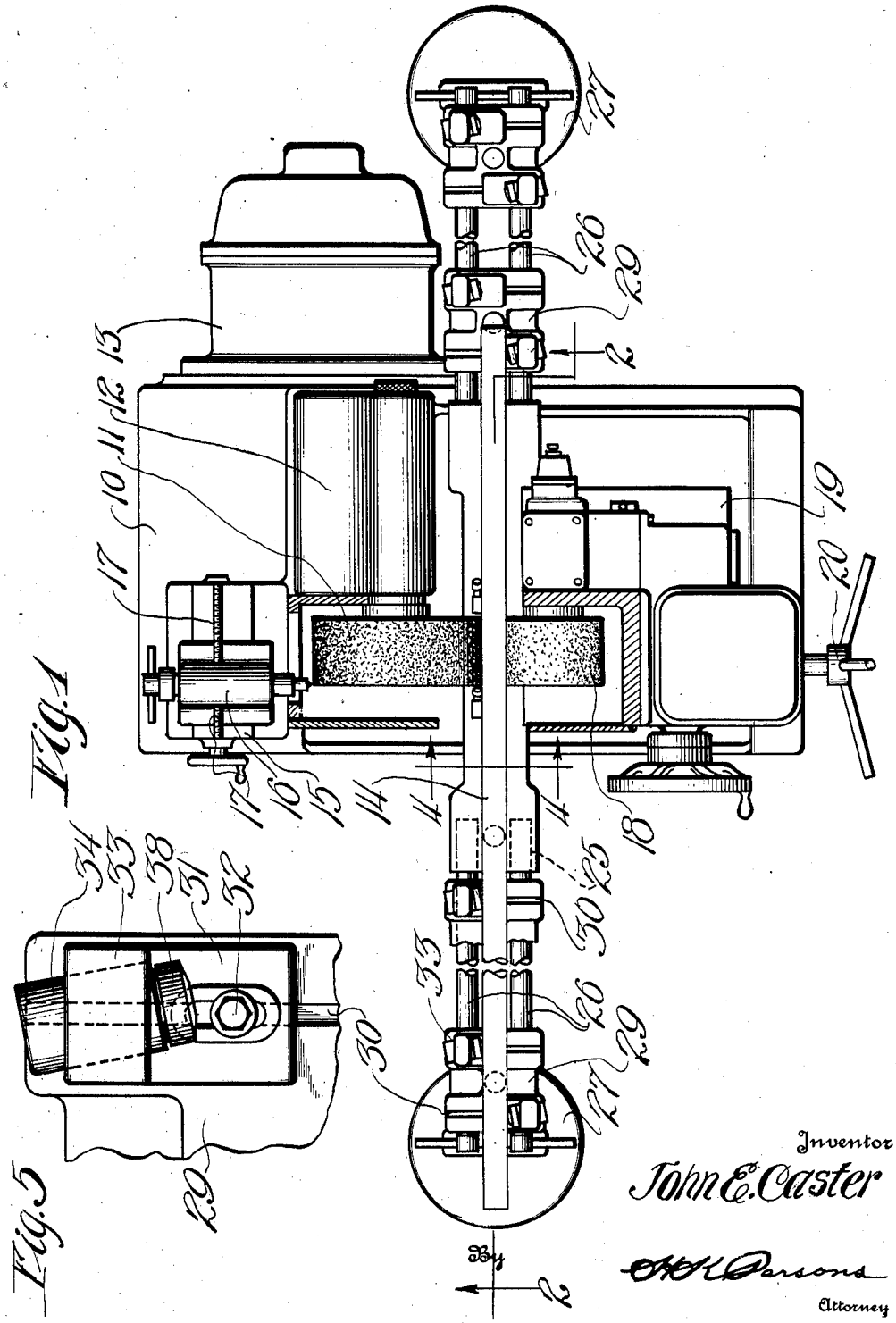
Sept. 8, 1931. J. E. CASTER 1,822,337

GRINDING MACHINERY

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GRINDING MACHINERY

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Fig. 2

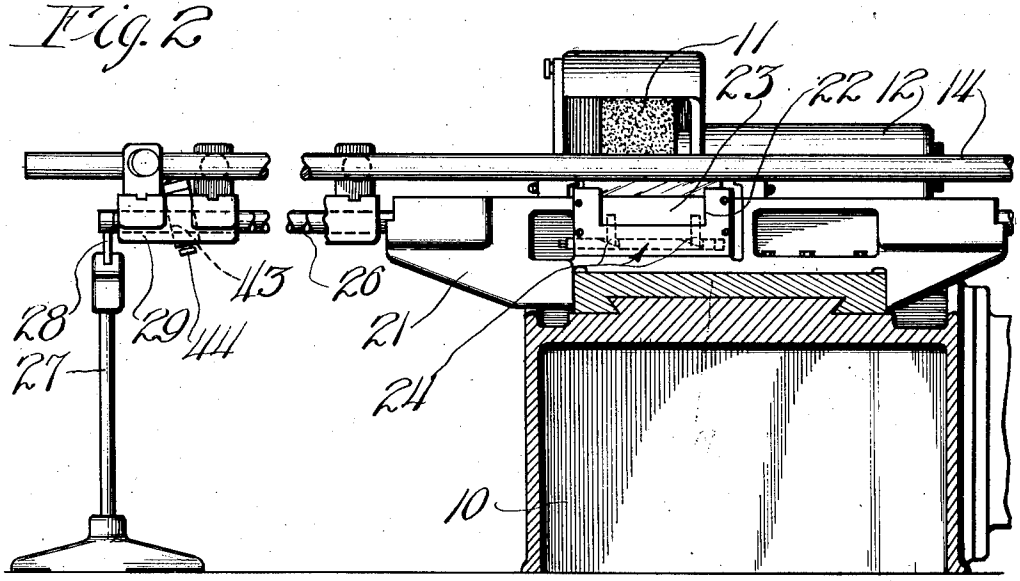
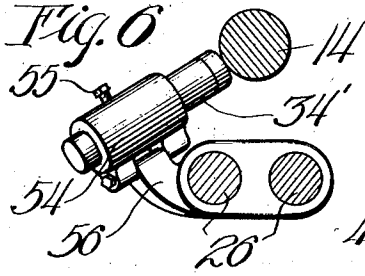


Fig. 6



