May 24, 1938. A. B. PEARSON 2,118,224

DISK ROLLING APPARATUS

Filed April 23, 1936 5 Sheets-Sheet 1

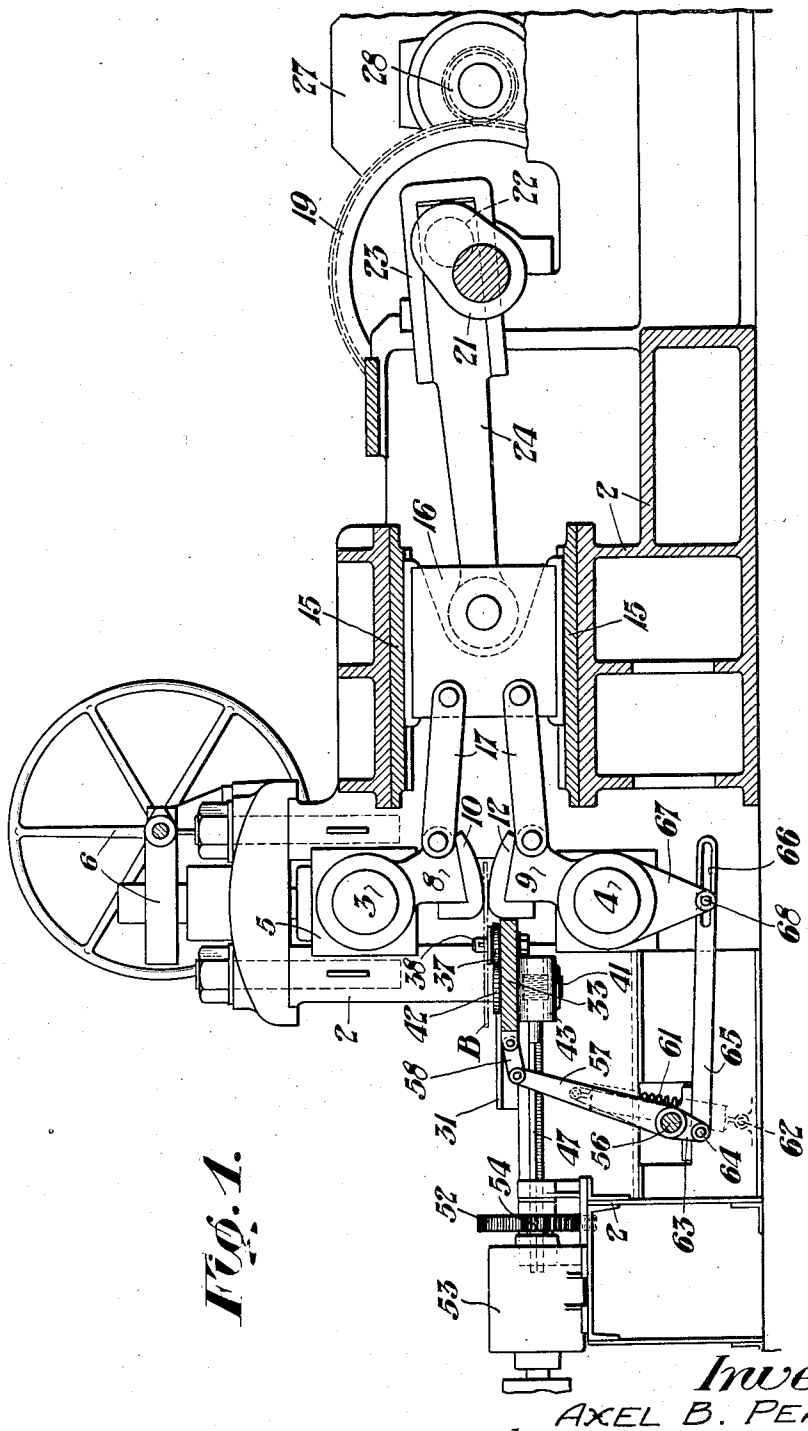


Fig. 1.

