April 15, 1930. P. KLAMP ET AL 1,754,630

DRESSING DEVICE FOR GRINDING WHEELS

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Fig. 1.

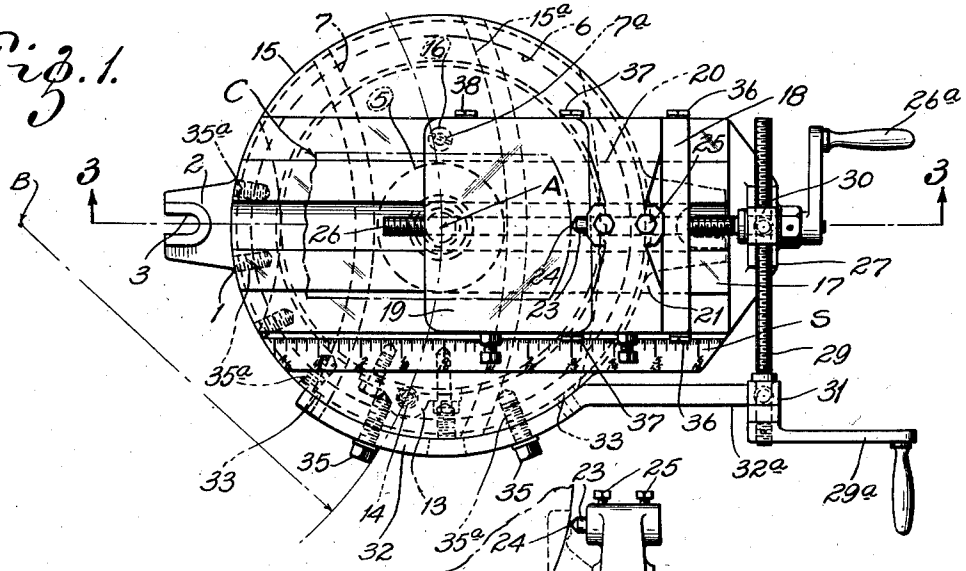


Fig. 2.

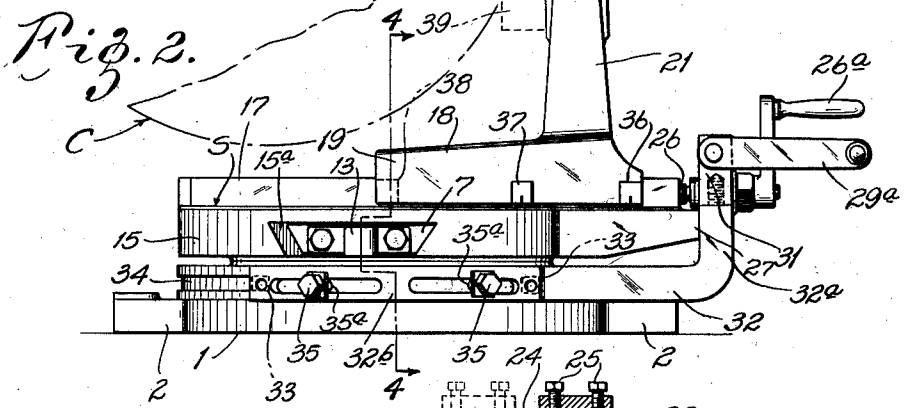
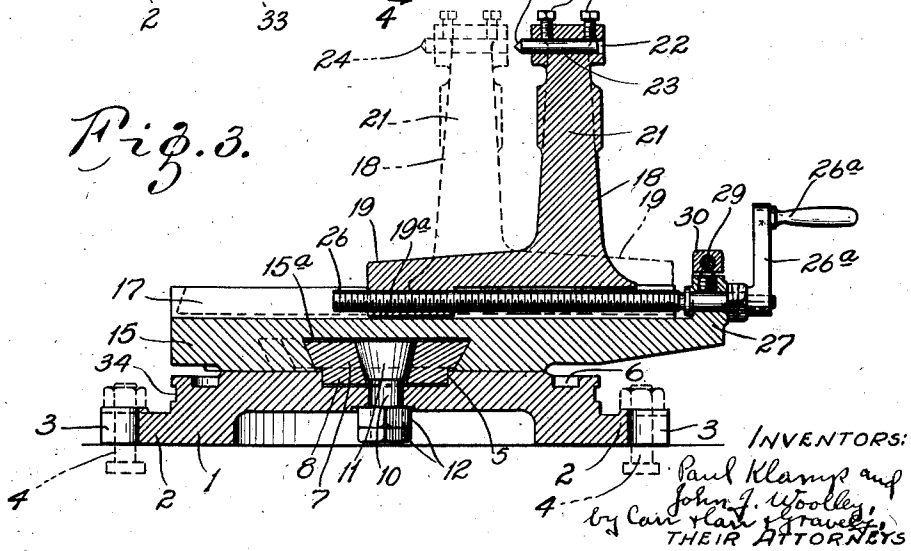


