Feb. 28, 1939. A. S. TERHAAR 2,148,914

ROTARY ROD BENDING APPARATUS

Filed June 29, 1936 2 Sheets-Sheet 1

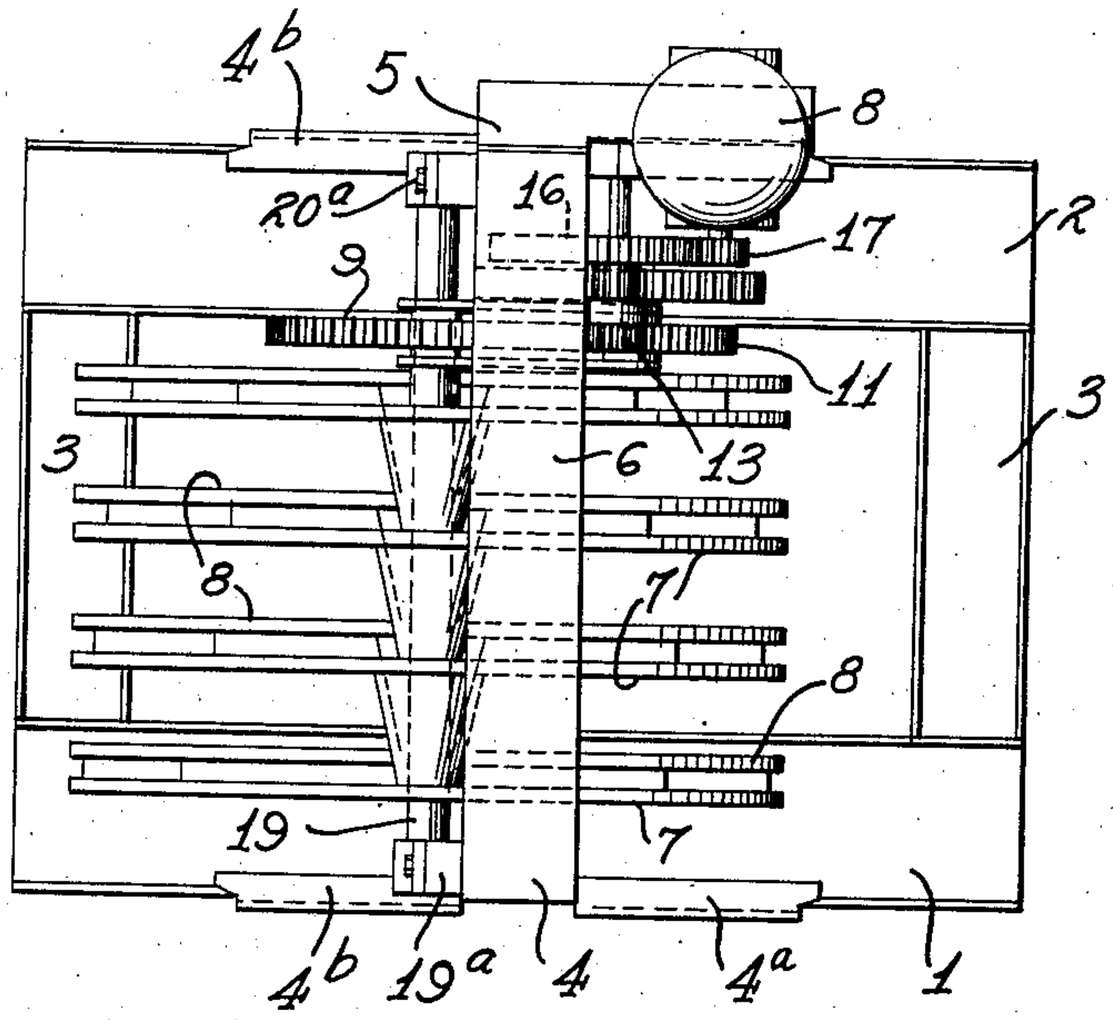

FIG. 1

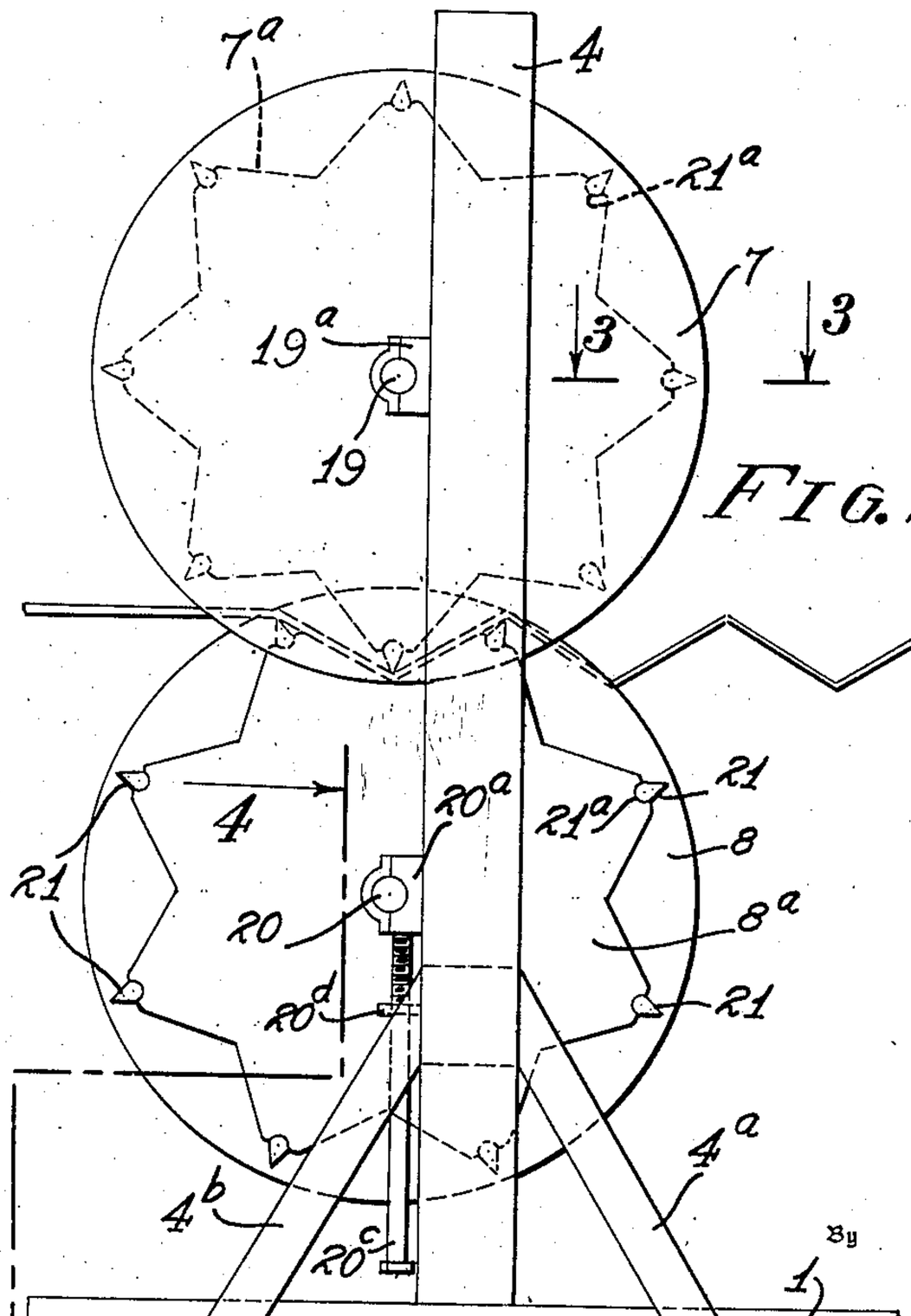

FIG. 2