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DISK ROLLING APPARATUS

Filed April 23, 1936 5 Sheets-Sheet 2

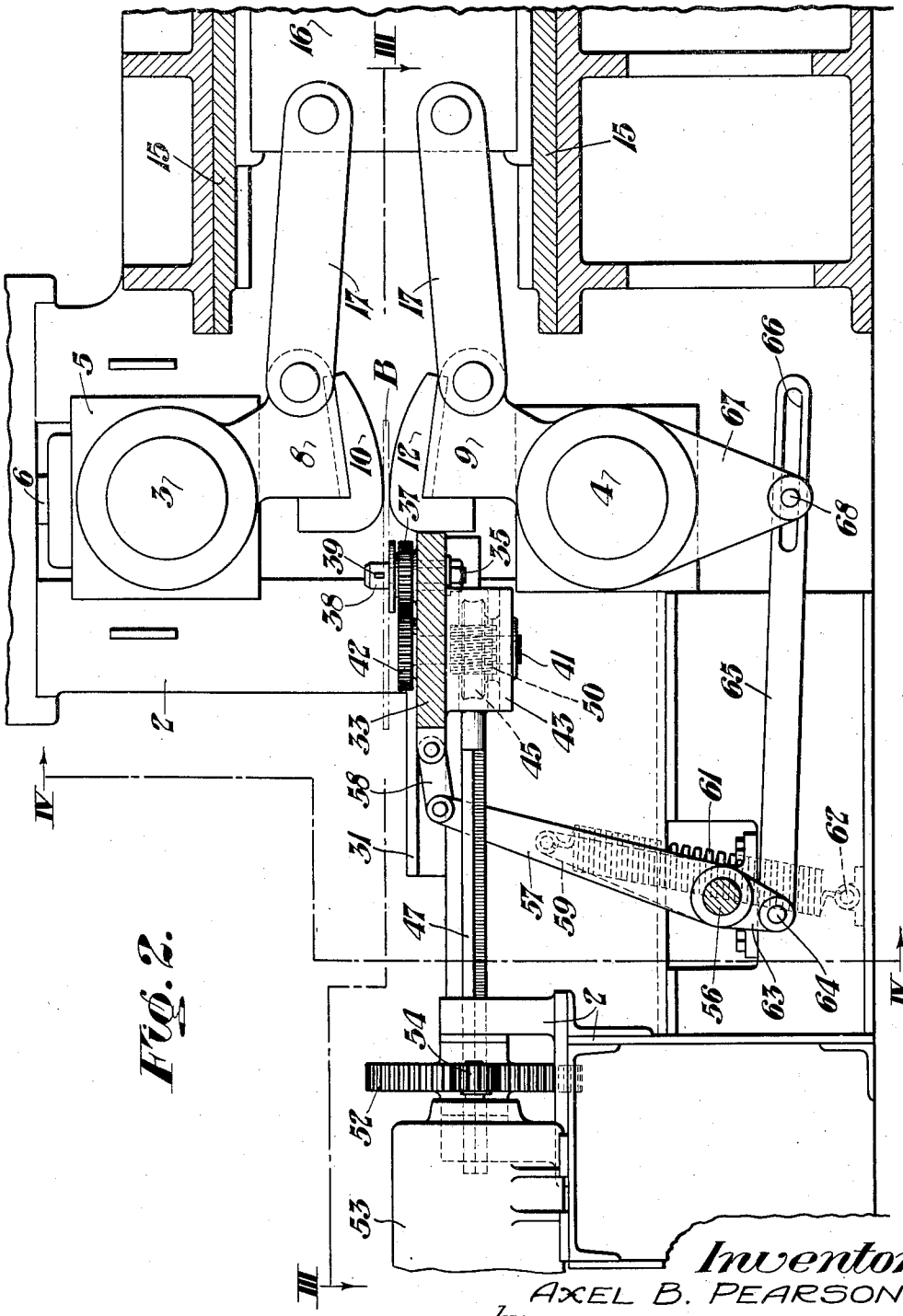


Fig. 2.

