April 29, 1958 W. J. HUGHES 2,832,330

GRINDING WHEEL DRESSER

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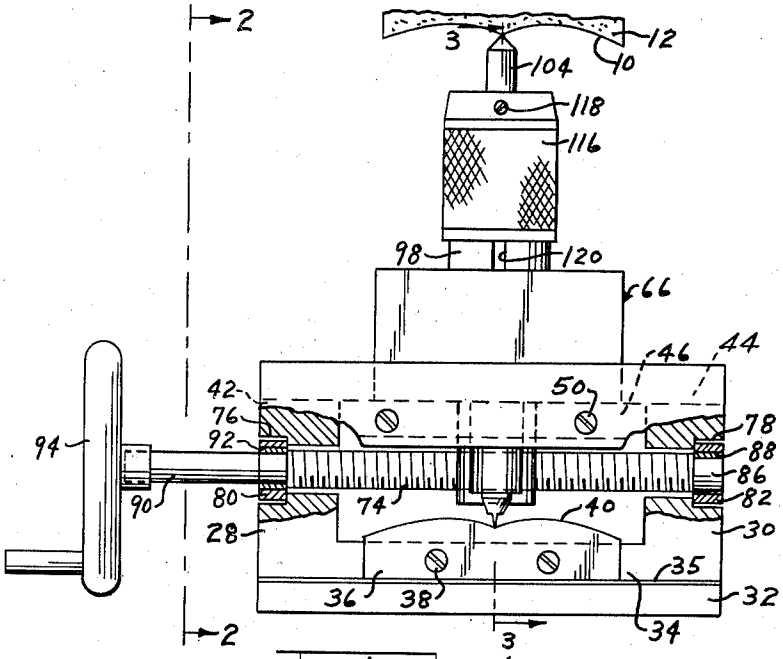


Fig. 1.

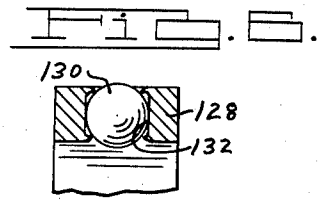


Fig. 5.

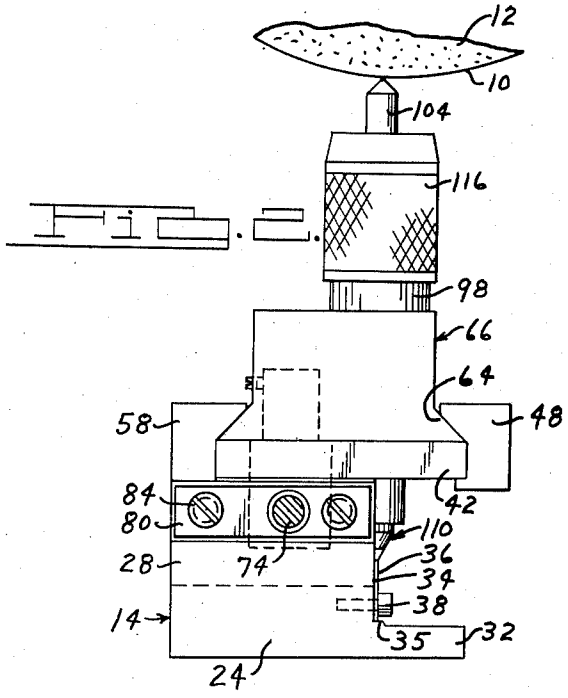


Fig. 2.

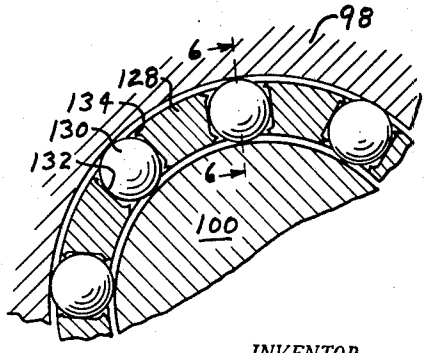


Fig. 6.

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Fig. 3.