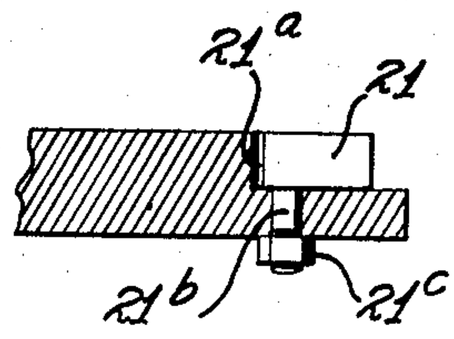

FIG. 3

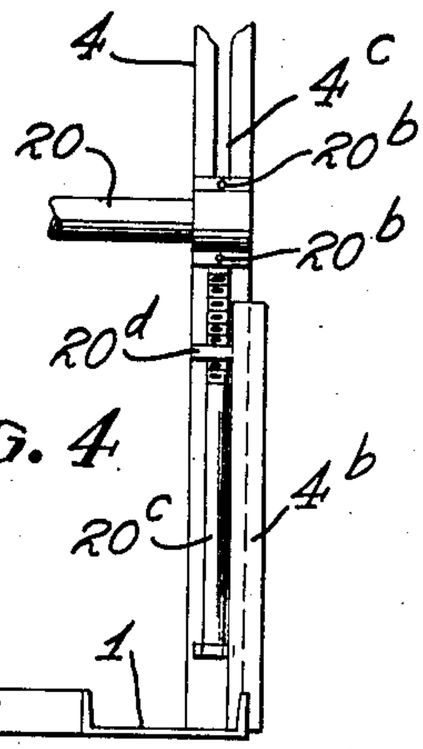

FIG. 4

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