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DISK ROLLING APPARATUS

Filed April 23, 1936 5 Sheets-Sheet 3

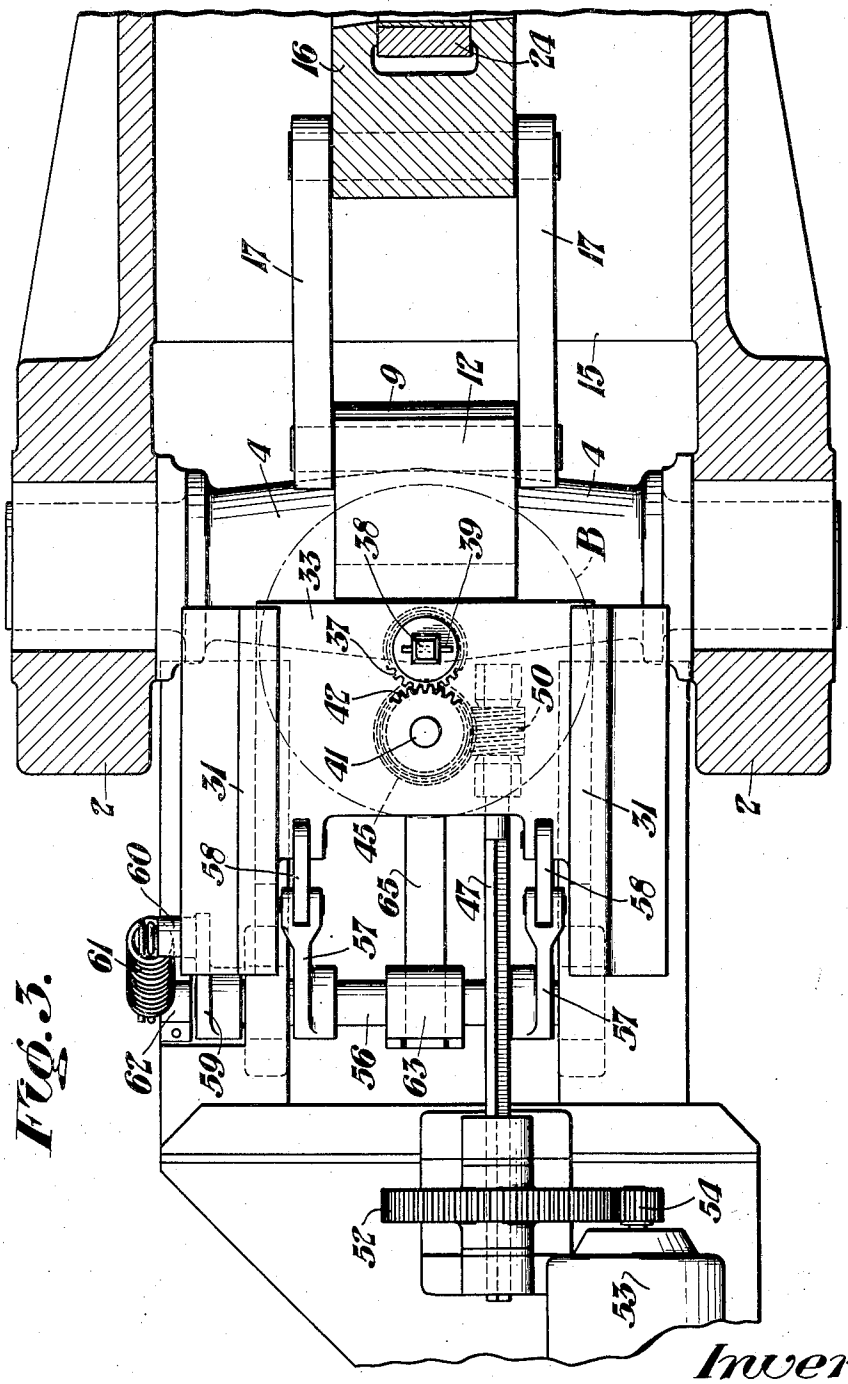


Fig. 3.