Fig. 3.



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Fig. 4.

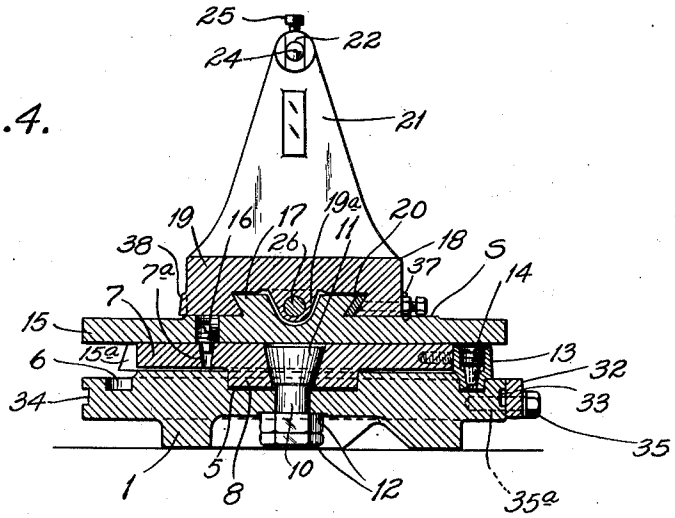
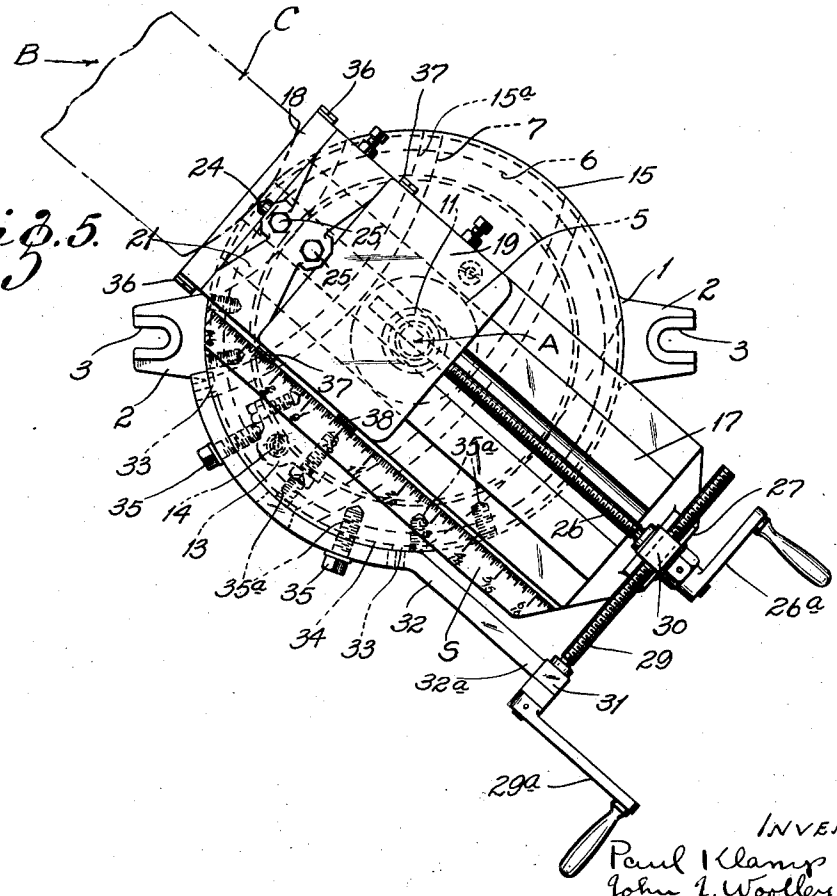