FIG. 5

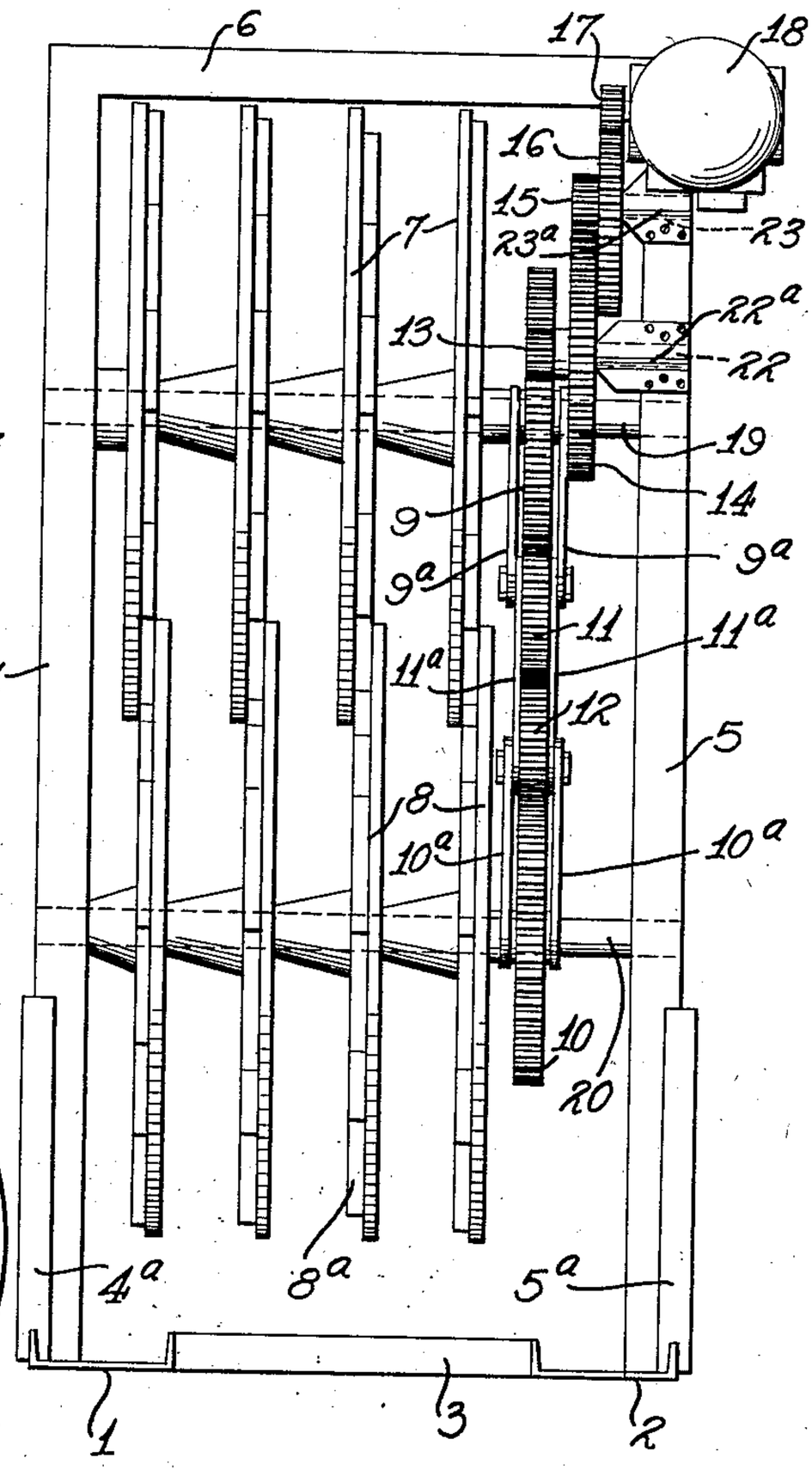
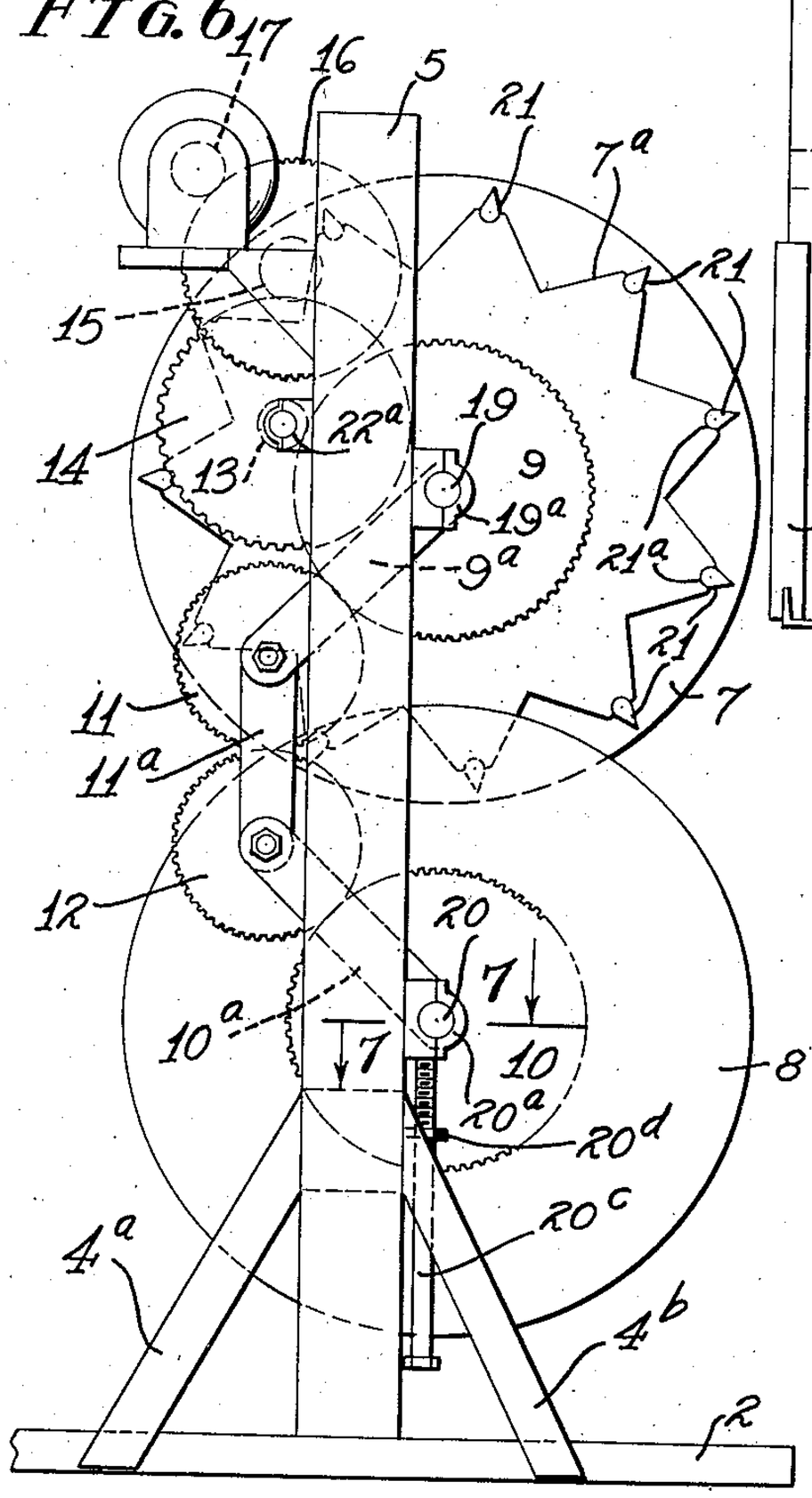


