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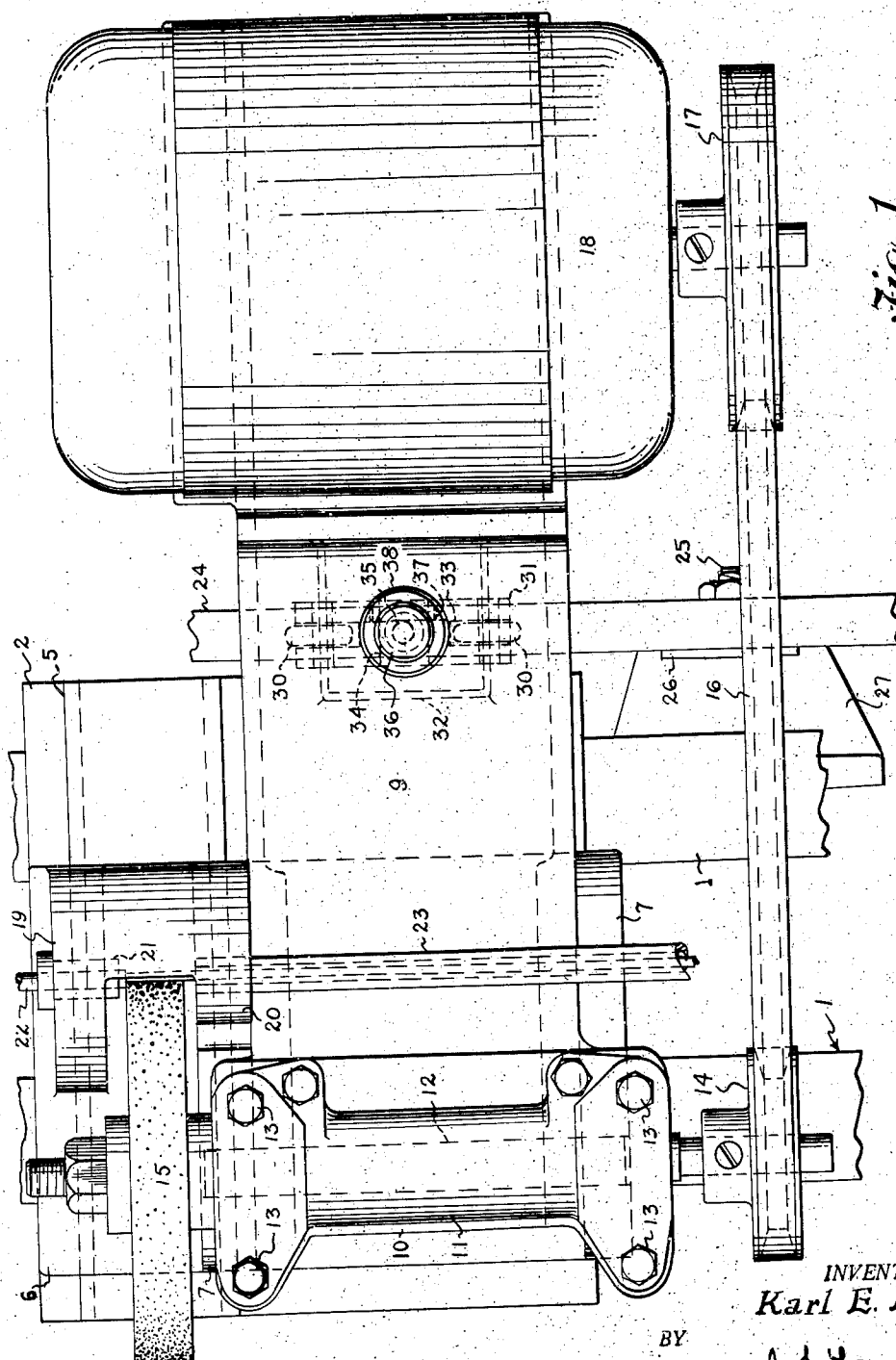
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2,463,783

