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TRUING MECHANISM FOR GRINDING WHEELS

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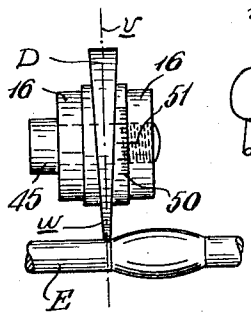


FIG. 3

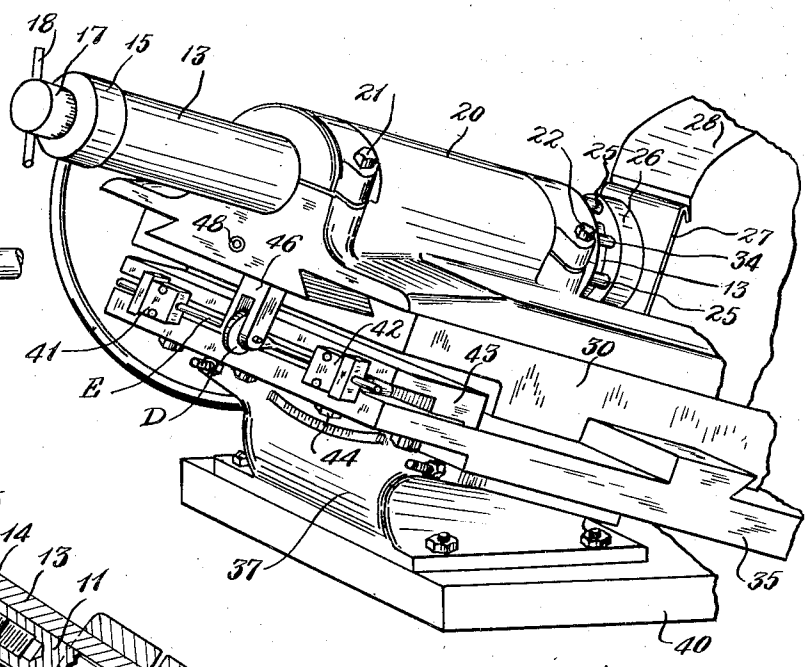


FIG. 1

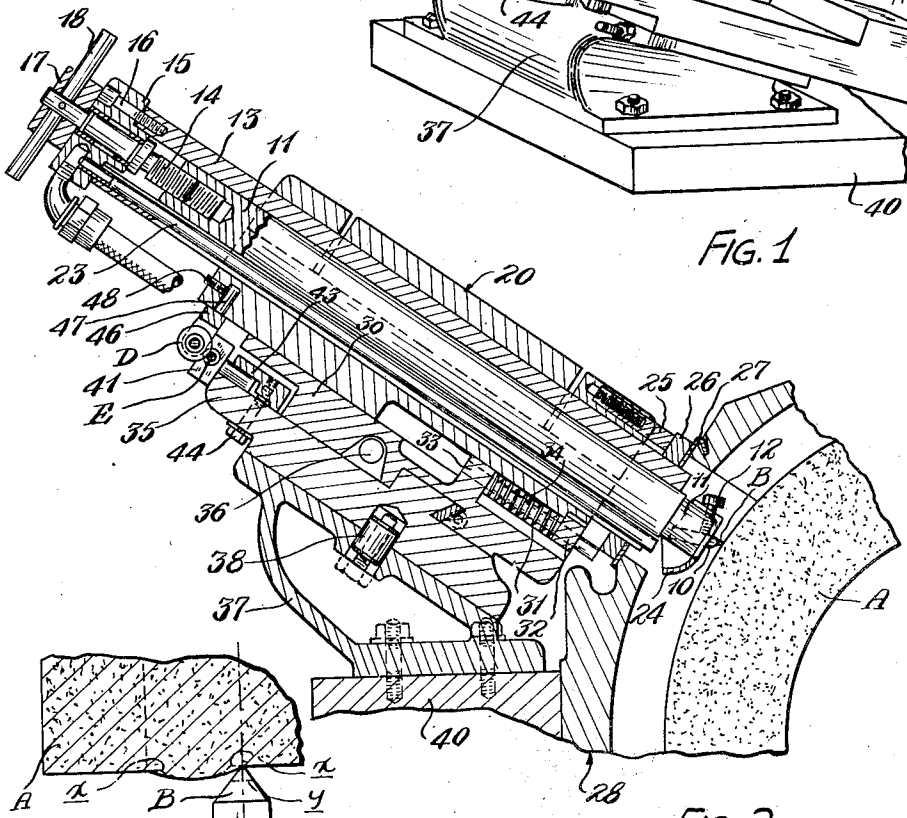


FIG. 2

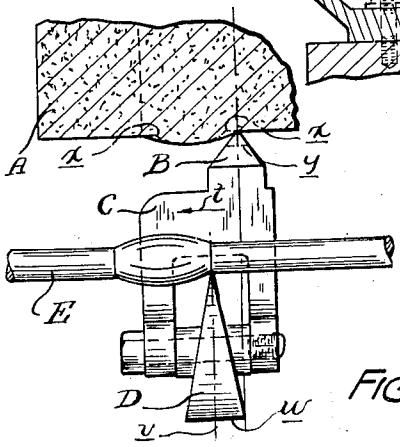


FIG. 4

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TRUING MECHANISM FOR GRINDING WHEELS

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5 Claims. (Cl. 125—11)

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The present invention relates to grinding machines and, more particularly, to grinding wheel profiling mechanism.