FIG. 6



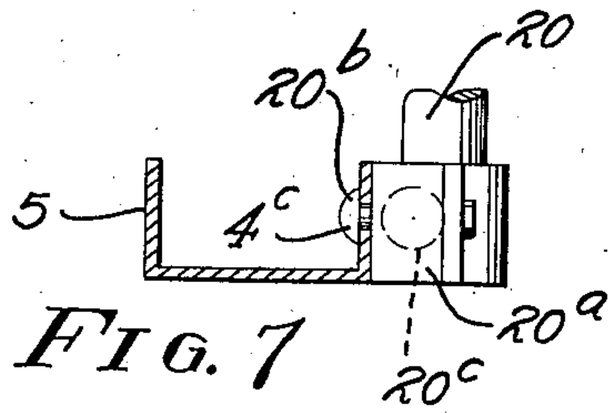


FIG. 7

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UNITED STATES PATENT OFFICE

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ROTARY ROD BENDING APPARATUS

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Application June 29, 1936, Serial No. 87,835

7 Claims. (Cl. 153—77)

My invention relates to a rotary rod bending apparatus and the objects of my invention are:

First, to provide an apparatus for readily and quickly bending rods into uniform angular relation of the portions of said rod;

Second, to provide an apparatus of this class which may be built in units operating in unison for quantity production;

Third, to provide an apparatus of this class in which the rod may be bent into various uniform angles with slight changes;

Fourth, to provide an apparatus of this class which may be operated either manually or power driven;

Fifth, to provide an apparatus of this class which is continuous in its operation, therefore, rods of any length may be bent into uniform angular relation;

Sixth, to provide an apparatus of this class in which rods such as reinforcing rods may be bent with a direct angle at the bending point;

Seventh, to provide an apparatus of this class which is very simple and economical of construction, easy to operate, efficient in its action, and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination, and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this aplication in which:

Figure 1 is a top or plan view of my rotary rod bending apparatus; Fig. 2 is a side elevational view of the same and showing a rod positioned therein in the position of being bent; Fig. 3 is an enlarged sectional view from the line 3—3 of Fig. 2; Fig. 4 is an elevational view of a fragmentary portion from the line 4—4 of Fig. 2; Fig. 5 is a side elevational view at a right angle from that of Fig. 2; Fig. 6 is a side elevational view from the opposite side of the apparatus from that of Fig. 2; and Fig. 7 is a fragmentary sectional view on an enlarged scale from the line 7—7 of Fig. 6.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings:

The base members 1 and 2, spacer bars 3, uprights 4 and 5, cross bar 6, disks 7 and 8, disk drive gears 9 and 10, idler gears 11, and 12, gears 13, 14, 15, 16, and 17, motor 18, and shafts 19 and 20 constitute the principal parts and portions of my rotary rod bending apparatus.

