Jan. 8, 1924. 1,480,512

J. C. CRITHFIELD

CYLINDER GRINDING MECHANISM

Filed May 4, 1922 3 Sheets-Sheet 1

Fig. 1.

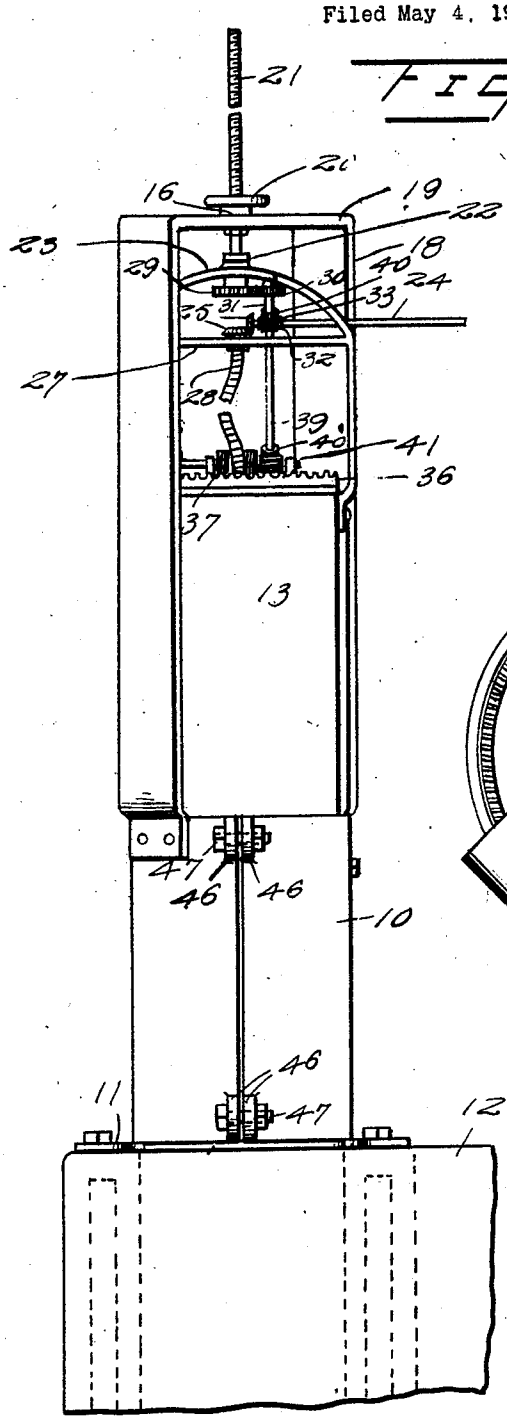
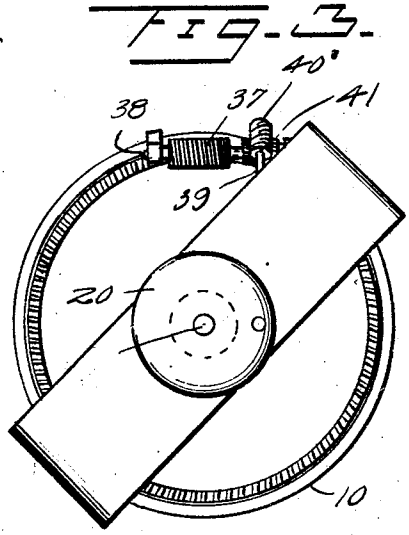


Fig. 3.



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Fig. 2.