Fig. 5.



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Patented Apr. 15, 1930 1,754,630

UNITED STATES PATENT OFFICE

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DRESSING DEVICE FOR GRINDING WHEELS

Application filed March 5, 1928. Serial No. 259,096.

This invention relates to a device for dressing or truing the grinding face of the grinding wheel of an automatic grinding machine. Its principal object is to produce a grinding device which can be readily adjusted to dress grinding wheels having peripheral or radial grinding faces of concave or convex curvature of different radii. Other objects are simplicity and cheapness of construction, compactness of design and fewness of parts.

The invention consists in the dressing device and in the construction, combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of the specification and wherein like symbols refer to like parts wherever they occur:

Fig. 1 is a plan view of a dressing device embodying our invention,

Fig. 2 is a side elevation of the device,

Fig. 3 is a vertical longitudinal section through the device on the line 3—3 in Fig. 1,

Fig. 4 is a vertical transverse cross-section through the device on the line 4—4 in Fig. 2, and

Fig. 5 is a plan view showing the device in another of its positions of adjustment.

The wheel dressing or truing device shown in the accompanying drawing comprises a circular base member 1 provided with diametrically opposed laterally projecting lugs 2 having outwardly opening notches 3 therein adapted to receive T-bolts 4, whereby the base may be clamped to the slideway of a grinding machine (not shown). The upper surface of the stationary base member 1 is provided at its center with a pocket bearing in the form of a circular recess 5 and near its edge with a circular groove 6 disposed concentric with the central circular recess 5. An arcuate guide plate or dovetail way 7 is provided at its center with a downwardly extending circular pivot boss 8 which is journaled in the central pocket bearing 5 in the base plate, whereby said guide plate is adapted to rotate on the base plate about the center A of said bearing as a center. The pivot boss 8 of the arcuate guide plate is held in engagement with the pocket bearing 5 of the base member 1 by means of a pilot bolt 10 having a conical head 11, which seats in a conical recess provided therefor in the center of the curved guide plate 7, and a depending shank portion, which extends through a central hole in the bottom of the recess 5 in said base member and is threaded at its lower end to receive a pair of lock nuts 12. The side marginal edges of the rotary way 7 are curved in arcs of circles described from a center indicated at B in Fig. 1 of the drawing, the two centers A—B being spaced ten inches apart.

Bolted to one end of the arcuate guide plate 7 is a clamp block 13 having a depending portion slidable in the circular groove 6 of the upper surface of the base member 1. The groove engaging portion of said clamp block is slotted and is also provided with a threaded bore having a conical lower end portion; and threaded into said bore is a screw 14 having a conical lower end adapted to bear against the conical bore in the slotted lower end of the clamp block. By this arrangement, when the set screw is tightened it spreads apart the slotted lower end of the clamp block against the side walls of the circular groove and thus prevents rotary movement of the guide plate on the base member 1.

A slide 15 has a circular base portion which rests on the base member 1 and is provided on its underside with a downwardly opening dovetail groove or channel 15ª which slidably engages the rotatably supported curved way 7 and is curved to correspond to curvature of said way, thereby permitting the silde to be slid across the base member in a circular arc whose center is located at B. The slide 15 may be locked to the guide plate 7 for movement therewith by means of a screw 16, which engages a threaded hole in the slide and has a tapered lower end portion adapted to cooperate with a tapered hole 7ª in the top of the guide plate.