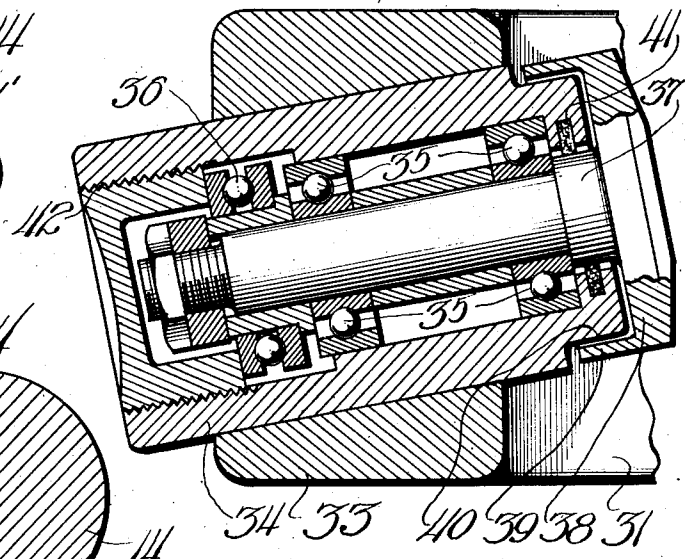
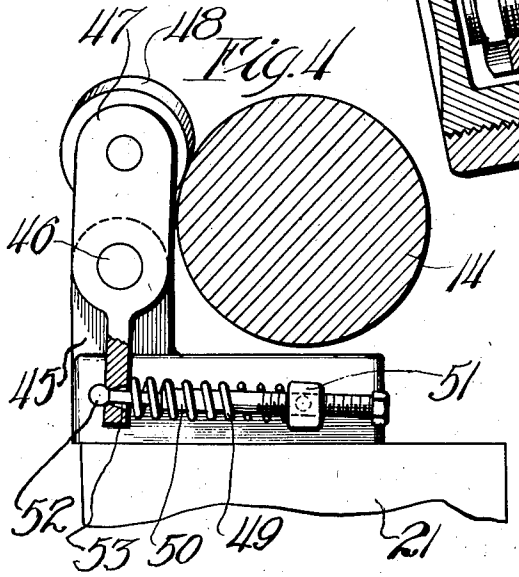


Fig. 3

Fig. 4



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Patented Sept. 8, 1931 1,822,337

UNITED STATES PATENT OFFICE

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GRINDING MACHINERY

Application filed July 12, 1927. Serial No. 205,219.