The base members 1 and 2 consist of channel members with their flat sides down and their leg members extending upwardly and said members 1 and 2 are in spaced relation to each other as shown. These members are secured and held in their spaced relation by means of the spacer bars 3 which are also positioned with their flat sides down and the leg members extending upwardly, thus providing a flat rectangular base. Secured to the upper sides of the members 1 and 2 are uprights 4 and 5 which extend upwardly from the middle of the members 1 and 2 and are held in secured relation at their upper end by means of cross bar 6. These uprights 4 and 5 are further supported by means of diagonal braces 4*a* and 4*b* extending from the members 1 and 2 upwardly on an angle and secured to the uprights 4 and 5.

Secured on the one side of the uprights 4 and 5 are journal members 19*a* in which is supported a shaft 19, and shiftably mounted on the uprights 4 and 5 are journal members 20*a* in which is revolubly mounted the shaft 20. These journals 20*a* are provided with rivets 20*b* which extend into slots 4*c* in the uprights 4 and 5 shown best in Fig. 4 of the drawings with the head on the opposite side from the journal, shown best in Fig. 7 of the drawings, which hold the journal members 20*a* in position on the uprights 4 and 5 but permit their being shifted upwardly and downwardly for varying the angle of the bend in the rod. These journals are supported by means of a screw 20*c*, the end of which rests against the lower side of the journal 20 and is screw-threaded in the lug 20*d* secured on the sides of the uprights 4 and 5 for holding the journal members in certain position for providing certain mesh position between the rod bending portions of the disks.

Mounted on the shaft 19 is a plurality of disks 7, and mounted on the shaft 20 is a plurality of disks 8, all in spaced relation to each other. The edges of the disks 7 and 8, it will be noted, overlap each other as shown best in Figs. 2, 5, and 6 of the drawings. On the one side of the disks 7 are provided angular portions 7*a* which are preferably integral therewith and mounted on the opposite sides of the disks 8 are similar angular portions 8*a* and these disks 7 and 8 are so positioned relative to each other that the angular portions 7*a* and 8*a* mesh with each other as shown best in Figs. 2 and 5 of the drawings. Each of these angular portions 7*a* and 8*a* are

provided at their peripheral extremities with hardened point members 21 which provide the bearing and bending surfaces for engagement with the rod when bending the same. These point members 21 are provided with rounded back surfaces 21*a* which fit in conforming recesses in the angular portions 7*a* and 8*a* and are secured and clamped in position by means of bolts 21*b* which extend through the main portion of the disks 7 and 8 and are held in secured relation by means of nuts 21*c*.

Secured in connection with the shaft 19 is a disk drive gear 9 and secured in connection with the shaft 20 is a disk drive gear 10. These gears 9 and 10 are synchronized by means of intermeshing gears 11 and 12 which are held in their intermeshing relation by means of links 11*a* and the gears 11 and 9 are held in intermeshing relation with the gears 9 by means of links 9*a*, and the gears 12 and 10 are held in intermeshing position by means of the links 10*a*.

Secured on the side of the member 5 is a journal member 22*a* in which is mounted a shaft 22 on the end of which is mounted a gear 13 which meshes with the gear 9 and on this same shaft 22 is another gear 14 which meshes with a gear 15 which is mounted on a shaft 23 which is secured on the upright 5 by means of journal member 23*a*. Mounted on this same shaft 23 is another gear 16 which meshes with a gear 17 which is secured on the main shaft of the motor 18 which is supported on an extended extension of the cross bar 6 and upright 5, thus providing a chain of gears between the motor and the shaft 19 and a chain of synchronizing gears between the shafts 19 and 20 and providing a synchronized relation between the disks and particularly the intermeshing angular portions thereof. It will be here noted that these chain gears and their relation may be modified or varied as desired.