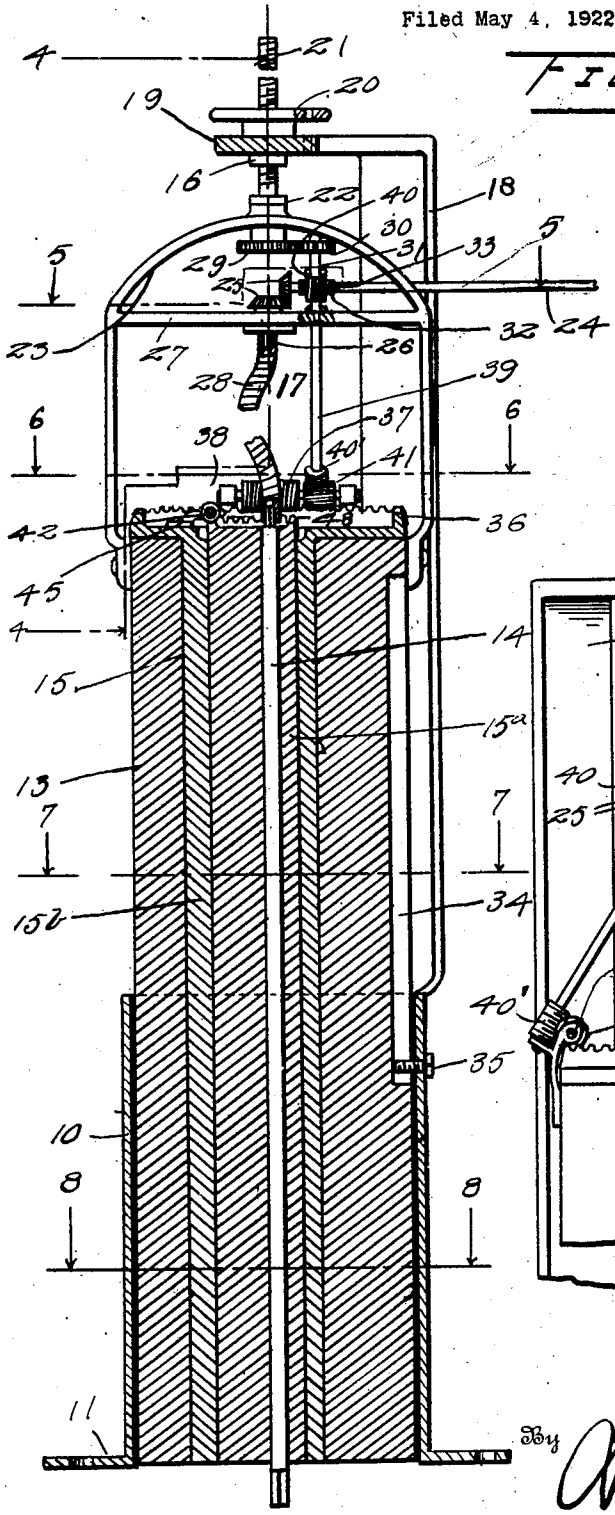
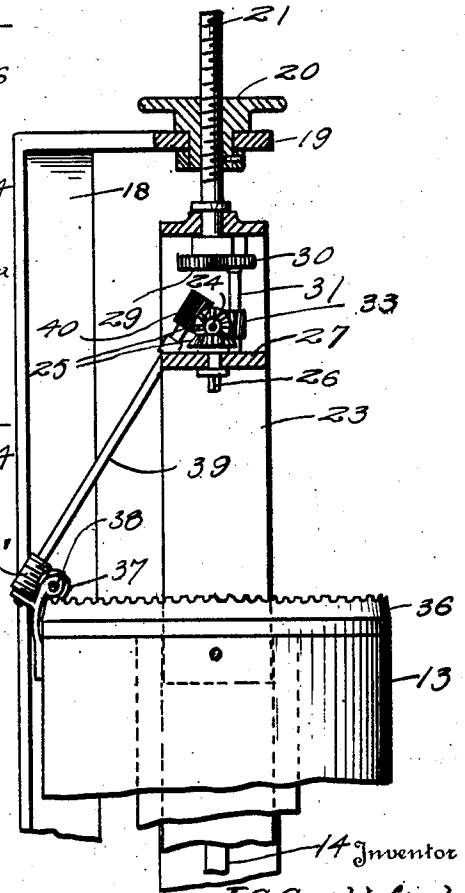


Fig. 4.