GRINDING MACHINE FOR BAR STOCK

Filed April 5, 1946

3 Sheets-Sheet 1



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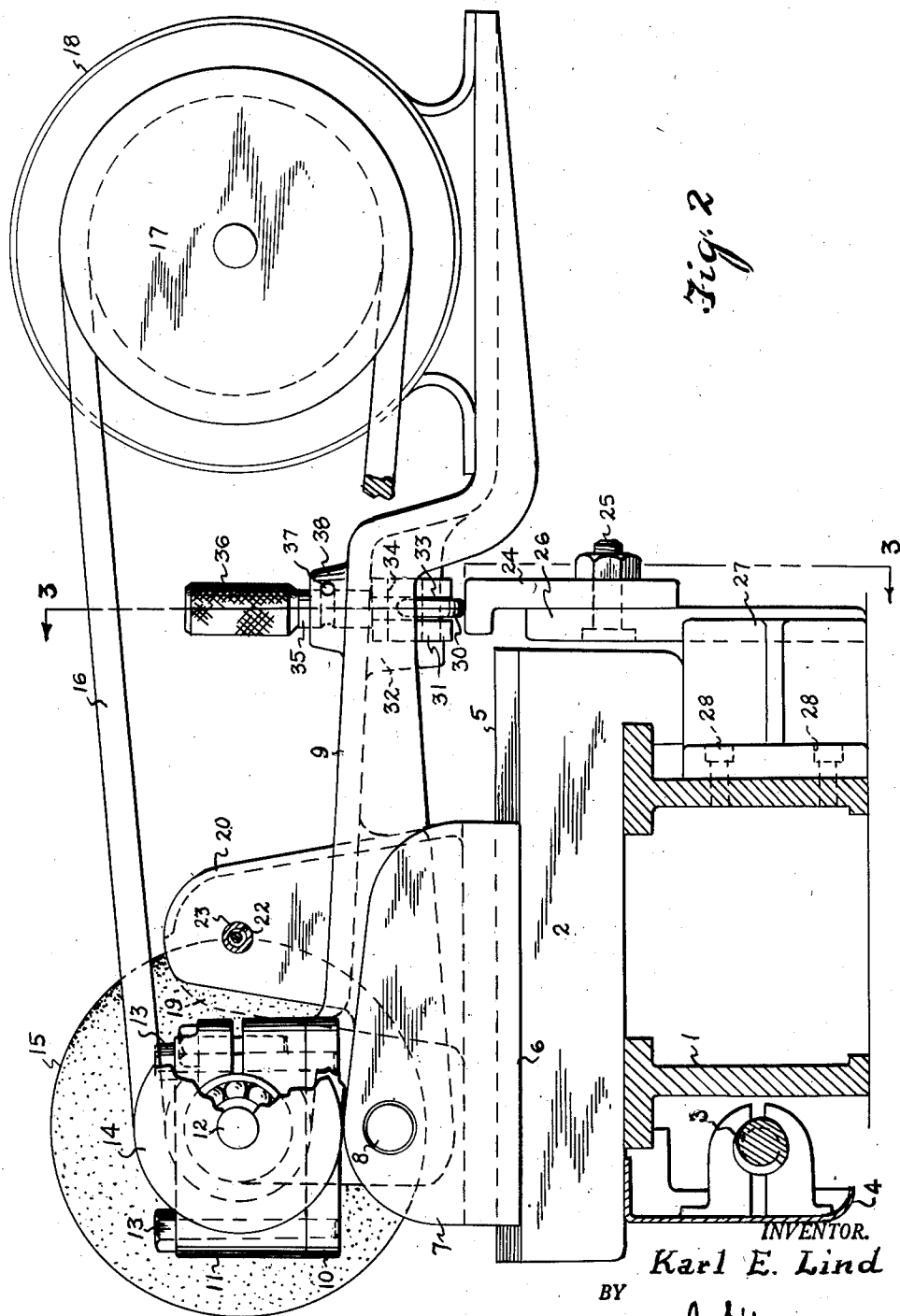