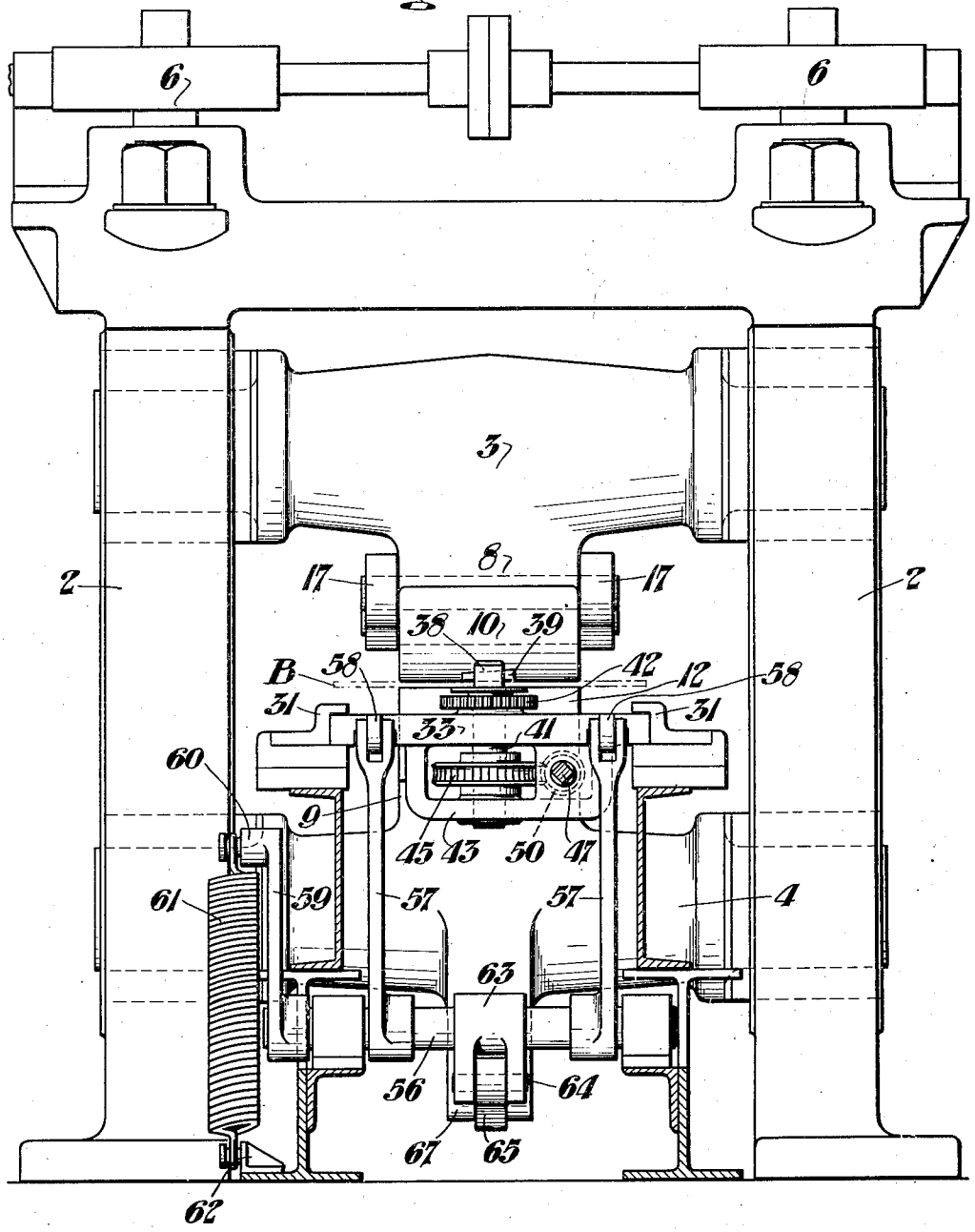
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DISK ROLLING APPARATUS

Filed April 23, 1936 5 Sheets-Sheet 4

Fig. 4.