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Fig. 5

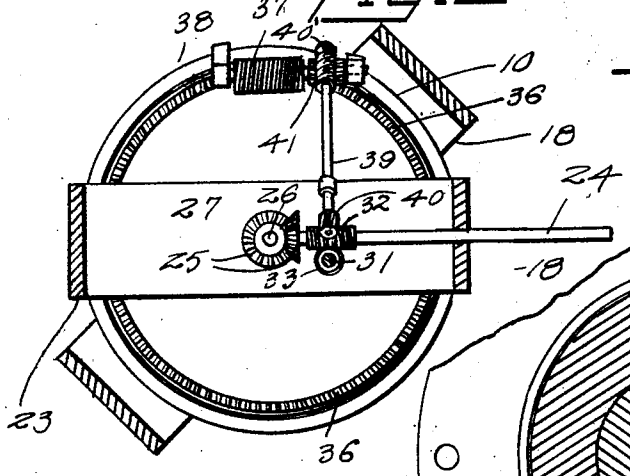


Fig. 7.

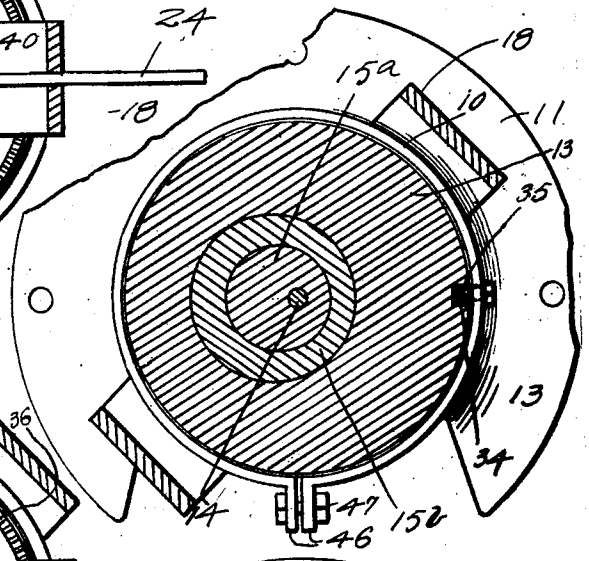


Fig. 6.

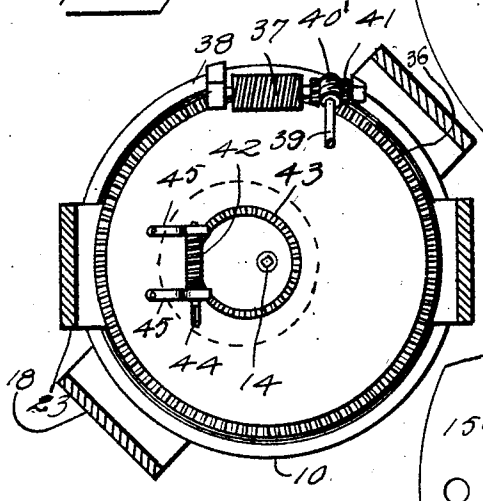
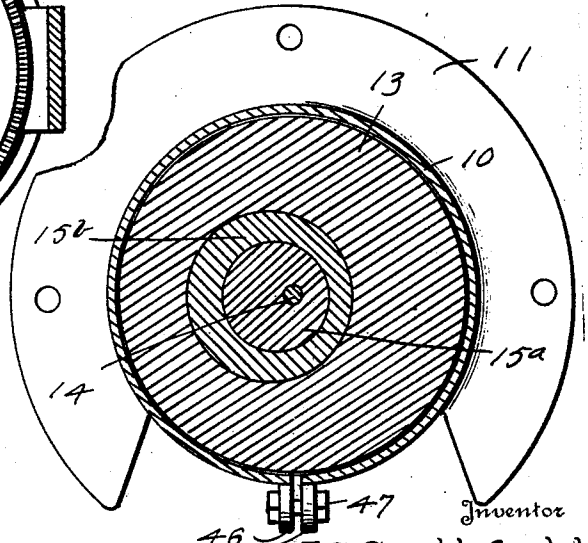


Fig. 8.



Inventor

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By W. Randolph, Jr. Attorney

Patented Jan. 8, 1924. 1,480,512

UNITED STATES PATENT OFFICE.

JAMES C. CRITHFIELD, OF WEAUBLEAU, MISSOURI.

CYLINDER-GRINDING MECHANISM.

