 2 is a top plan view of the same. Fig. 3 is an end elevation. Fig. 4 is a detail sectional view through the bending member. Figs. 5 and 6 are respectively detail sectional views through the supporting means for the article. Figs. 7, 8 and 9 are detail views illustrating the manner of bending different forms.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a suitable frame is employed, comprising longitudinally disposed sills 10 connected by cross beams 11, the frame being preferably, though not necessarily supported on wheels 12 whereby it can be readily transported from place to place. Journaled on an intermediate portion of the frame, transversely of the sills 10, is a shaft 13 that projects beyond one side of the frame, and has mounted thereon, a bending or forming member. To this end, as shown more particularly in Fig. 4, a hub 14 is suitably secured to the projecting end of the shaft 13, and is provided with a disk 15 carrying a bending or forming device, preferably in the form of a lug 16. The end portion 17 of the shaft which projects beyond the disk, constitutes a mandrel about which the articles are bent. The shaft

13 can be operated by any suitable power, but in the present embodiment, a driving shaft 18 is employed that is journaled transversely on the frame and has handle cranks 19 fastened to its opposite ends. A countershaft 20 is interposed between the shafts 13 and 18, and is geared to both as shown respectively at 21 and 22.

For the purpose of supporting the articles to be bent, tracks 23, preferably in the form of angle irons, are secured to the outer side of the sill 10 that is adjacent to the bending member, said tracks being fastened in place by suitable bolts 24 or other devices, and being spaced from the sills by collars 25 through which the fasteners pass. An article-supporting stirrup 26 is arranged to be adjustably placed on either of the tracks, having a depending stem 27 that engages between the tracks and sill. It will be evident that the supporting device can be placed on either side of the bending member. Guiding means for the article to be operated upon, is also employed. For this purpose, a depending hanger bracket 28 is employed comprising convergently disposed bars secured at their upper ends by suitable bolts 29. The lower end of the bracket has an outstanding gudgeon 30 on which is pivoted an extensible arm. This arm comprises sections 31 and 32 connected by a turnbuckle 33, the lower end of the lower section 31 being journaled in the gudgeon 30 and held in place by a nut 34 or other suitable device. The upper end of the upper section 32 has journaled thereon a guide roller 35. This swinging arm operates in a keeper 36 secured to the adjacent sill 10, the end portions 37 thereof constituting stops which positions the guide rollers on opposite sides of the bending member, as will be evident by reference to Fig. 1.

In order to accurately determine the amount of bend to be given to any article, a stop holding bar 38 is employed which is mounted on the frame, and extends and curves over the bending member, being preferably disposed concentrically to the axis of rotation of the said member. This bar has a series of openings 39 in any of which can be placed a stop pin 40. A suitable gage is also employed for the articles. This gage comprises standards 41 that are mounted on the frame on opposite sides of the



bending member and are provided with longitudinally disposed scales 42 and similarly disposed slots 43. A gage bar 44, arranged above the bending member, has clamping bolts 45 passing therethrough, these bolts also passing through the slots 43. Thus the bar is vertically adjustable on the standards and can be held at any desired position. Said bar has a suitable longitudinally disposed scale 46.

In using the machine, the article to be bent as shown in Figs. 7, 8 and 9, is placed between the mandrel 17 and lugs 16, whereupon the bending device is turned by the driving means and through the interposed gearing until the desired bend has been secured. This can be readily determined by placing stop pin 40 in the proper opening, and the lengths of the parts between the bends can be calculated by means of the gage mechanism. The article moreover can be bent in opposite directions, all that is required being the reversal of the guide roller 35 and the supporting stirrup 26.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a machine of the character set forth, the combination with a supporting frame, of a shaft extending across and projecting beyond one side of the frame, forming a mandrel about which the article is bent, an operating member rotatable with but having its inside face spaced from the projecting end of the shaft and so arranged in relation to the shaft that the article to be bent is inserted between the inner face of said member and the shaft, driving means mounted on the frame, gearing interposed between and connecting the driving means and shaft, stationary rests mounted on the frame at opposite sides of the said member and spaced therefrom, and a work-guiding element adjustable to a position between either rest and said member.