One of the principal objects of the invention is the provision of a novel and improved grinding wheel profiling device employing a diamond or like truing tool which becomes blunt with wear and which will be simple in construction and readily adjustable to compensate for wear of the tool.

Another object of the invention is the provision of a novel and improved cam follower for a grinding wheel profiling device employing a diamond or like truing tool which becomes blunt with wear and which follower is readily adjustable to compensate for variation in size of the tool caused by wear.

The invention resides in certain constructions and combinations and arrangements of parts and further objects and advantages will be apparent to those skilled in the art to which it relates from the following description of the preferred embodiment described with reference to the accompanying drawings forming a part of this specification in which similar reference characters designate corresponding parts, and in which

Fig. 1 is a perspective fragmentary view of a grinding machine provided with grinding wheel profiling equipment embodying the present invention;

Fig. 2 is a fragmentary sectional view of the mechanism shown in Fig. 1 taken substantially on the vertical plane through the lonigtudinal axis of the diamond holder;

Fig. 3 is an enlarged bottom elevational view of the cam and cam follower shown in the preceding figures; and

Fig 4 is a diagrammatic view illustrating the principle of operation of the cam follower shown.

While the present invention may be embodied in numerous structures and is applicable to grinding wheel profiling mechanism generally, the preferred embodiment is herein illustrated and described as applied to a Cincinnati No. 2 centerless grinding machine manufactured and sold commercially by Cincinnati Grinders, Incorporated, Cincinnati, Ohio. Because the machine referred to is well-known, only those parts which are necessary to a complete understanding of the present invention are herein illustrated and described in detail.

Referring to Fig 4, the diagrammatic view illustrating the principle of operation of the preferred embodiment shown, as the grinding wheel A is trued by the diamond B carried by the slidably

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mounted diamond holder C biased toward the grinding wheel and including the disk-like cam follower D in engagement with the stationary cam E, the diamond wears in time, necessitating adjustment thereof toward the wheel. As the diamond wears, it becomes blunt, as indicated by the dotted line y, necessitating an adjustment of the diamond transversely of the wheel to avoid distorting the form on the wheel, as indicated by the dotted lines x. In the present instance this adjustment is taken care of by rotating or adjusting the cam follower which has a cylindrical cam-engaging edge w of varying width concentric with its axis of rotation. The cam follower is rotated an amount necessary to increase the width thereof in engagement with the cam an amount equal to the increase in width of the end of the diamond.

Assuming that the relative direction of movement between the cam and cam follower is as indicated by the arrow t, when the cam follower D is adjusted to bring a wider portion of the edge w into position to engage the cam, the diamond will be moved by the follower, as the follower engages and moves along the inclined part of the cam, away from the grinding wheel sooner than it otherwise would, thus avoiding the distortion indicated at x. The cam-engaging surface w is concentric with respect to the axis of rotation of the disk and is symmetrical about the center plane v of the disk, which plane is normal to the axis of rotation and direction of movement indicated by the arrow t, therefore, a similar condition obtains as the cam follower moves along the decline on the cam.

Referring to Figs. 1 to 3 of the drawings, the reference character 10 designates a diamond nib provided with a diamond B. The diamond nib 10 is detachably mounted in a cylindrical diamond holder 11 by a setscrew 12. The diamond holder 11 is slidably supported and non-rotatably keyed within a sleeve 13 and is adapted to be adjusted longitudinally therein by an adjusting screw 14 having threading engagement with a tapered bore in the diamond holder. The adjusting screw 14 is rotatably supported against axial movement in an adjusting screw guide 15 fixed to the outer end of the sleeve 13 by suitable screws 16. The outer end of the adjusting screw 14 is provided with a dial 17 and a hand grasp 18 for facilitating adjustment of the diamond holder within the sleeve 13.

The sleeve 13 is slidably keyed within the sleeve housing 20 and is adapted to be clamped in any adjusted position by clamp screws 21 at opposite

ends of the sleeve housing, which clamp screws are adapted to flex parts of the sleeve housing into engagement with the sleeve. A longitudinally extending pipe 23 within the diamond holder 11 provides means for supplying water to a water deflector 24 connected to the front end of the diamond holder, which deflector directs the water to the diamond B. A plurality of spring-pressed splash guard plungers 25 carried by the sleeve housing 20 yieldably press splash guard washers 26, 27 into engagement with the grinding wheel cover 28.

The sleeve housing 20 is slidably supported on an inclined slide 30 for movement toward and from the grinding wheel A by suitable ways and is continuously biased or urged toward the grinding wheel by a plurality of springs 31 interposed between a spring plate 32 detachably bolted to the lower forward end of the sleeve housing 20 and a projection 33 formed integral with the slide 30. The springs 31, only one of which is shown in the drawings, surround pins 34 fixed to the slide 30, which pins prevent the springs from buckling and interfering with the free movement of the sleeve 20 on the slide 30.