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May 24, 1938. A. B. PEARSON 2,118,224

DISK ROLLING APPARATUS

Filed April 23, 1936 5 Sheets-Sheet 5

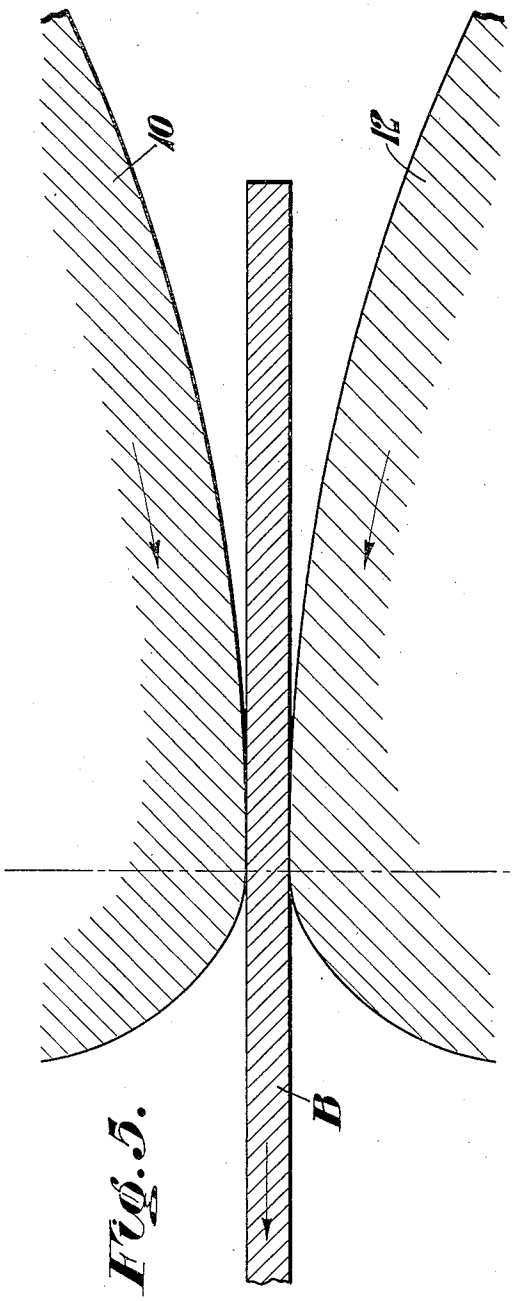


Fig. 5.

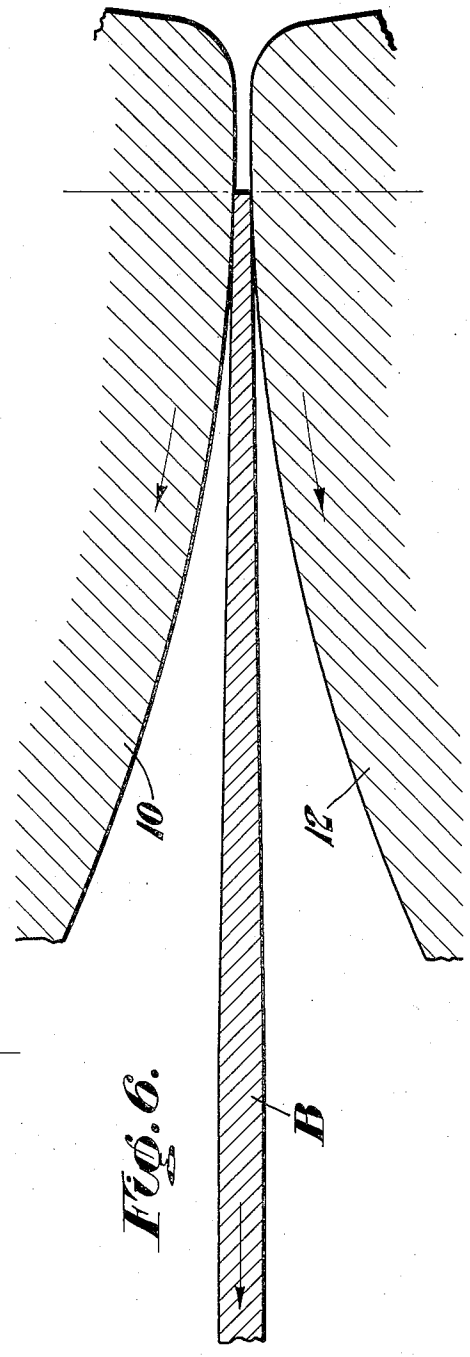


Fig. 6.

