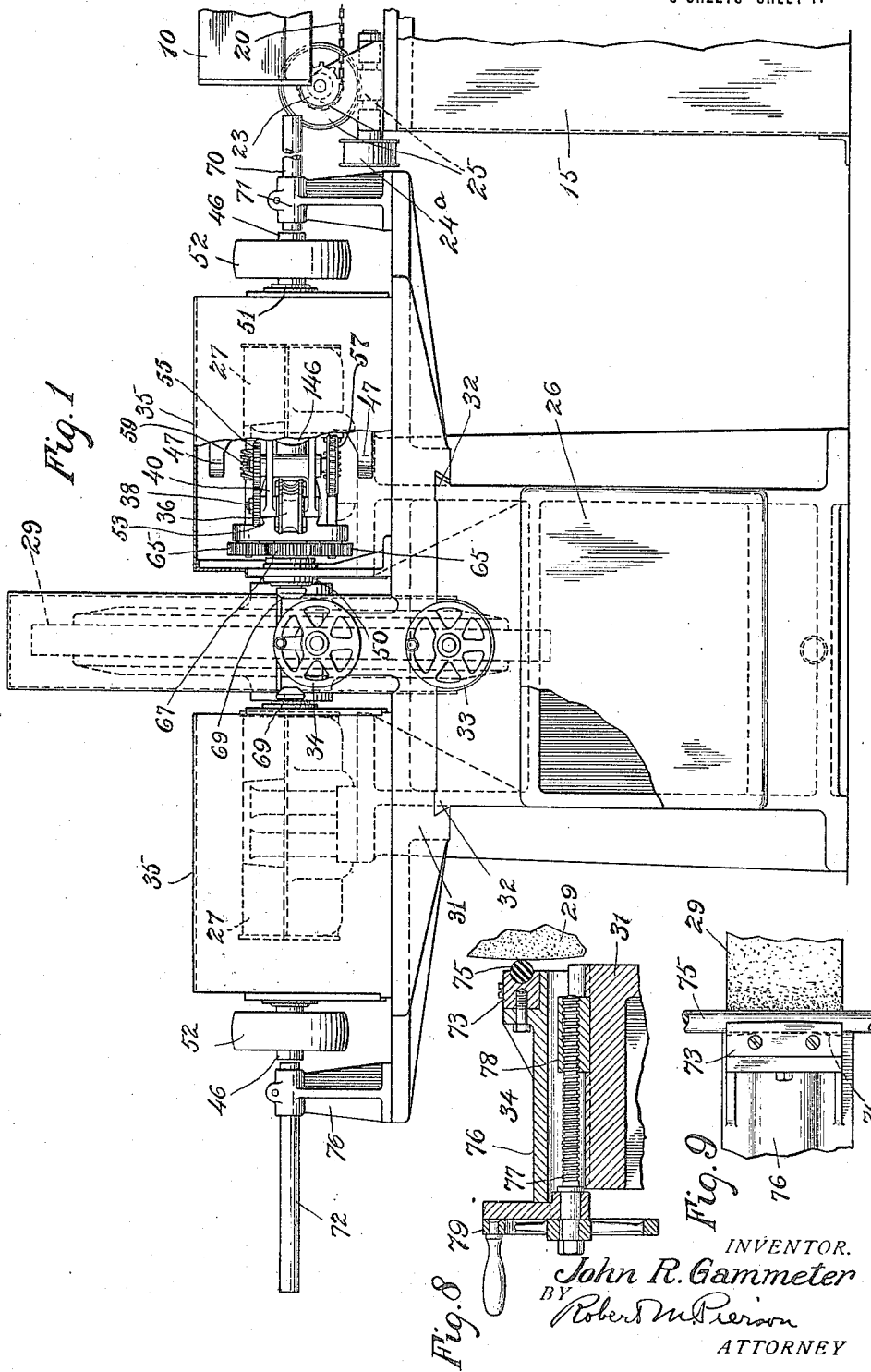


J. R. GAMMETER.
 ROD TURNING MACHINE.
 APPLICATION FILED FEB. 8, 1918.

1,301,679.