Application filed May 4, 1922. Serial No. 558,461.

To all whom it may concern:

Be it known that I, JAMES C. CRITHFIELD, a citizen of the United States, residing at Weaubleau, in the county of Hickory and State of Missouri, have invented certain new and useful Improvements in a Cylinder-Grinding Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a cylinder grinding apparatus of a portable form and construction adapted particularly for shop and garage use which may be applied to a cylinder to be ground without dismounting or removing the cylinder from its bed on the machine such as an automobile or similar power driven vehicle, to the end that the regrinding of cylinders may be effected at a considerably reduced cost as compared with the present practice, not only by reason of the reduction in the cost of the apparatus but also of the fact that the grinding as above indicated may be accomplished with less work in the way of preparation on the part of the mechanic; and with these general objects in view the invention consists in a construction, combination and relation of parts of which a preferred embodiment is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side view of a cylinder grinding apparatus embodying the invention applied in the operative position to a cylinder to be reground;

Figure 2 is a central longitudinal sectional view of the same,

Figure 3 is a plan view thereof,

Figure 4 is a vertical section of the upper portion of the mechanism on the plane indicated by the line 4—4 of Figure 2,

Figure 5 is a transverse section on the plane indicated by the line 5—5 of Figure 2,

Figure 6 is a transverse section on the plane indicated by the line 6—6 of Figure 2,

Figure 7 is a horizontal section on the plane indicated by the line 7—7 of Figure 2,

Figure 8 is a transverse section on the plane indicated by the line 8—8 of Figure 2.

The apparatus embodies essentially a guide cylinder 10 having a base 11 adapted to be bolted, clamped or otherwise rigidly secured to the end of a motor cylinder 12 which is to be reground or dressed, a carrier cylinder 13 which is fitted to slide in the guide cylinder, a grinding arbor 14 which is mounted in a double or multiple eccentric 15 which in turn is mounted in the carrier cylinder, feed mechanism 16 for advancing the carrier cylinder with relation to the motor cylinder which is being ground and driving mechanism indicated at 17 for actuating the grinding arbor.

The guide cylinder 10 carries a frame 18 having a cross head 19 provided with an opening in which is rotatably mounted a feed nut 20, engaged with a feed screw 21 which has a swivel connection at 22 with a yoke or bail 23 extending upward from the carrier cylinder and mounted in suitable bearings on the said yoke is a drive shaft 24 having connection by means of intermeshing bevel gears 25 with a stub shaft 26 mounted in a cross bar 27 of said yoke and connected by a flexible shaft 28 with the grinding arbor. A gear 29 is attached to the feed screw for actuation by a pinion 30 carried by a counter shaft 31 which receives rotary motion at a low rate of speed through a worm 32 on the drive shaft 24 and a worm gear 33 on the counter shaft, so that a relatively slow feeding movement is imparted by the feed screw to the carrier cylinder as the grinding arbor is rotated at a relatively high rate of speed in its action upon the inner surface of the cylinder which is being ground.

The carrier cylinder has a pin and groove guiding connection with the guide cylinder 10 to prevent rotary movement of the former relative to the latter while permitting a longitudinal or axial sliding movement, and in the construction illustrated the groove 34 is formed in the carrier cylinder in engagement with the pin 35 carried by the guide cylinder. The double or compound eccentric 15 consists of the inner eccentric member 15^a in which the grinding arbor is directly mounted for rotation and the outer eccentric

member 15b carrying the inner member and mounted in the carrier cylinder with a peripheral worm gear 36 at its upper end engaged by a worm 37 carried by a counter shaft 38 which receives its motion from the drive shaft 24 through speed reducing gearing consisting in the construction illustrated of a shaft 39 which receives its motion through the worm 40 meshing with the worm 32 carried by the power shaft, and which carries at its opposite end a worm 40' meshing with a worm gear 41, so that a continuous rotary motion may be imparted at a low rate of speed to the outer eccentric member carrying the grinding arbor. Adjustment of the inner eccentric member with relation to the outer member to vary the eccentricity of the grinding arbor may be effected by means of a manually operable worm 42 meshing with a worm gear 43 on the inner eccentric member, the shaft 44 of said worm being mounted in suitable brackets 45 on the end of the outer eccentric member.