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Patented May 24, 1938 2,118,224

UNITED STATES PATENT OFFICE

2,118,224

DISK ROLLING APPARATUS

Axel B. Pearson, Munhall, Pa.

Application April 23, 1936, Serial No. 76,026

2 Claims. (Cl. 80—16)

This invention relates to metal-working and more particularly to apparatus for rolling disk-shaped blanks of tapering thickness. Such blanks, or work-pieces, may be used for a variety of purposes, including the manufacture of wheels for road vehicles.

In my co-pending application, Serial No. 76,027, filed April 23, 1936, and bearing the same title, there is disclosed an apparatus for producing blanks of the type described. In the apparatus of the co-pending application the die elements engage and work the blanks, or work-pieces, during their movement in both directions (i. e., from a point adjacent the center of the work-piece toward the periphery thereof, and vice versa).

It is among the objects of the present invention to efficiently produce disk-shaped blanks of tapering thickness on an apparatus which is easy and inexpensive to build and operate.

The foregoing and other objects will be apparent after referring to the drawings, in which:

Figure 1 is an elevation, partly in section, of the apparatus of the invention.

Figure 2 is an enlarged fragmentary elevation, partly in section, of the apparatus of Figure 1.

Figure 3 is a view on the line III—III of Figure 2.

Figure 4 is a view on the line IV—IV of Figure 2.

Figures 5 and 6 are working diagrams illustrating the effect of the apparatus on a wheel-blank, or other work-piece.

Referring more particularly to the drawings, the numeral 2 designates a housing which rotatably supports a pair of upper and lower shafts 3 and 4 respectively. More specifically, the upper shaft 3 rides in chocks 5 which are adjusted with respect to the lower shaft 4 by a conventional screwdown 6. A downwardly extending lobe 8 is carried by the upper shaft 3 and a similar but upwardly extending lobe 9 is carried by the lower shaft 4. A die member 10 is mounted on the upper lobe 8 and a similar and coacting die member 12 is mounted on the lower lobe 9.

A horizontal slideway 15 is disposed adjacent the lobes 8 and 9 and carries a slideable block 16 which is connected to each of the lobes by means of links 17.

A gear 19 is rotatably mounted adjacent the horizontal slideway 15 and carries on its shaft a crank 21. This crank 21 carries a crankpin 22 which is mounted in a frame 23 that is carried on one end of a connecting-rod 24. The other end of the connecting-rod 24 is connected to the slidable block 16 in the slideway 15. The gear 19 is driven by an adjacently disposed motor 27 through a pinion 28. From the foregoing description it can readily be seen that the die members 10 and 12 will be operated in both directions upon each revolution of the crank 21 on the shaft of the gear 19. This permits the rolling of a disk from a point near its center toward its periphery as well as in the opposite direction (i. e., from its periphery toward its center).

The housing 2 carries a pair of horizontal guideways 31 at a point below the line of pass between the upper and lower die elements 10 and 12 respectively. A horizontal table 33 is slidably disposed in the horizontal guideways 31 to support the wheel-blank, or other work-piece. This horizontal table 33 carries on its end adjacent the die elements 10 and 12 a vertical rotatable shaft 35. The upper end of the shaft 35 extends substantially above the upper surface of the horizontal table 33 and has a gear 37 secured thereto. A blank-centering pin 38 extends upwardly from the gear 37 and may, for example, be square in section in order to seat in a correspondingly contoured aperture in the center of the wheel-blank, or other work-piece. This blank-centering pin 38 is provided adjacent its upper extremity with a right angular aperture which accommodates a wedge-pin 39, the function of which is to make the blank secure on the horizontal table 33.

The horizontal table 33 also carries a vertical shaft 41 which is parallel to the vertical shaft 35. This vertical shaft 41 extends slightly above the upper surface of the horizontal table 33 and is provided at this point with a gear 42 which is secured thereto and meshes continuously with the gear 37 on the shaft 35.

The lower end of the vertical shaft 41 is journaled in a frame 43 which depends from the horizontal table 33. Immediately below the lower surface of the horizontal table 33 a worm gear 45 is secured to the shaft 41.