Fig. 2

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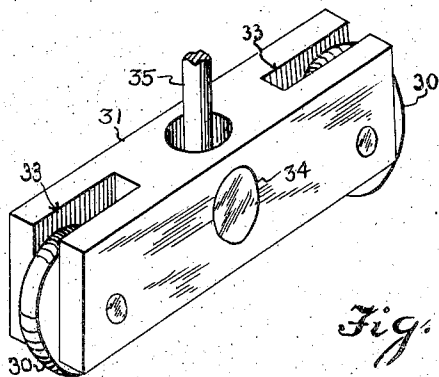
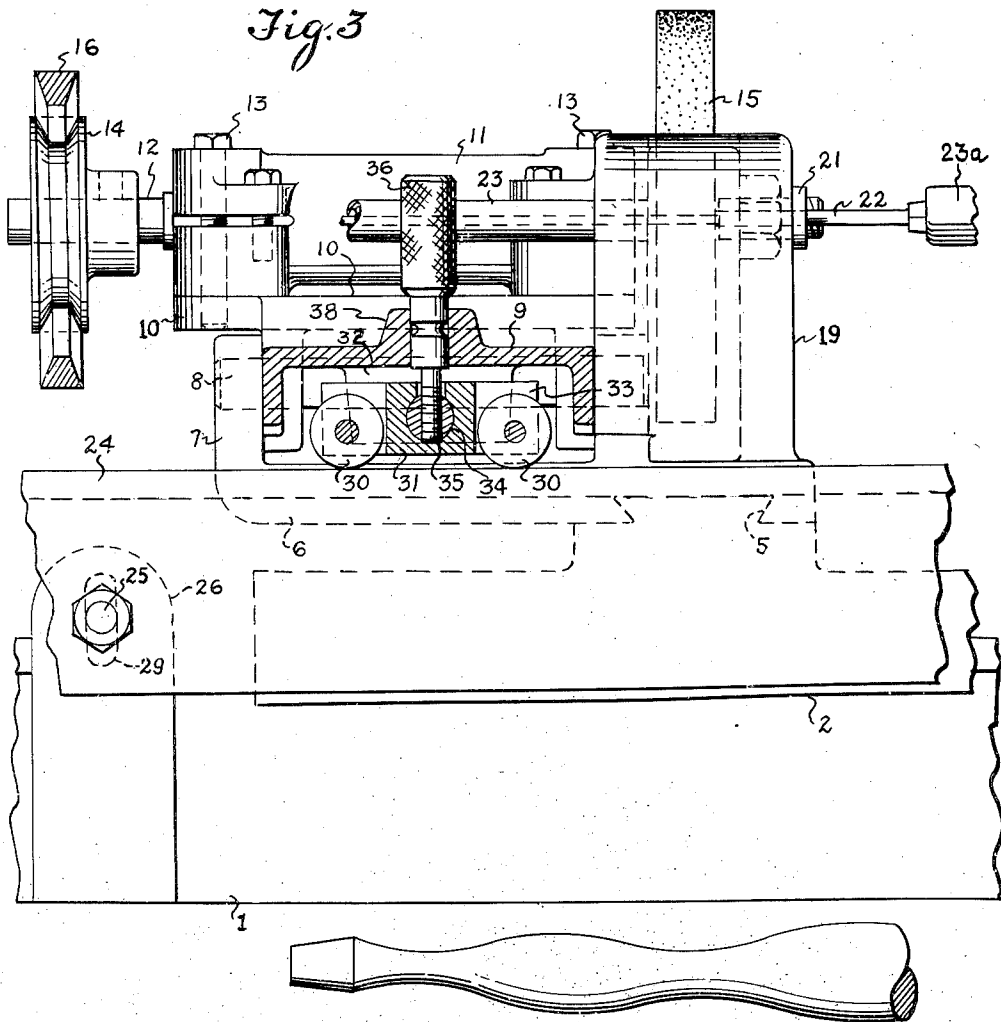
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GRINDING MACHINE FOR BAR STOCK

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7 Claims. (Cl. 51—50)

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This invention relates to grinding machines and particularly machines for grinding bar stock to a predetermined contour.

An object of the invention is to provide a machine adapted to be quickly and easily attached to an ordinary lathe, converting the latter into a bar stock grinder.

Another object is to adapt a grinding machine to readily apply a gradual taper or other selective contour to bar stock.

Another object is to adapt the lead screw of a lathe to feed a grinding machine along the lathe bed for progressively applying a desired contour to a length of bar stock driven by the lathe spindle.

Another object is to journal a grinding wheel on a pivotal carrier also mounting a drive motor for said wheel, and to utilize the weight of the motor to urge the wheel toward the work with a desired definite force.