Moreover to provide means to compensate for wear the guide cylinder 10 is preferably of longitudinally split construction, as shown in Figure 8, with the edges flanged as shown at 46 and connected by adjusting bolts 47 to the end that a perfectly aligned movement of the carrier cylinder may be effected under all conditions.

Having thus described the invention, what I claim is:—

1. A cylinder grinding apparatus including a guide cylinder adapted for alinement with the cylinder to be ground, a frame rising from the guide cylinder having side members outwardly offset with respect to said guide cylinder, a carrier of greater length than the guide cylinder slidable therein, a grinder arbor carried by the cylinder, a yoke rising from the carrier and disposed within and guided by said frame, said yoke being of greater width than the guide cylinder and at its side being in contact with said side members, operating gearing for the arbor carried by the yoke, and means extending into the frame intermediate the side members to drive said gearing.

2. A cylinder grinding apparatus including a guide cylinder adapted for alinement with the cylinder to be ground, a frame rising from the guide cylinder having side members outwardly offset with respect to said guide cylinder. a carrier of greater length than the guide cylinder slidable therein, a grinder arbor carried by the cylinder, a yoke rising from the carrier and disposed within and guided by said frame, said yoke being of greater width than the guide cylinder and at its side being in contact with said side members, operating gearing for the arbor carried by the yoke, means in the frame intermediate the side members to drive said gearing, said frame having a cross head, a nut on said cross head, and a feed screw carried by said yoke and engaged by said nut.

3. A cylinder grinding apparatus including a guide cylinder adapted for alinement with the cylinder to be ground, a frame rising from the guide cylinder having side members outwardly offset with respect to said guide cylinder, a carrier of greater length than the guide cylinder slidable therein, a grinder arbor carried by the cylinder, a yoke rising from the carrier and disposed within and guided by said frame, said yoke being of greater width than the guide cylinder and at its side being in contact with said side members, operating gearing for the arbor carried by the yoke, means in the frame intermediate the side members to drive said gearing, said frame having a cross head, a nut on said cross head, and a feed screw carried by said yoke and engaged by said nut, said carrier having a vertically elongated slot, and means on the guide cylinder extending into said slot to prevent rotation of the carrier relatively thereto.

4. A cylinder grinding apparatus including a slidable carrier, a rotatable grinder arbor, means journaled in the carrier in which said arbor is journaled, said means including a gear wheel engaging the upper end of the carrier, a yoke extending from said carrier, gearing mounted in said yoke, means to drive said gearing, said gearing including a flexible shaft engaging the arbor, and a shaft and gear coacting with said gear wheel.

5. A cylinder grinding apparatus including a carrier, a rotatable grinder arbor, means journaled in said carrier and in which said arbor is journaled, a gear on said means disposed over the upper end of the carrier, a yoke rising from the carrier having a cross bar, a stub shaft journaled in said cross bar, a flexible shaft extending from said stub shaft to said arbor, a drive shaft, means to drive said stub shaft from the drive shaft, a second shaft, means to drive the second shaft from the drive shaft, a gear in mesh with the first mentioned gear, and a gear on the second shaft in mesh with the second mentioned gear.

6. A cylinder grinding apparatus including a carrier, a rotatable grinder arbor, means journaled in said carrier and in which said arbor is journaled, a gear on said means disposed over the upper end of the carrier, a yoke rising from the carrier having a cross bar, a stub shaft journaled in said cross bar, a flexible shaft extending from said stub shaft to said arbor, a drive shaft, means to drive said stub shaft from the drive shaft, a second shaft, means to drive the second shaft from the drive shaft, a gear in mesh with the first mentioned gear, a gear on the second shaft in mesh with the second men-

tioned gear, the frame in which the yoke slides having a cross head, a nut on said cross head, a feed screw engaged by said nut and extending from the yoke, a gear wheel on the feed screw, a driving connection between the last mentioned gear wheel and said drive shaft.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES C. CRITHFIELD.

Witnesses:
J. H. McCaslin,
J. B. Smith.