A horizontal shaft 47 is journaled on one of its ends on the housing 2 and extends into the frame 43 which depends from the horizontal table 33. This shaft 47 is square in section and carries on its extended end a worm 50 which is journaled in the frame 43. This worm 50 is constantly in mesh with the worm gear 45.

The end of the horizontal shaft 47 which is journaled on the housing 2 has secured thereto a gear 52 which is driven from an adjacently disposed motor 53 through a pinion 54.

The motor 53 may be operated to rotate the

blank-centering pin 38 on the horizontal table 33 regardless of the position of the latter with respect to the horizontal guideways 31.

A horizontal shaft 56 is journaled on the housing 2 below the horizontal guideways 31 and has secured thereto a pair of upwardly extending levers 57 the upper ends of which are connected to the horizontal table 33 through short pivoted links 58. A vertically extending lever 59 is secured to one end of the horizontal shaft 56 and carries on its extreme end a laterally offset portion 60 to which there is connected one end of a spring 61. This spring 61 depends vertically and its lower end is connected to the housing 2, as shown at 62. A downwardly extending bifurcated lever 63 is also secured to the horizontal shaft 56. A pin 64 is carried between the bifurcations of this lever 63 for pivotally supporting one end of a link 65. The other end of the link 65 extends beneath the shaft 4 which supports the lower die element 12 and is slotted, as shown at 66. A downwardly extending bifurcated lever 67 is secured to the shaft 4 and carries between its bifurcations a pin 68 which rides in the slot 66 of the link 65.

The movement of the horizontal table 33 away from between the die elements 10 and 12 is brought about by the contact of the pin 68 on the bifurcated lever 67 with the outer end of the slot 66 in the link 65. On the return stroke of the die elements 10 and 12 they do not engage the wheel-blank, or other work-piece B. The return movement of the work-piece is rapidly initiated by the operation of the spring 61 and is continued until this movement is arrested by the contact of the front edge of the table 33 with the edge of the lower die element 12, at which time the work-piece is in proper position with respect to both of the die elements preparatory to rolling. The motor 53 is momentarily set in motion, automatically or otherwise, to partially rotate the work-piece the required amount preparatory to making the next rolling stroke. This may be done at any time during which the die elements 10 and 12 are out of contact with the work-piece.

The beginning and end of the rolling stroke and the movement of the work-piece B are graphically illustrated in Figures 5 and 6.

While I have shown and described one specific embodiment of my invention, I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of my invention, as defined by the following claims.

I claim:

1. In an apparatus for radially rolling and tapering a disk-shaped metallic work-piece, a pair of coacting oscillatory rolling cams, the working surfaces of said coacting oscillatory rolling cams being constructed and arranged to oscillate in a direction which is opposite the direction of reduction during the rolling operation, a movable work-piece carriage, means for moving said work-piece carriage toward and away from said coacting oscillatory rolling cams prior to and after the rolling stroke, respectively, said means including a lost-motion connection operable in both directions of movement of said work-piece carriage, said lost-motion connection being operable to move said work-piece carriage toward said oscillatory rolling cams immediately prior to the rolling operation and away therefrom immediately after the rolling operation, said work-piece carriage being freely movable during the rolling operation in a direction which is opposite the direction of reduction, and means for restraining the movement of said work-piece carriage in both directions during the take-up of said lost-motion connection.

2. In an apparatus for radially rolling and tapering a disk-shaped metallic work-piece, a pair of coacting oscillatory rolling cams, the working surfaces of said coacting oscillatory rolling cams being constructed and arranged to oscillate in a direction which is opposite the direction of reduction during the rolling operation, a movable work-piece carriage, means for moving said work-piece carriage toward and away from said coacting oscillatory rolling cams prior to and after the rolling stroke, respectively, said means including a lost-motion connection operable in both directions of movement of said work-piece carriage, said lost-motion connection being operable to move said work-piece carriage toward said oscillatory rolling cams immediately prior to the rolling operation and away therefrom immediately after the rolling operation, said work-piece carriage being freely movable during the rolling operation in a direction which is opposite the direction of reduction, means for restraining the movement of said work-piece carriage in both directions during the take-up of said lost-motion connection, and means independent of the movement of said work-piece carriage for rotating said work-piece.

AXEL B. PEARSON.