This invention relates to improvements in grinding machinery and has particular reference to an improved structure particularly adapted for the use in grinding of bars or other long cylindrical articles.

The prime object of the present invention is the provision of a structure particularly applicable for use in conjunction with a centerless grinding machine which will facilitate the accurate handling and proper feeding of long or heavy work pieces axially through the machine.

A further object of the invention is the provision of means for supplementing the friction grip of the regulating wheel in imparting the feed components to the work at the same time reduce the liability of slippage between work and regulating wheel.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification taken in connection with the accompanying drawings, and it will be understood that any structural modifications may be made within the scope of the appended claims without departing from or exceeding the spirit of the invention.

Figure 1 is a plan view of a centerless grinder embodying the present improvements.

Figure 2 is a view partially in elevation and partially in section taken as on the line 2—2 of Figure 1.

Figure 3 is an enlarged sectional view through one of the work engaging members and the supports therefor.

Figure 4 is a fragmentary section as on line 4—4 of Figure 1, and

Figure 5 is an enlarged plan view of one of the adjustable work engaging members.

Figure 6 is a detail view of a modified form of roll support.

In the drawings the numeral 10 designates the bed of a centerless grinding machine provided with the grinding wheel 11 journalled in the bearings 12 and driven as from the attached motor 13. This wheel is operated at a high or grinding rate of speed as for example 5,000 feet surface speed per minute and in a clockwise direction as the machine is viewed from the left, Figure 1, so that its grinding face moves downwardly at its point of engagement with the work 14.

To preserve proper surface on the face of the grinding wheel the bed preferably supports the guideway 15 for a suitable truing device 16 transversely shiftable across the face of the grinding wheel as by feed screw 17.

Disposed in opposition to the grinding wheel at its point of engagement with the work, is the regulating wheel 18 rotating about its axis in the same direction as the grinding wheel, so that its operative or work engaging portion moves in a direction opposite that of the adjacent face of the grinding wheel. This regulating wheel is preferably supported on slide 19 adjustable toward and from the work as by control wheel 20. It is rotated at a slow rate of speed and serves to frictionally engage and control the rate of rotation of the work. Incidentally, it is ordinarily set at an angle to the axis of the work, so that it exerts a diagonal thrust providing a feed component tending to urge the work axially through the machine.

To support the work during its grinding in the case of long bars or the like, use is made of a special bracket frame 21 secured to the slide 19 and movable therewith as the regulating wheel unit is adjusted. This bracket is centrally formed with a recess or relieved portion 22 in which is slidably mounted a work rest blade 23. Vertical adjustment for proper engagement with the work may be imparted to this work blade as through the wedge mechanism indicated at 24.

The ends of the bracket are provided with sockets 25 to receive the extension guide rods 26 laterally projecting at both sides of the machine for engagement with the work prior to its entry into the grinding throat between the wheels and to properly support the work against springing, whipping or the like as it passes out of the grinding throat. Suitable means such as the standards 27 having cap portons 28 interengaging with the outer ends of the rods 26 serve to properly support these ends to whatever distance they may be extended for particular work.