Patented Apr. 22, 1919.

3 SHEETS—SHEET 1.

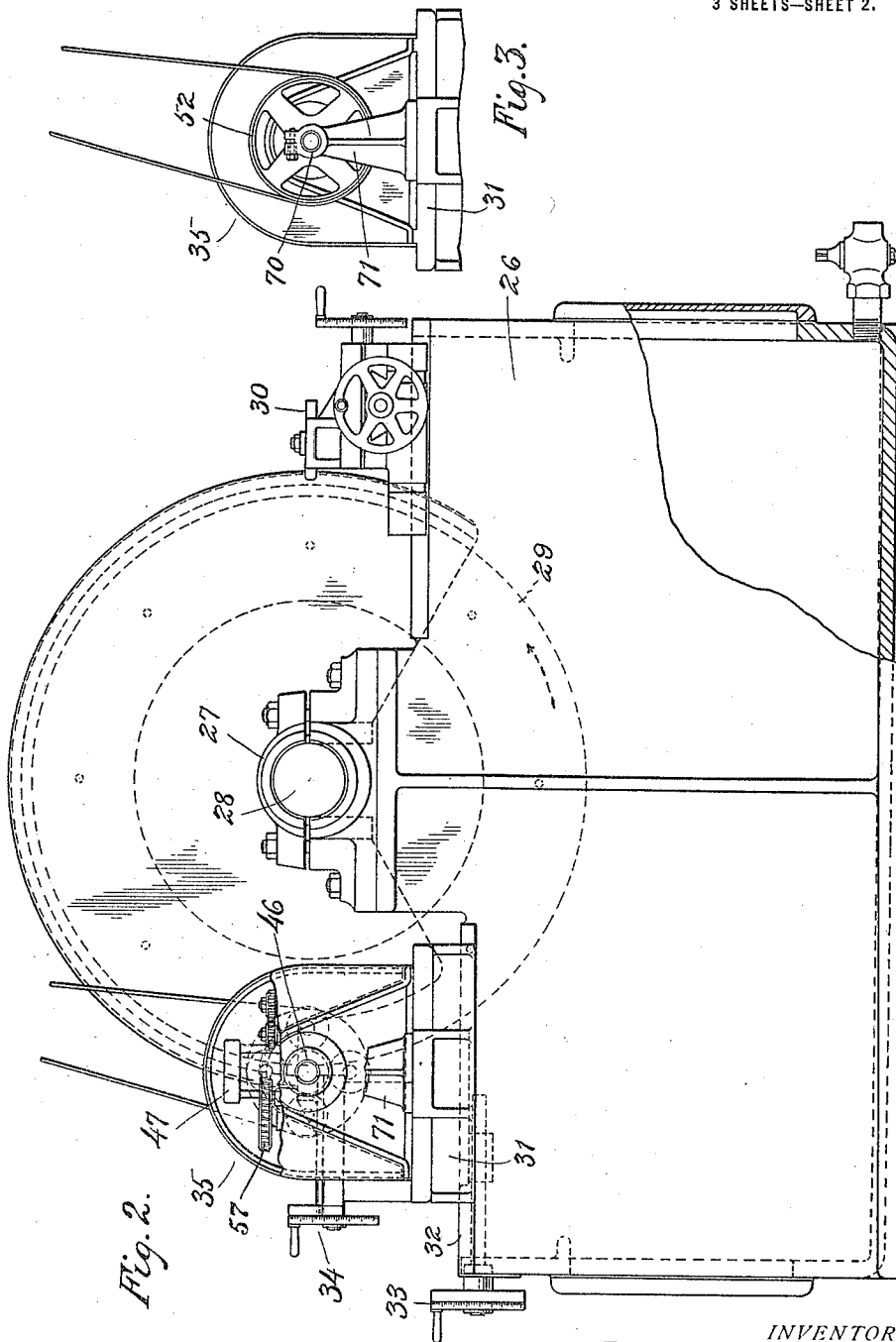


INVENTOR.
John R. Gammeter
 BY *Robert M. Person*
 ATTORNEY

J. R. GAMMETER.
 ROD TURNING MACHINE.
 APPLICATION FILED FEB. 8, 1918.

1,301,679.