Another object is to adapt said carrier to be fed lengthwise of the work along a track which may be selectively inclined to progressively vary the depth of cut taken by the wheel, thus applying a desired taper to the work.

Another object is to accurately position a length of rotating bar stock with relation to a grinding wheel acting on and advancing lengthwise of such stock.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, wherein:

Fig. 1 is a top plan view of the improved machine as attached to a lathe.

Fig. 2 is a side elevational view of the same.

Fig. 3 is a vertical cross section on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of a roller-mounting block employed in the machine.

Fig. 5 is a view exemplifying a contour which the machine may impart to bar stock.

In these views, the reference character 1 designates a lathe bed comprising the usual pair of spaced beams, said bed slidably mounting the usual carriage 2 adapted to be advanced at a selective speed by the usual lead screw 3, engaged by an apron 4 depending from the carriage. Ordinarily the carriage 2 mounts a cross feed carriage (not shown), a dovetailed rib 5 being extended transversely of the lathe on the top face of the carriage 2 as a guide means and retainer for such cross feed carriage. In applying my machine to a lathe, the cross feed carriage is removed and replaced by a horizontal base plate

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6, formed in its bottom face with a groove dovetailed to fit said rib.

Supported on and above the plate 6 by a pair of spaced uprights 7, is a pivot pin 8 parallel to the lathe bed. Pivoted on such pin and held in place by the uprights 7, is one end of an elongated platform 9, projecting rearwardly beyond the carriage 2. The platform 9 has its pivotal forward end portion somewhat enlarged, as indicated at 10 to seat a bearing block 11 for a spindle 12 parallel to and spaced above the pin 8, the ends of the block being secured to the seat 10 by stud bolts 13. The ends of the spindle 12 project from the block 11 to respectively mount a pulley 14 and a grinding wheel 15, a drive being transmitted to such pulley through a belt 16 from a pulley 17 on the shaft of an electric motor 18 on the rear end of the platform 9. The platform is preferably downwardly ribbed from end to end thereof so as to form an inverted channel, and it is further preferred to downwardly offset the rear end portion of the platform to dispose the motor shaft substantially in the horizontal plane of the spindle 12.

Integrally upstanding from the plate 6 adjacent to and at opposite sides of the grinding wheel are a pair of pedestals 19 and 20, the latter being illustrated as an extension from one of the uprights 7, the pedestal 19 being between the pedestal 20 and the lathe headstock (not shown). Transversely fixed in the pedestal 19 is a bushing 21, interiorly proportioned to serve as a positioning bearing for a length of rotating bar stock 22 requiring machining. Fixed in the pedestal 20 and projecting therefrom toward the tailstock (not shown), is a metal tube 23 of any desired length for receiving and positioning machined work. The bushing 21 and tube 23 are of course aligned, their common axis being transverse and approximately tangential to the grinding wheel and at least approximately in the horizontal plane established by the wheel axis.

It will now be evident that weight of the motor tends to downwardly rock the platform on the pin 8 and to thereby urge the grinding wheel toward the stock 22. Hence the depth of cut may be regulated by controlling response of the platform 9 to such weight, as will be now described. Fixed on the lathe bed in any suitable manner is a track 24 extending lengthwise of said bed at the rear of the carriage 2 and beneath the mid portion of the platform 9. As shown, the track is attached by several bolts 25 to adapters 26, each carried by a bracket 27 bolted at 28 to the lathe bed. The adapters are vertically slot-

ted at 29 to receive the bolts 25, whereby the track may be horizontally disposed or may have a gradual inclination toward either end. Seating on the track 24 to travel lengthwise thereof are a pair of horizontally spaced rollers 30 carried by the platform, and a provision is made for vertically adjusting such rollers relative to the platform to accurately regulate spacing of the platform above the track and hence the depth of cut taken by the grinding wheel. Thus the rollers are journaled in opposite ends of a mounting formed by a block 31, set into a housing 32 formed on and beneath the platform. Said block is free to slide up and down in said housing and has slots 33 in its ends to accommodate said rollers. Centrally set into the described block is a pin 34 parallel to the roller axes, the block being freely pivotal on such pin. An adjusting screw 35, threaded into a socket diametrically formed in the pin 34 extends upwardly through the platform and carries a milled operating knob 36 above the platform. A pin 37 set into a boss 38 upstanding on the platform engages in an annular groove of the screw shank, restraining the latter from lengthwise travel while affording it free rotation.