The parts 26 have mounted thereon a plurality of bracket blocks 29 having the ways 30 for the work contact slides 31. These latter may be secured in adjusted position on the bracket as by the clamp screws 32. Slides 31 are formed with the offset lug portions 33 receiving sleeves 34. Sleeves 34 in turn house the radial bearings 35 and thrust bearing 36 on spindle 37 supporting the spindle for free rotative movement and against binding on axial pressure thereagainst. The outer end of the spindle carries the frustro conical work engaging head 38 provided with a depending flange portion 39 overlying the reduced end 40 of the sleeve 34 to protect the sleeve from grit, abrasive or liquid tending to injure the contained bearings. This action is supplemented by the packing washer 41 at the forward end and by the screw plug closure 42 at the opposite end of the sleeve. This latter serves to retain in place the spindle and its supporting bearings as clearly illustrated in Figure 3. By reference to the drawings it will be noted that there are a plurality of units each having the frustro conical cap 38, the units being disposed in staggered relation for engaging the underside and opposite or lateral portions of the work, so that the same is held in proper alinement with the work rest and grinding throat both vertically and laterally. As a result it is accurately introduced between the grinding and regulating wheel and with equal accuracies led away from these wheels insuring work of correct diameter, roundness and straightness.

The members 38 at the sides are so disposed that the work engages a non-radial line thereon in such manner that the spinning or rotating movement imparted to the work by the pressure in the same direction of the grinding wheel and regulating wheel thereagainst causes the frustro conical cap members to exert a forward feeding component in connection with their rotation. The members are so designed as to exert an equal or greater component in this direction than does the regulating wheel itself, so that they fully supplement the action of this wheel in aiding the speed of the work through the machine.

With reference to the drawings it is to be noted that it is of course quite feasible to impart an in and out adjustment to the lateral members by loosening of clamp 32 and sliding same inward into proper engagement with the work. To facilitate a corresponding adjustment of the bottom or work supporting guide roll this member is preferably slidable through an aperture as at 43 in the bracket 29 and is adjusted and locked in place as by headed screw 44.

To augment additionally the grip between regulating wheel and work, there is preferably utilized a supplemental pressure roll such as shown in Figure 4. Rising from the main bracket 21 is an ear 45 to which is pivoted as at 46 the pressure arm 47 bearing work contacting roller 48. This roller is urged in the direction of the work piece 14 as by spring 49 mounted on limiting screw 50. This latter is in threaded engagement with lug 51, the spring 49 being interposed between the lug and lower end of the lever, while the screw has a ball head 52 interengaged with the outer face of the lever and extends through the conical aperture 53, which allows of suitable play of the roll but limits its inward urge. It will thus be noted that this roller may be set to exert a constant pressure of the work against the regulating wheel while the roll itself is permanently tilted or set at an angle so that as it rolls against the work it will have a corresponding feed component to that of the regulating wheel. On account of the fact that this member is disposed adjacent the grinding wheel it will be noted that it is tilted in the opposite direction from the direction of tilt of the regulating wheel.

Figure 6 shows a modified form of support for the member 38 in that the sleeve 34′ is slidable in the secondary sleeve 54 being adapted to be clamped in adjusted position as by set screw 55. This permits of in and out adjustment of the sleeve as desired. In addition, the sleeve 54 is capable of swivelling movement on the bracket 56 which is supported for longitudinal sliding movement on the guides 26. Thus the device as an entirety may be longitudinally adjusted, the position of the support angularly varied to change the point of contact and given in and out adjustment according to size and to compensate for variance of position on account of the angling or tilting movement.

I claim:—

1. A centerless grinding machine of the character described, including a grinding wheel, a regulating wheel and a bracket intermediate said wheels, the grinding wheel being adapted to be rotated in the direction of the bracket at a high or grinding rate of speed and the regulating wheel being adapted to rotate with its operative face moving in a direction away from the bracket at its point of opposition to the grinding wheel, said bracket having a central recess to receive a work rest member, a work rest adjustably mounted within the recess, the bracket extending laterally to one side of the wheels and terminating in a socketed portion, guide supports carried by the socketed portion, and work engaging members mounted on said guide supports for supporting and guiding the work piece into the grinding throat.

2. A centerless grinding machine of the character described, including a grinding wheel, a regulating wheel and a bracket intermediate said wheels, the grinding wheel being adapted to be rotated in the direction

of the bracket at a high or grinding rate of speed and the regulating wheel being adapted to rotate with its operative face moving in a direction away from the bracket at its point of opposition to the grinding wheel, said bracket having a central recess to receive a work rest member, a work rest adjustably mounted within the recess, the bracket extending laterally to one side of the wheels and terminating in a socketed portion, guide supports carried by the socketed portion, and work engaging members mounted on said guide supports for supporting and guiding the work piece into the grinding throat, said work engaging members including frustro conical work contacting members disposed to exert a feeding component on the work as they are rotated thereby.