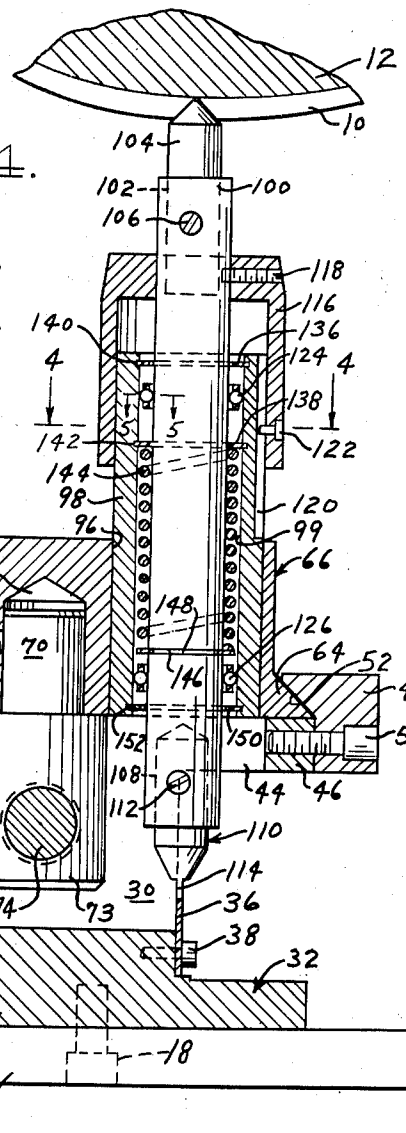
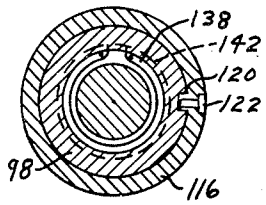


Fig. 4.



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GRINDING WHEEL DRESSER

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5 Claims. (Cl. 125—11)

This invention relates to a grinding wheel dressing device, and, more particularly, to an apparatus for forming precise contours on grinding wheels.

Heretofore there has been a common practice when making contoured dies and tools to cut the workpiece down to the approximate shape or contour and then to finish the workpiece to the desired contour by hand tools. Such a practice is, of course, expensive and time consuming. Accordingly, it is the primary object of this invention to provide a device for dressing a grinding wheel to a desired contour, in the reverse form, whereby, the contour may be ground directly on the workpiece with a minimum of labor and expense.

It is another object of this invention to provide a grinding wheel dressing device which includes a follower means which is substantially free of friction in its movements, whereby it is possible to follow the identical contour of a template and cut the reverse identical contour in a grinding wheel, and when the contoured grinding wheel is used to grind a workpiece the identical contour of the template will be formed on the workpiece.

It is a further object of this invention to provide a grinding wheel dressing device which includes, a novel bearing structure for mounting a holder post carrying a template follower and a diamond dressing tool, and a means for preventing grit and dirt from fouling the bearing structure, whereby, it is possible with this device to grind any combination of radii, angles and/or contours, and wherein the radii or points are only limited by the size of the follower points and diamond dressing tool points, and, any radii, contour or angle can be accurately followed up to an angle of 45°.

It is still another object of this invention to provide a device of this class which is simple and compact in construction, economical of manufacture, and efficient in operation.

Other objects, features and advantages of this invention will be apparent from the following detailed description and the appended claims, reference being had to the accompanying drawings forming a part of the specification, wherein like reference numerals designate corresponding parts of the several views.

In the drawing:

Fig. 1 is a front side elevational view of an illustrative embodiment of the invention;

Fig. 2 is a left side elevational view of the structure illustrated in Fig. 1, taken along the line 2—2 thereof, and being partly in section;

Fig. 3 is an elevational sectional view of the structure illustrated in Fig. 1, taken along the line 3—3 thereof;

Fig. 4 is a horizontal sectional view of the structure illustrated in Fig. 3, taken along the line 4—4 thereof;

Fig. 5 is a partial horizontal sectional view of the structure illustrated in Fig. 3, taken along the line 5—5 thereof; and,

Fig. 6 is a sectional view, and enlarged, of the structure illustrated in Fig. 5, taken along the line 6—6 thereof.

Referring now to the drawings, and more particularly to Fig. 3, wherein is shown an illustrative embodiment of the invention, the numeral 10 designates a partial portion of a grinding wheel periphery on which it is desired to form a desired contour. The grinding wheel is designated by the numeral 12. The numeral 14 designates a body or base member which is adapted to be mounted on a suitable supporting structure as 16 by means of the machine screws 18 when in use. The base member 14 may be further secured to a vertical supporting structure as 20 by means of the machine screws 22. The instant device is especially adapted for use with a surface grinder, and may be held in place by means of a magnetic chuck, if desired.