Patented Apr. 22, 1919.
 3 SHEETS—SHEET 2.



INVENTOR.
John R. Gammeter
 BY *Robert M. Pierson*
 ATTORNEY

1,301,679.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

JOHN R. GAMMETER, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ROD-TURNING MACHINE.

1,301,679.

Specification of Letters Patent.

Patented Apr. 22, 1919.

Application filed February 8, 1918. Serial No. 216,066.

To all whom it may concern:

Be it known that I, JOHN R. GAMMETER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Rod-Turning Machines, of which the following is a specification.

This invention relates to machines for turning cylindrical rods of hard rubber, metal or other material, of the type employing an automatic mechanism for feeding the rods longitudinally and at the same time rotating them while subjected to the action of the grinding wheel or other stock-removing tool in order that the latter may reduce the rod to the form of a true cylinder of the desired diameter; together, preferably, with an automatic magazine feeder to automatically introduce the rods to the action of said rotating and feeding mechanism, and means to guide them before and after their introduction. My invention includes improvements in feeding chucks of the centrifugal gripping type for machines of this character, and improvements in the side-thrust block or work-rest.

Of the accompanying drawings,

Figure 1 is a front elevation, partly broken away, showing a rod-grinding machine embodying my improvements.

Fig. 2 is an end elevation, partly broken away.

Fig. 3 is a detail end elevation of one of the feeder drives.

Fig. 4 is a vertical longitudinal section and elevation of one of the units of the feeder-chuck mechanism.

Fig. 5 is a cross section on the line 5—5 of Fig. 4.

Fig. 6 is a perspective view of the rod magazine and its positive feeder.

Figs. 7, 8 and 9 are, respectively, a perspective view, a longitudinal section and a detail plan view of the device for opposing the lateral thrust of the grinding wheel against the work.

For storing a quantity of the unground rods and positively introducing them one-by-one to the action of the frictional rod-feeding devices or feeder-chucks, I employ a magazine 10 supported by legs 11 upon a base-plate 12 which has a tongue-and-groove guiding connection 13 with a bed-plate 14, the latter being mounted upon a pedestal 15,

and the base-plate having slots 16 occupied by bolts 17 for the purpose of fixing the magazine at the proper distance from the first unit of the feeder-chuck mechanism. The magazine comprises a sloping chute or platform 18 on which the rods are stored, an oppositely-sloping wall 19, and a guard-strip 19^a adjustably mounted on the latter in a position to admit the lowermost rod in the stack. At the bottom of the platform 18 runs the upper stretch of an endless chain 20 having a suitable number of projections 21 thereon for engaging the rear end of the lowermost rod and positively advancing it from the bottom of the stack, said chain being mounted upon sprocket wheels 22, 23, the latter of which is driven by a belt 24, through a pulley 24^a and worm gearing 25.

26 is a hollow pedestal or tank having bearings 27 in which is journaled the shaft 28 of a grinding wheel 29, the latter being composed of a suitable abrasive, such as carborundum, and rotated at high speed in the direction of the arrow by a belt and pulley (not shown). 30 is an adjustable dressing tool for truing the edge face of the grinding wheel.

31 is a sliding base carrying the feeder-chuck devices and mounted on guides 32 on the pedestal 26 for adjusting the radial position of the rod axis with reference to the edge face of the grinding wheel, and 33 is a graduated hand-wheel adjustment for fixing the position of the work accurately in the desired relation to said grinding wheel. 34 is a lateral-thrust-opposing device hereinafter described.