The upper surface of the slide 15 is provided with a dovetail rib or way 17 which extends radially with respect to the center A; and a diamond carrier 18 has a base portion 19 which rests on the slide 15 and is provided on its under side with a dovetail groove or

channel 20 which slidably engages the way on the slide 15. The diamond carrier 18 is provided with an upstanding bracket or standard 21 whose upper end has a cylindrical bore 22 extending horizontally therethrough in directions parallel to the direction of sliding movement of said carrier. Slidably mounted in the bore 22 is a cylindrical diamond holder 23, one end of which has a diamond 24 set therein for dressing the grinding wheel. The diamond holder 23 is clamped in the bore 22 of the standard 21 of the diamond carrier 18 in any desired position of adjustment by means of a pair of set screws 25.

The diamond carrier 18 is slid along the way 17 on the slide 15, in a direction crosswise to the arcuate way 7, by means of a screw 26, one end of which is journaled in an upstanding bracket 27 formed integral with said slide adjacent to one end of said way. The screw 26 is held against axial movement preferably by means of a collar on one side of the bracket and a nut on the other side thereof and is rotated by means of a crank 26^a secured to its outer end. The threaded portion of the screw extends loosely through a longitudinal groove provided therefor in the way 17 of the slide 15 and is threaded through a threaded bore in a lug 19^a which depends from the underside of the base 19 of the diamond carrier 18. By this arrangement, rotation of the screw by means of the crank causes the diamond carrier 18 to slide radially of the center A. The slide 15 may be moved about the centers A or B, to cause the diamond to traverse the grinding face of the grinding wheel C that is to be dressed, by means of a screw 29 disposed substantially at right angles to the screw 26. One end of the screw 29 is threaded through a threaded bore in the head of a swivel screw 30 threaded into the upstanding bracket 27 which supports the outer end of the screw 26; and the opposite end of said screw 29 passes through a smooth bore in the upper end of a swivel nut 31, which is threaded on the upstanding free outer end portion 32^a of a bracket 32. The screw 29 is rotated by means of a crank 29^a fixed to one end thereof and is held against axial movement preferably by means of collars located on opposite sides of the swivel nut 31. It is noted that the swivel screw 30 and swivel nut 31 are loosely screwed in their supporting brackets 27 and 32, respectively, so as to swivel thereon and thus permit the screw 29 to change its angular position when said screw is rotated to swing the slide 15. The inner end portion 32^b of the bracket 32 is curved to fit the circular base member 1 and is provided with shoes 33 slidable in a circumferential slideway 34 formed in the peripheral edge of said base member. The bracket 32 is adjustably secured to the base member 1 by means of cap screws 35 which pass through slots in the bracket and are threaded into any one of a series of circumferentially spaced holes 35^a in the peripheral edges of said base. By this arrangement, the bracket 32 may be adjusted circumferentially of the base 1 to position the screw 29 at substantially right angles to the screw 26 when the slide is rotated to bring the diamond into a position opposite the grinding face of the grinding wheel.

Extending longitudinally of the way 17 on the slide 15 near the front edge thereof is a scale S which is graduated to give readings in inches and fractions thereof; and each longitudinal side edge of the base portion of the diamond carrier 18 has two index marks 36 and 37 cut thereon adapted to cooperate with the scale on the slide 15. In the present device, the index marks 36 and 37 are spaced two and one-half inches apart, along each side edge of the carrier, with the two marks on one side of the carrier in line with the two marks on the other side thereof, and a reading obtained by means of the index marks on the side of the carrier next to the scale S. By this arrangement, the diamond carrier 18 may be turned end for end on the way 17. As shown in the drawing, the scale S on the slide 15 has two sets of numerals, the inner set reading from 4 to 0 and from 0 to 6; and the outer set reading from 6 to 16.