The operation of my rotary rod bending apparatus is as follows: A rod to be bent in angular uniform relation of the portions such as a reinforcing rod or the like is fed into the apparatus between the points 21 on the disk members 7 and 8 and with the revolution of the disks, the rod is bent in angular uniform shape as shown best in Fig. 2 of the drawings. If it is desired to provide more acute angles in the bent portions of the rod, the disks 8 are shifted toward the disk 7 by turning the bolt 20*c* in the lug 20*d* and thus shifting the journals 20*a* upwardly toward the journals 19*a*, thus the angles may be varied by shifting of the disk 8 upwardly and downwardly on the uprights 4 and 5, the points 21 being the bearing and bending points may be reinforced as they become worn.

Though I have shown a particular construction, combination, and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination, and arrangement, but desire to include in the scope of my invention, the construction, combination, and arrangement substantially as set forth in the appended claims.

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

1. In a rotary rod bending apparatus, revolubly mounted disk members in spaced relation to each other and provided with extended intermeshing changeable points, said disk members extending in overlapped relation to each other and oppositely disposed from each other, means for shifting and holding one of said disks in various intermeshing relations with the other, and gear and link means for revolving said disks in synchronized relation.

2. In a rotary rod bending apparatus, a pair of spaced base members, uprights secured thereto, a cross bar connecting the uprights at their upper ends, shafts journalled in said uprights in superposed relation, disks secured to said shafts provided with intermeshing points extending laterally from said disks and said disks being positioned on the separate shafts in opposed relation whereby the points intermesh.

3. In a rotary rod bending apparatus, a pair of spaced base members, uprights secured thereto, a cross bar connecting the uprights at their upper ends, shafts journalled in said uprights in superposed relation, disks secured to said shafts provided with intermeshing points extending laterally from said disks, said disks being positioned on the separate shafts in opposed relation whereby the points intermesh, and spur gear and link means connecting said shafts.

4. In a rotary rod bending apparatus, a pair of spaced base members, uprights secured thereto, a cross bar connecting the uprights at their upper ends, shafts journalled in said uprights in superposed relation, disks secured to said shafts provided with intermeshing points extending laterally from said disks, said disks being positioned on the separate shafts in opposed relation whereby the points intermesh, the peripheries of said disks extending outwardly past said points whereby the peripheries of said disks form guides and supports for rods passing between each pair of disks at their peripheries.

5. In a rotary rod bending apparatus, a pair of spaced base members, uprights secured thereto, a cross bar connecting the uprights at their upper ends, shafts journalled in said uprights in superposed relation, disks secured to said shafts provided with intermeshing points extending laterally from said disks, said disks being positioned on the separate shafts in opposed relation whereby the points intermesh, and spur gear and link means connecting said shafts, said points being removable and changeable.

6. In a rotary rod bending apparatus, revolubly mounted disk members in spaced relation to each other and provided with extended intermeshing points, the outer ends of said points being inwardly of the periphery of said disk members, said disk members extending in overlapped relation to each other and oppositely disposed from each other and forming guide means for the rods while bending, and bolt means for shifting and helding one of said disks in various intermeshing relations with the other.

7. In a rotary rod bending apparatus, revolubly mounted disk members in spaced relation to each other and provided with extended intermeshing points, the outer ends of said points being inwardly of the periphery of said disk members, said disk members extending in overlapped relation to each other and oppositely disposed from each other and forming guide means for the rods while bending, bolt means for shifting and holding one of said disks in various intermeshing relations with the other, and a chain of spur gears for revolving said disks in synchronized relation.

ALOYSIUS S. TERHAAR.