2. In a machine of the character set forth, the combination with a forming member rotatable in opposite directions, of guide means for the article to be acted on, and a support for the guide means adjustable to different positions on different sides of the forming member.

3. In a machine of the character set forth, the combination with a forming member rotatable in opposite directions, of a guide

roller for the article to be acted on, and a support for the roller adjustable to positions on different sides of the forming member.

4. In a machine of the character set forth, the combination with a support, of a forming member mounted on the support and rotatable in opposite directions, and a guide member pivoted on the support and swinging to positions on opposite sides of the forming member.

5. In a machine of the character set forth, the combination with a supporting frame, of a rotatable bending member journaled thereon and rotatable in opposite directions, a hanger suspended from the frame, a swinging arm pivoted on the hanger, and a roller journaled on the arm, said arm being extensible.

6. In a machine of the character set forth, the combination with a frame, of a rotatable bending member mounted thereon, a track mounted on the frame, and an article supporting stirrup detachably engaged with and adjustable along the track toward and from the bending member.

7. In a machine of the character set forth, the combination with a supporting frame, of a rotatable bending member mounted thereon, and an article supporting device slidably mounted on the frame and arranged to be placed on opposite sides of the bending member.

8. In a machine of the character set forth, the combination with a supporting frame, of a rotatable bending member mounted thereon, an article supporting device arranged to be placed on the frame on opposite sides of the bending member, and a guide member adjustable to positions on opposite sides of the bending member.

9. In a machine of the character set forth, the combination with a supporting frame, of a rotatable bending member journaled thereon, tracks located on the frame on opposite sides of the bending member, an article supporting stirrup arranged to be placed upon either track, a hanger suspended from the frame beneath the bending member, a swinging arm pivoted on the hanger, a roller journaled on the upper ends of the arm and movable therewith to positions on opposite sides of the bending member, and stops for positioning the roller.

10. In a machine of the character set forth, the combination with a rotary bending member, of a stop holding device extending about the same, and a stop adjustable to different positions on the holding device, said stop being located in the path of movement of the article bent by the member for determining the amount of the bend made.

11. In a machine of the character set forth, the combination with a rotary bending member, of a curved stop holding bar



extending around a portion of the bending member and having a series of openings, and a stop pin arranged to be placed in the different openings and in the path of movement of the article bent.

12. In a machine of the character set forth, the combination with a rotary bending member, of a gage comprising supports located on opposite sides of the bending member, and a gage bar vertically adjustable on the supports and located above the bending member.

13. In a machine of the character set forth, the combination with a supporting frame, of a rotary bending member journaled thereon, spaced standards carried by the frame and located on opposite sides of the bending member, said standards being provided with slots and scales, a gage bar adjustable on the standards and having a scale, and holding devices passing through the bar and through the slots in the standards.

14. In a machine of the character set forth, the combination with a wheeled supporting frame, of a rotary bending member

journaled thereon, operating means for the bending member geared to the same, tracks located on one side of the frame and on opposite sides of the bending member, a work supporting stirrup arranged to be placed upon the tracks, a hanger suspended from the frame, a swinging extensible arm pivoted on the hanger, a roller journaled on the upper end of the arm and swinging to positions on opposite sides of the bending member, stops for limiting the movement of the arm, standards mounted on the frame and having scales, a gage bar vertically adjustable on the standards and having a scale, a curved stop holding bar surrounding the upper portion of the bending member and having a plurality of openings, and a stop pin arranged to be placed in the different openings.

In testimony, that I claim the foregoing as my own, I have hereunto affixed my signature in the presence of two witnesses.

THEODORE KARDONG.

Witnesses:

A. MANTHEY,  
MATT. GROSS.