3. A centerless grinding machine of the character described, including a grinding wheel, a regulating wheel and a bracket intermediate said wheels, the grinding wheel being adapted to be rotated in the direction of the bracket at a high or grinding rate of speed and the regulating wheel being adapted to rotate with its operative face moving in a direction away from the bracket at its point of opposition to the grinding wheel, said bracket having a central recess to receive a work rest member, a work rest adjustably mounted within the recess, the bracket extending laterally to one side of the wheels and terminating in a socketed portion, guide supports carried by the socketed portion, and work engaging members mounted on said guide supports for supporting and guiding the work piece into the grinding throat, said work engaging members including a sleeve, a frustro conical work contacting member disposed to exert a feeding component on the work as they are rotated thereby a spindle extending from the contacting member, and antifriction means within the sleeve supporting the spindle of said frustro conical contact member for free rotation.

4. A centerless grinding machine of the character described, including a grinding wheel, a regulating wheel and a bracket intermediate said wheels, the grinding wheel being adapted to be rotated in the direction of the bracket at a high or grinding rate of speed and the regulating wheel being adapted to rotate with its operative face moving in a direction away from the bracket at its point of opposition to the grinding wheel, said bracket having a central recess to receive a work rest member, a work rest adjustably mounted within the recess, the bracket extending laterally to one side of the wheels and terminating in a socketed portion, guide supports carried by the socketed portion, work engaging members mounted on said guide supports for supporting and guiding the work piece into the grinding throat, said work engaging members including frustro conical work contacting members disposed to exert a feeding component on the work as they are rotated thereby, antifriction means supporting said frustro conical contact members for free rotation, and additional means for insuring proper engagement between regulating wheel and work, including a pressure roll disposed in opposition to the regulating wheel and means for urging the pressure roll against the work in a direction toward said wheel.

5. A centerless grinding machine of the character described, including a grinding wheel, a regulating wheel and a bracket intermediate said wheels, the grinding wheel being adapted to be rotated in the direction of the bracket at a high or grinding rate of speed and the regulating wheel being adapted to rotate with its operative face moving in a direction away from the bracket at its point of opposition to the grinding wheel, said bracket having a central recess to receive a work rest member, a work rest adjustably mounted within the recess, the bracket extending laterally to one side of the wheels and terminating in a socketed portion, guide supports carried by the socketed portion, work engaging members mounted on said guide supports for supporting and guiding the work piece into the grinding throat, said work engaging members including frustro conical work contacting members disposed to exert a feeding component on the work as they are rotated thereby, antifriction means supporting said frustro conical contact members for free rotation, means for insuring proper engagement between regulating wheel and work, including a pressure roll disposed in opposition to the regulating wheel, means for urging the pressure roll against the work in a direction toward said wheel, and means for limiting the movement of the pressure roll in the direction of the work.

6. A centerless grinder including a work rest, a grinding wheel disposed adjacent the work rest and having its operative face moving in the direction of the rest to perform a grinding operation on a piece of work when supported by the rest, a regulating wheel disposed at the opposite side of the rest and having its operative face movable in a direction away from the rest at a slow rate of speed to control the rate of rotation of a work piece, said wheels having parallel axes whereby the grinding wheel exerts a grinding action only, and the regulating wheel exerts a work controlling action only, and means for causing feeding movement of work within the machine comprising a freely rotatable member frictionally engaging the work and having its axis disposed at an acute angle to the axis of the work and adapted to be frictionally rotated by engagement of the work therewith whereby said member will cause an auto-

matic feeding movement of the work through the machine.

7. The combination with a centerless grinder including a bed, a grinding and a regulating wheel carried thereby, of a bracket member for application thereto having a work rest blade supporting portion and a lateral socketed portion, a work support guide interfitting with said socketed portion, and an outer work support adjustably mounted on the guide and projecting into position to co-operate with a work rest blade in positioning a work piece between the wheels.

In testimony whereof I affix my signature.

JOHN E. CASTER.