The operation of the device is as follows: When it is desired to dress a grinding wheel provided with a convex radial or peripheral grinding surface having a radius curvature of four inches or less, the diamond carrier 18 is positioned on the way 17 of the adjustable slide 15 with its diamond supporting standard 21 located at the right-hand end of said carrier. The diamond holder 23 is then positioned in the bore 22 with its diamond located on the left-hand side of the standard and is adjusted longitudinally of the supporting bore 22 by means of a gage block 39, which is shown in dotted lines of Fig. 2 of the drawing, to bring the diamond 24 in line with the index marks 37 of the carrier, after which the holder 23 is locked in position by the set screws 25. Assuming that the convex surface that is to be dressed has a radius of three inches, the diamond carrier 18 is adjusted longitudinally of the dovetail way 17 on the slide 15 by means of the crank 26^a to bring the index mark 37 in line with the graduation marked 3 and 13 on the scale S, thereby locating the diamond 24 three inches from the center A. The slide 15 is then locked to the arcuate way 7 for rotation therewith by engaging the screw 16 with the tapered hole 7^a in said arcuate way. With parts thus adjusted, as shown in full lines in Figs. 1, 2 and 3, the base plate 1 is moved longitudinally of the bed of the grinding machine and the slide 15 and bracket 32 rotated on the base about the center A to bring the diamond 24 into

position opposite to and in contact with the surface that is to be dressed. The bracket 32 is then clamped to the base member by means of the cap screws 35; and the convex grinding surface of the wheel is dressed by manipulating the crank 29ª to cause the diamond to move back and forth across the grinding surface while the grinding wheel rotates. When it is desired to dress a grinding wheel provided with a convex grinding surface having a radius of curvature of from 4 to 10¾ inches, the diamond carrier 18 is turned end for end on the way 17 of the slide without disturbing the adjustment of the diamond, and the index mark 36 used in adjusting the carrier longitudinally of the way to set the diamond for the desired radius. The screw 16 is then disengaged from the hole 7ª in the arcuate plate 7, which is then clamped to the base 1 by tightening the screw 14 in the clamp block 13, thereby preventing rotation with said way about the center A and causing the slide to slide along the arcuate slideway about the point B as a center. When it is desired to adjust the device for dressing a convex surface having a radius of from 10¾ inches to 14 inches, the grinding carrier is positioned on the slide with its standard to the right and with the diamond point projecting from the left-hand side of the standard in line with the index mark 37, which is used in locating the diamond for the radius desired, and the device is adjusted to cause the diamond to slide on the arcuate way about the point B as a center.

When it is desired to dress a grinding wheel provided with a concave grinding surface having a radius of curvature of 6¼ inches or less, the diamond carrier is positioned on the way of the slide with its standard located to the left, and with the diamond in line with the index mark 36 and the device is adjusted to cause the diamond to move about the center A. When it is desired to adjust the device for dressing a concave surface having a radius of from 6¼ to 13¼ inches, the diamond carrier is positioned on the slide with its standard to the left and with the diamond in line with the index marks 37, and the device is adjusted to cause the diamond to swing about the center B. When dressing a concave grinding surface having a radius of from 13¼ to 16½ inches, the diamond carrier is positioned on the slide with its standard to the right and with the diamond point in line with the index marks 36, and the device is adjusted to cause the diamond to move about the center B.

As shown in the drawing, the index marks 36 and 37 are spaced 2½ inches apart, and the side of the carrier located adjacent to the scale when the carrier is positioned on the slide with its standard located at the left hand end of the carrier, is provided with a third index mark 38 located 2½ inches to the right of the index mark 37. The purpose of this third index mark 38 is to enable the operator to obtain a reading when the two index marks 36 and 37 have passed beyond the left-hand end of the scale. For instance, with the diamond in line with marks 36 a correct reading is obtained with the mark 38 by adding 5 inches to the amount indicated by the mark 38 when using the center A and by subtracting 5 inches from said amount when using the center B. With the diamond in line with the marks 37, a correct reading is obtained with the mark 38 by adding 2½ inches to the amount indicated by the mark 38 when using the center A and by subtracting 2½ inches when using the center B.