The base member 14 comprises a bottom wall 24, an integral upwardly extending vertical rear wall 26, the left and right integral side walls 28 and 29, respectively, and a front stepped portion 32 on the front side of the bottom wall. The stepped bottom wall portion 32 includes a front vertical face 34 and a horizontal face 35 on which the template 36 is mounted. The template 36 is held against the face 34 by any suitable means, as by means of the machine screws 38. The numeral 40, Fig. 1, designates the upper contoured edge of the longitudinally disposed template 36. The contour 40 is the contour which is to be cut in the workpiece, but which is first cut into the reverse form in the grinding wheel periphery 10.

The base member further includes the integral forwardly extending arms 42 and 44 on the left and right side walls, 28 and 30, respectively, which are joined by the integral longitudinal arm 46. As shown in Figs. 2 and 3, a longitudinally extending gib 48 is secured to the arm 46, by any suitable means, as by the machine screws 50. The gib 48 has an inwardly sloping bearing surface 52.

The upper edge of the rear wall 26 is stepped and is provided with a horizontal surface 54 terminating in the vertical surface 56, on which surfaces is positioned a longitudinal gib 58. The gib 58 is secured on the rear wall 26 by any suitable means, as by the machine screws 60, and is provided with an inwardly sloping bearing surface 62.

Slidably mounted in the area between the bearing surfaces 52 and 62, on top of the base member walls, is the lower dovetailed end 64 of the slide 66. The slide 66 is provided with a vertical hole 68 on the lower rear side thereof in which is secured the pin 70, by means of the retaining screw 72. The pin 70 carries an integral nut 73 in which is threadably mounted the horizontal screw 74.

As best seen in Figs. 1 and 2, the left and right base walls 28 and 30 are provided with horizontal slots 76 and 78, respectively, in which is secured the end plates 80 and 82, respectively. The end plates 80 and 82 are secured in place by suitable machine screws, as 84. The rear end of the screw 74 is provided with a journal 86 which is suitably rotatably mounted in the bearing 88 in the end plate 82. The front end of the screw 74 is integral with the shaft 90 which is journaled in the bearing 92 in the front plate 80. The shaft 90 is provided with a fixedly mounted hand wheel 94 for turning the shaft.

The slide 66 is provided with a vertical aperture 96 in which is fixedly mounted a vertical sleeve 98 having an aperture 99 therethrough. A carrier member or holder post 100 is operatively mounted in said aperture 99, as more fully described hereinafter. The upper end of the holder post 100 is provided with an axial hole 102 in which is secured a grinding wheel dressing tool 104, as a diamond tool. The dressing tool 104 may be secured in the holder post 100 by any suitable means, as by the retaining screw 106. The lower end of the holder post 100 is provided with an axial hole 108 in which is secured a follower means 110, as by means of the retaining screw 112. The follower means 110 is provided with the usual follower point 114. A knurled cap 116 is fixed

on the holder post 100, as by means of the retaining screw 118, and telescopically encloses the upper end of the sleeve 98 to prevent any grit and dirt from entering between the post and the sleeve.

The sleeve 98 is provided with a longitudinal slot 120 on the outer surface thereof in which is received the guide pin 122 for maintaining the radial relationship of the holder post 100 in the sleeve 98. The holder post 100 may be held in an inoperative position by lifting up the post and turning the cap 116 so as to remove the pin 122 from the slot 120 and resting the pin 122 on the top edge of the sleeve 98.

A pair of ball bearing members 124 and 126 are operatively mounted in the sleeve 98 between the sleeve and the holder post 100, and said bearing members are free to move a predetermined distance in the sleeve when the holder post moves upwardly and downwardly. As shown in Figs. 5 and 6, each of the bearing members 124 and 126 comprises a retaining ring as 128 in which is operatively held a plurality of ball bearings 130. The ring 128 is provided with a plurality of sockets as 132, and the balls are held in the sockets 132 by crimping the edges 134 inwardly.