The slide 30 is supported upon a swivel plate 35 for movement transversely of the face of the grinding wheel A by suitable ways and is adapted to be moved transversely of the grinding wheel in any convenient manner as by a lead screw or a hydraulic motor. Preferably a hydraulic motor, not shown, is employed. The reference character 36 indicates the piston rod of such a motor connected to the slide 30 for reciprocating the same upon the swivel plate 35. The swivel plate 35 is mounted upon the swivel bracket 37 for limited movement about the pivot 38, however, this feature of the device forms no part of the present invention and is merely referred to because it is a part of the commercial grinding machine heretofore mentioned. The swivel bracket 37 is supported upon the grinding wheel guard bracket 40 connected to the grinding wheel cover 28.

According to the provisions of the present invention, as the slide 30 is reciprocated to cause the diamond to traverse the face of the wheel the movement of the diamond B radially of the grinding wheel A is controlled by the cam follower and cam D and E, respectively. The cam E shown is a rod-like member of non-uniform diameter so constructed that the desired form will be produced upon the grinding wheel A as the diamond B is traversed across the face thereof. The round shape of the cam permits it to be adjusted about its longitudinal axis as one or more parts of it wear. Opposite ends of the cam E are removably supported in suitable cam brackets 41, 42 having rear projections thereon through the medium of which the brackets are removably clamped to the swivel plate 35 by a clamp member 43 and clamp screws 44 projecting through suitable apertures in the swivel plate 35 and having threaded engagement with the clamp member 43. The construction is such that the cam can be readily adjusted or replaced as required.

The cam follower D shown is a suitable disk-shaped member having its faces ground at an angle to produce the peripheral surface or edge *w* of varying width symmetrical about the center plane *v* of the disk and concentric about its axis of rotation. Obviously the cam follower may be otherwise constructed. The cam follower D is provided with means in the form of a central aperture through which a screw 45 projects for adjustably securing it in the lower end

of a yoke-like member 46 provided with a cylindrical projection 47 through the medium of which it is fixedly secured to the sleeve housing 20 by a setscrew 48. If desired, the cam follower D may be provided with indicia 50 for assisting in making any desired adjustment thereof. The reference character 51 indicates a reference line for the indicia 50.

From the foregoing description of the preferred embodiment of the invention, it will be apparent that the objects heretofore enumerated and others have been accomplished and that there has been provided a new and improved grinding wheel profiling device which can be readily adjusted to compensate for wear of the tool. While the preferred embodiment of the invention has been described in considerable detail, alternative constructions will be readily apparent to those skilled in the art to which the invention relates; for example, the disk-like cam follower D can be replaced by a cam follower linearly adjustable in a direction normal to the direction of movement of the sleeve 20 on the slide 30 and having a flat surface of varying width for engaging the cam. It is my intention to hereby cover all alternative constructions coming within the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. In a grinding wheel profiling device, the combination of a diamond holder, means adapted to support said diamond holder for movement toward and from a grinding wheel, a cam, a cam follower having a surface of varying width adapted to engage said cam for limiting the movement of said diamond holder toward the grinding wheel, means for producing relative movement between said cam and said cam follower, and means for adjusting said cam follower whereby different portions of said surface of varying width are caused to engage said cam.

2. In a grinding wheel profiling device, the combination of a diamond holder, means adapted to support said diamond holder for movement toward and from a grinding wheel, a cam, a cam follower having a surface of varying width adapted to engage said cam for limiting the movement of said diamond holder toward the grinding wheel, means for producing relative movement between said cam and said cam follower, and means for adjusting said cam follower whereby different portions of said surface of varying width are caused to engage said cam, said surface of varying width being symmetrical about a plane normal to the length of said cam.

3. In a grinding wheel profiling device, the combination of a diamond holder, means adapted to support said diamond holder for movement toward and from a grinding wheel, means for yieldably biasing said diamond holder in a direction toward the grinding wheel, a cam, a disk-like cam follower having an edge of varying width for limiting the movement of said diamond holder toward the grinding wheel, means for producing relative movement between said cam and said cam follower, and means for adjusting said cam follower about a transverse axis to cause different portions of the edge thereof to engage said cam, said edge of varying width being symmetrical about a plane at right angles to said transverse axis.

4. In a grinding wheel profiling device, the combination of a diamond holder, means adapted to support said diamond holder for movement toward and from a grinding wheel, means for

yieldably biasing the diamond holder in a direction toward the grinding wheel, a stationary cam, a disk-like cam follower having an edge the width of which varies axially thereof, means for connecting said cam follower to said diamond holder, and means for adjusting said cam follower about its axis whereby different portions of the edge are caused to engage said cam.

5. A cam follower for a grinding wheel profiling device, said cam follower comprising a disk-like member adapted to be supported for rotation or adjustment about a predetermined axis and having non-parallel side faces lying in opposite sides of an acute dihedral angle bisected by a central plane normal to said axis and a peripheral surface concentric with said axis and of varying width between said side faces.

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