Obviously, the hereinbefore described dressing device admits of considerable modification without departing from the invention; therefore, we do not wish to be limited to the precise arrangement shown and described.

What we claim is:

1. A dressing device comprising a base, a way rotatably supported thereon, and a dressing tool supported on said way for rotation therewith and for sliding movement thereon along a circular arc whose center is offset with respect to the rotary axis of said rotary member.

2. A dressing device comprising a base, an arcuate way rotatable thereon, a slide movable along said way, and a dressing tool mounted on said slide for sliding movement crosswise of said way, said tool being reversible end for end on said slide.

3. A dressing device comprising a base, a member rotatably supported thereon, and provided with an arcuate way, a dressing tool supported on said member for sliding movement along the arcuate way thereof, means for locking said member to said base, and means for locking said tool against sliding movement along said arcuate way.

4. A dressing device comprising a base having an arcuate way rotatably supported thereon, a slide movable along said way, a dressing tool mounted on said slide for sliding movement crosswise of said way, and means for adjusting said dressing tool for concave and convex surfaces, said device being provided with a scale for indicating the distance between the cutting edge of the dressing tool and the rotary axis of the way and the distance between said edge and the center of the radius of curvature of said arcuate way.

5. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, a slide slidable on said arcuate way, a tool carrier slidable on said slide, a dressing tool mounted on said tool carrier, means for locking said arcuate way against rotation on said base member, and means for locking said slide to said arcuate way.

6. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, a cutting tool adjustably mounted in said tool carrier, and means for sliding said tool carrier along said slide.

7. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, a cutting tool adjustably mounted in said tool carrier, means for sliding said tool carrier along said slide, and means for moving said slide along said arcuate way and for partially rotating said way about its axis of rotation.

8. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, a cutting tool adjustably mounted in said tool carrier, means for sliding said tool carrier along said slide, and means for moving said slide along said arcuate way and for partially rotating said way about its axis of rotation, said means comprising a bracket secured to said base and a screw journaled in said bracket and having threaded engagement with said slide.

9. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, a cutting tool adjustably mounted in said tool carrier, means for sliding said tool carrier along said slide, means for moving said slide along said arcuate way and for partially rotating said way about its axis of rotation, said means comprising a bracket secured to said base and a screw journaled in said bracket and having threaded engagement with said slide, and means for adjusting said bracket along a circular arc described from the center of rotation of said arcuate way.

10. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, means for moving said tool carrier along said slide, a cutting tool adjustably mounted in said tool carrier, means for sliding said tool carrier along said slide, means for moving said slide along said arcuate way and for partially rotating said way about its axis of rotation, said means comprising a bracket secured to said base and a screw journaled in said bracket and having threaded engagement with said slide, means for adjusting said bracket along a circular arc described from the center of rotation of said arcuate way, and means on said tool carrier and said slide for indicating the distance between the cutting edge of the tool and the center of rotation and the center of curvature of said arcuate slide.

11. A dressing device comprising a base member, an arcuate way rotatably supported on said base member, means for locking said arcuate way to said base member, a slide slidable along said arcuate way, means for locking said slide to said way, a tool carrier slidable along said slide, said tool carrier being reversible end for end on said slide, means for moving said tool carrier along said slide, a cutting tool adjustably mounted in said tool carrier, means for sliding said tool carrier along said slide, means for moving said slide along said arcuate way and for partially rotating said way about its axis of rotation, said means comprising a bracket secured to said base and a screw journaled in said bracket and having threaded engagement with said slide, means for adjusting said bracket along a circular arc described from the center of rotation of said arcuate way, and means on said tool carrier and said slide for indicating the distance between the cutting edge of the tool and the center of rotation and the center of curvature of said arcuate slide, said means comprising a scale on said slide and index marks on said tool carrier.

Signed at Canton, Ohio, this 1st day of March, 1928.

PAUL KLAMP.
JOHN J. WOOLLEY.