The rod-rotating and feeding units are two in number, of similar construction, located in casings 35 upon opposite sides of the plane of the grinding wheel, for successively engaging and rotating the rods and progressively feeding them past the wheel. These devices are of the nature of work-feeding friction chucks, and each embodies in its construction two serially-positioned pairs of work-gripping wheels 36, 36, 37, 37 occupying planes at right-angles to each other and having grooved peripheries of frictional material such as compressed cloth, paper, vulcanized fiber or the like, the laminations of which are indicated in Fig. 5. These wheels have an orbital movement about the axis of the work and also a rotary movement on their own axes, being secured

to shafts 38, 39 mounted in bearings on the extremities of levers 40, 41 which are fulcrumed on shafts 42, 43 journaled in bearing bosses 44, 45, formed upon a hollow shaft 46, the levers and their wheels being thus carried eccentrically or orbitally on said shaft. The other ends of the levers are formed with weights 146, 47 which tend to rock the levers and press the gripping wheels against the work by the action of centrifugal force when the shaft 46 is rotated. Said shaft has a central aperture or bore 147 for the passage of the rods, and side openings 48, 49 thereto for admitting the gripping wheels. The shaft is mounted in anti-friction bearings 50, 51 and provided with a belt pulley 52 for rotating it.

For positively rotating the several gripping wheels, spur gears 53, 54 are keyed to the shafts 38, 39 and meshed with mating spur gears 55, 56 keyed to the fulcrum shafts 42, 43. On the opposite ends of the latter are secured worm gears 57, 58 which mesh with worms 59, 60 formed on shafts 61, 62, the latter being mounted parallel to the shaft 46 in anti-friction bearings 63, 64 and carried around orbitally by the rotation of said shaft 46. On the ends of the worm shafts are secured planetary spur-gear pinions 65, 66 meshing with central spur gears 67, 68 which are secured to the housings of the ball bearings 50, 51 and thereby held against rotation. 69 is a frusto-conical shield on the end of shaft 46 adjacent to the grinding wheel for protection against the entrance of water and grindings from said wheel.

70 is a tubular guide interposed between the magazine 10 and the receiving end of the hollow shaft 46 of the first feeder-chuck unit, in line with said shaft and with the discharging point of the magazine, for guiding and conducting the rods from said magazine into the hollow shaft, this guide being clamped in a bracket 71 on the slide 31. A similar guide 72 is clamped in a bracket 73 in line with the discharge end of the hollow shaft 46 in the second feeder-chuck unit.

Opposite the working edge of wheel 29, at the grinding position, is a lateral-thrust block or work support 73 incorporated in the thrust device 34 which is shown in detail in Figs. 7, 8 and 9. The face of this block is formed with a half-round groove 74 whose middle portion is parallel with the line of feeding movement and whose ends slope toward and away from said line to give the forward end of the rod 75 a proper entrance as it approaches, and relieve the side thrust on its finished rear end just as it leaves the grinding wheel. Block 73 is mounted on a slide 76, which in turn is guided for transverse movement on the main cross-slide 31, and adjusted by

means of a screw 77 which works in a relatively-stationary nut 78, the screw being suitably shouldered against its slide 76 and having a hand-wheel 79 for turning it to perform the adjustment of block 73.

In the operation of the machine, a quantity of unground rods is stacked on the platform or chute 18 of the magazine 10, and the projections 21 on the chain 20 running along the bottom of said magazine cause the rods to be positively fed one-by-one from the bottom of the stack into the guide tube 70. The automatic magazine feeder could be dispensed with and the rods introduced by hand to the hollow shaft of the first feeder-chuck unit without departing from my invention, but such method would involve constant attendance at the receiving end, and would be less convenient and satisfactory than the one shown. The chain advances the rod 75 into the grip of the first pair of grooved friction wheels of the right-hand chuck unit shown in Fig. 1, corresponding to the pair of wheels 37 of the left-hand unit illustrated in Fig. 4, and the rod is thereby advanced to the second pair of grooved wheels 38, and thence out through the end shield 69 of the first unit, across the edge face of the abrasive wheel 29 and into and through the end shield 69 and hollow shaft 46 of the second unit, whose gripping wheels engage the rod and continue its feeding movement until the finished rod is discharged through the tubular guide 72, each successive rod being pushed out of said guide by the rod behind it. The rotation of the gripping wheels is caused by the orbital movement of the planetary pinions 65, 66 about the central fixed gears 67, 68, producing rotation of the planet gears which is transmitted through the intermediate worm and spur gearing to the gripping wheels. The centrifugal weights 146, 47 keep the gripping wheels yieldingly pressed against the rod, and the orbital revolution of said wheels turns the rod about its own axis during the longitudinal feeding movement thereof, so that the stock is uniformly removed during the transit of the rod across the periphery of the abrasive wheel 29, and the rod is thereby ground to a true cylindrical surface of a diameter determined by the radial distance between the rod's axis and said periphery of the grinding wheel. The thrust-block 73 keeps the rod from being deflected by the side pressure of the grinding wheel against it, and properly guides said rod in passing from the first chuck unit, across the open space and into the second unit. The employment of the centrifugally-weighted levers makes it possible to dispense with springs for holding the gripping wheels against the work. The provision in each chuck of two serially-mounted pairs of gripping