In use of the described machine, the track 24 will be set horizontally for machining bar stock to a uniform diameter, and if the stock is to be tapered, the track is inclined at the desired angle of taper. As the machine is advanced along the lathe bed by the lead screw 3, the grinding wheel is rapidly driven by the motor 18, and the stock to be machined is rotatively driven by the lathe chuck (not shown). The R. P. M. of the stock may be considerably less than of the grinding wheel. If the track is horizontal, the wheel will take a uniform cut depending in depth jointly on the extent of elevation of the track and on the adjusted position of the block 31 with respect to the platform. The regulation effected by screwing the block up or down obviously affords much greater accuracy than a track adjustment. The track adjustment is primarily useful in predetermining the pitch of any taper which it is desired to impart to the stock. Fulcruming of the block 31 midway of its length assures that both rollers 30 will properly seat on the track, regardless of the adjusted position of said block. While a single roller might serve the purpose, greater accuracy and longer life is assured by the construction illustrated. It is important to note that the same machine may well be employed to form bar stock with numerous predetermined contours other than a taper, if desired. Thus for example, there is shown in Fig. 5, a length of stock ground to varying diameters, obtainable obviously by imparting a similar contour to the roller seating face of the track 24. A single traverse of the carriage along the stock to be machined suffices to impart a desired contour.

While the invention has been disclosed as a lathe attachment, it is obvious that it may be otherwise associated with a traveling carriage and rotatively driven stock to machine the latter. For facing lengths of cylindrical bar stock, the described machine may replace special lathes now employed and produce a smoother and more accurate job at a reduction in cost.

What I claim is:

1. In a grinding machine, the combination with a grinding wheel, a carrier for said wheel, a carriage for advancing the wheel along a work surface, and means pivoting the carrier on said carriage, of a track extending in the direction of

carriage advance, a pair of rollers engaging the track and spaced lengthwise of the track, a mounting for said rollers, a screw on said carrier for adjusting said mounting to and from the track, and means on the carrier resisting rotation of the mounting about the screw axis.

2. In a grinding machine as set forth in claim 1, means pivoting said mounting on the screw to turn about an axis parallel to and substantially equidistant from the roller axes.

3. In a machine for grinding rotating bar stock, a grinding wheel, a carrier for said wheel, a carriage, means for advancing the carriage lengthwise of the stock, means pivoting the carrier on the carriage about an axis affording movement of the wheel to and from the stock, a guide for the stock adjacent to and at one side of the wheel and mounted on said carriage, means for biasing said carrier about said axis toward the stock position established by said guide, and a track extending substantially in the direction of carriage advance and limiting the carrier response to said biasing means.

4. In a machine for grinding rotating bar stock as set forth in claim 3, a guide tube for machined stock mounted on the carriage at the opposite side of the grinding wheel from the specified guide.

5. In a grinding machine, the combination with a grinding wheel, a carrier for said wheel, a carriage for advancing the wheel along a work surface, and means pivoting the carrier on the carriage, of a track extending in the direction of carriage advance, a pair of members spaced lengthwise of the track and engaging the track to travel thereon, a mounting for said members, and means on the carrier attaching said mounting to the carrier and affording an adjustment of the mounting to and from the carrier, the mounting being pivotal on said attachment means about an axis substantially equidistant from said spaced members.

6. In a grinding machine, the combination with the elongated frame of such machine, of a carriage mounted for rectilinear travel on said frame, a carrier pivoted on said carriage and comprising an upstanding arm substantially above the carrier pivot and a relatively long laterally projecting arm, a motor carried on the free end portion of the laterally projecting arm, a grinding wheel journaled on said upstanding arm, a drive connection from the motor to the grinding wheel, a track mounted on said frame and extending beneath the laterally projecting arm in the direction of travel of said carriage, and a roller journaled on said laterally projecting arm and held to said track by the weight of the motor.

7. In a grinding machine as set forth in claim 6, a work guide on said carriage establishing a work axis toward which said grinding wheel is urged by the weight of the motor.

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