The movement of the upper bearing member 124 is limited by the retaining ring clips 136 and 138 which are positioned in the grooves 140 and 142, respectively, in the sleeve 98. A coil spring 144 is positioned in the sleeve around the holder post 100, and the upper end of the spring abuts the retaining clip 138 and the lower end of the spring is seated on the retaining ring clip 146 which is fixed in the groove 148 on the holder post 100. The lower bearing member 126 is limited in its movement by means of the retaining clip 146 and another retaining ring clip 150 which is fixedly mounted in the groove 152 in the lower end of the sleeve 98.

In the use of the invention, a template as 36 having the desired contour thereon is mounted on the base member and the follower means is brought into contact with the contour 40 of the template 36. The supporting structure 16 is moved upwardly so as to bring the diamond tool 104 into contact with the grinding wheel 12 and as the wheel 12 rotates, the screw 74 is rotated by means of the handwheel 94, which action moves the slide 66 longitudinally of the base member 14. As the slide moves, the follower means 110 will slidably move on the contoured edge 40 of the template and the holder post 100 will be moved vertically in accordance with the contour 40. The periphery 10 of the grinding wheel 12 will be dressed off in accordance with the reverse contour of the contour 40. A workpiece may thus be quickly and easily cut with the grinding wheel 12 to form a contour on the workpiece periphery which will be identical to the contour 40 on the template 36.

While it will be apparent that the preferred embodiment of the invention herein disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What I claim as new is:

1. A device for forming a contour on a grinding surface comprising: a base member; a slide movably mounted on said base member in one direction; means for moving said slide on said base member; means for mounting a template on said base member; a carrier member movably mounted on said slide for movement in the direction transverse to said one direction; a follower means mounted on the lower end of said carrier member adapted to slide on the contoured edge of the template; a resilient biasing means normally biasing said carrier member downwardly so as to maintain said follower means in contact with said template; a dressing tool mounted on the upper end of said carrier member for dressing a grinding surface to the contour of said template, and in the reverse form thereof; said carrier member being movably supported in said slide by means of a pair of spaced apart freely movable bearing members; said bearing members each comprising a carrier ring having a plurality of sockets therein, in each of which is rotatably carried a ball bearing adapted to contact the carrier member on one side thereof and the slide on the other side thereof to give friction free movement between said carrier member and said slide; said device being provided with means for locking said carrier member in an inoperative position clear of said template; and, said resilient biasing means being operatively mounted between said bearing members.

2. A device for forming a contour on a grinding surface comprising: a base member; a slide movable horizontally on said base member; means for moving said slide on said base member; means for mounting a template having a contoured edge thereon, in a vertical position on said base member with the contoured edge facing upwardly; a vertically disposed sleeve fixedly mounted on said slide and extending therethrough; a holder post movably mounted in said sleeve for vertical movement relative to said sleeve; a follower means mounted on the lower end of said holder post and adapted to slidably contact the contoured edge of said template; a dressing tool mounted on the upper end of said holder post for dressing a grinding surface to the reverse contour of said contoured template edge; a resilient biasing means normally biasing said holder post downwardly so as to maintain said follower means in contact with said contoured template edge when said slide is moved on said base member; a pair of spaced apart retaining members fixedly mounted in said sleeve adjacent the upper end thereof; a first bearing member operatively mounted between said pair of retaining members and operatively contacting said holder post and said sleeve to provide friction free movement therebetween; said resilient biasing means being disposed in said sleeve and having its upper end abutting the lower one of said pair of retaining members and its lower end abutting another retaining member fixedly mounted on the holder post adjacent the lower end thereof; a further retaining member fixedly mounted in said sleeve adjacent the lower end thereof; and, a second bearing member operatively mounted between said last mentioned retaining members and operatively contacting said holder post and said sleeve to provide friction free movement therebetween.

3. The structure as defined in claim 2, wherein: each of said bearing members comprises a plurality of ball bearings carried in a ring, and said bearing members are adapted to move longitudinally of said sleeve between said pair of retaining members and said latter mentioned retaining members when said holder post movers in said sleeve.

4. The structure as defined in claim 3, wherein: said device is provided with means for retaining said holder post in a fixed radial position when said holder post is moved in said sleeve.

5. The structure as defined in claim 4, wherein: a cap is fixedly mounted on the upper end of said holder post and is adapted to telescopically enclose the upper end of said sleeve.

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