wheels in different planes furnishes adequate driving power without heavy pressure and more accurately centralizes the work than in chucks using only a single pair of wheels.

In place of the grinding wheel, any other suitable rod-turning or stock-removing or other tool may be employed, and various modifications of constructional embodiment may be made without departing from my invention.

I claim:

1. In a rod-turning machine, a hollow rotary shaft, a lever pivoted eccentrically thereon and having a centrifugal weight at one side of its pivot, a rod-gripping friction wheel journaled on said lever at the other side of its pivot, and means for positively rotating said wheel on its axis.

2. In a rod-turning machine, a chuck comprising two sets of rod-gripping friction wheels serially positioned in fixed angular relation in different planes, means for orbitally revolving them to rotate the rod, and means for positively rotating said wheels to advance the rod axially.

3. In a rod-turning machine, a hollow rotary shaft, two pairs of rod-gripping wheels journaled eccentrically thereon in planes at right angles, and means for positively rotating said wheels on their axes.

4. In a rod-turning machine, a hollow rotary shaft, two pairs of grooved, rod-gripping wheels eccentrically mounted thereon in planes at right angles, centrifugally-actuated means for projecting said wheels toward the shaft axis, and means for positively rotating said wheels on their axes.

5. In a rod-turning machine, a hollow rotary shaft, a lever eccentrically pivoted thereon and having on opposite sides of its pivot a centrifugal weight and a rod-gripping wheel, a gear carried by the lever co-axially with said wheel for rotating the latter, an intermeshing gear co-axial with the pivot of said lever, a stationary gear concentric with the shaft, and gearing connect-

ing said intermeshing gear and said stationary gear.

6. In a rod-turning machine, a chuck comprising two pairs of positively-driven, centrifugally-actuated, rod-gripping wheels serially positioned in fixed angular relation in different planes, and means for rotating said chuck.

7. In a rod-turning machine, a hollow rotary shaft, stationary gears at opposite ends of said shaft, concentric therewith, two pairs of centrifugally-actuated rod-gripping wheels serially located on said shaft in planes at right angles, and two sets of gearing on said shaft, adapted to rotate the respective rod-gripping wheels and including orbital gears meshing with the respective stationary gears.

8. In a rod-turning machine, the combination of a rod-treating tool, and two automatic chuck-mechanisms located in positions anterior and posterior to said tool for successively engaging the rods and simultaneously rotating and axially advancing them while subjected to the action of the rod-treating tool, each said mechanism including two pairs of positively-rotated gripping wheels serially positioned in fixed angular relation in different planes.

9. In a rod-turning machine, the combination of means for axially feeding and rotating the work, a stock-removing tool mounted alongside the path of the work, and an opposed lateral-thrust member having a grooved working face with an entrance slanting toward the line of feed.

10. In a rod-turning machine, the combination of means for axially feeding and rotating the work, a stock-removing tool mounted alongside the path of the work, and an opposed lateral-thrust member having a grooved working face with an exit slanting away from the line of feed.

In testimony whereof I have hereunto set my hand this 6 day of February, 1918.

JOHN R. GAMMETER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."