Feb. 2, 1943. R. E. ROOT 2,309,924

UNIVERSAL RADIUS TRUING FIXTURE FOR GRINDING MACHINES

Filed March 29, 1941

FIG. 1

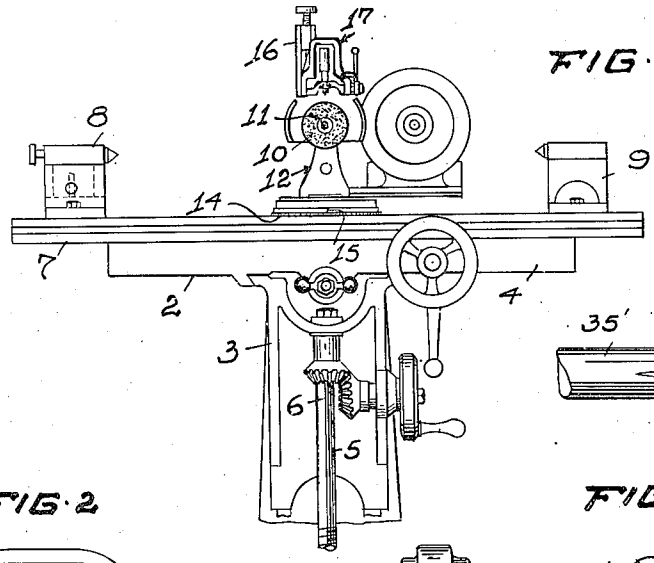


FIG. 7

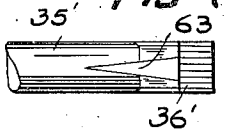


FIG. 2

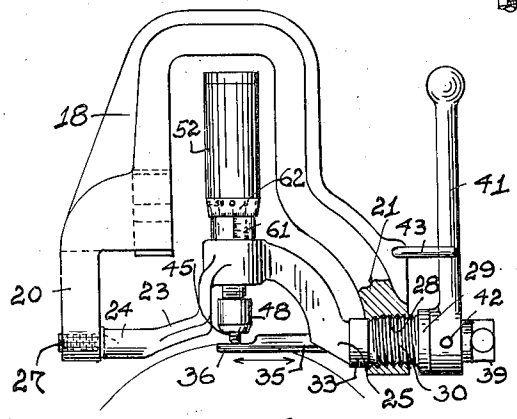


FIG. 8

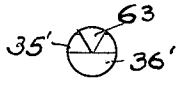


FIG. 3

FIG. 5

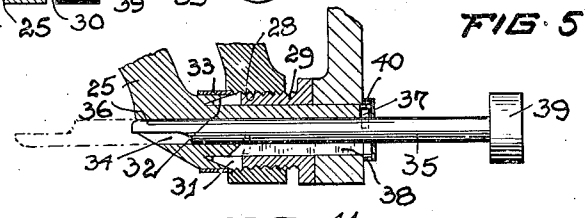


FIG. 4

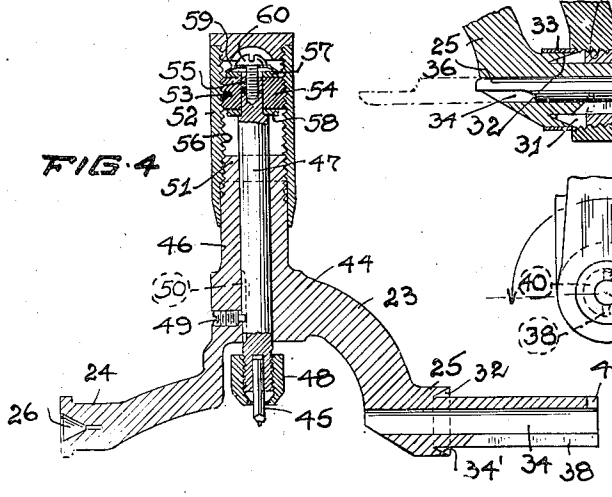
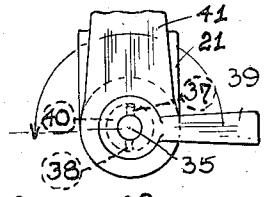


FIG. 6



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UNIVERSAL RADIUS TRUING FIXTURE FOR GRINDING MACHINES

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Application March 29, 1941, Serial No. 385,880

5 Claims. (Cl. 125—11)

This invention relates in general to grinding machines and more particularly to grinding wheel truing apparatus or fixtures, the principal object being the provision of a simple apparatus permitting a grinding wheel to be quickly and accurately trimmed or dressed to any desired radius for cutting concave, convex or compound contours.

Another object of the invention is the provision of a grinding wheel truing apparatus or fixture in which the diamond holding and supporting rod is longitudinally adjustably secured in a pivotally supported auxiliary frame and in which micrometer adjustments can readily and easily be made without the use of special gages.

A further object of the invention is the provision of a grinding wheel truing apparatus or fixture of the type described above which includes shiftable gage means permitting simple alignment of the diamond of the apparatus with the pivot axis of the auxiliary frame to enable quick and accurate micrometer adjustment of the apparatus to any desired radius.

Other objects of the invention consist in the provision of a grinding wheel truing apparatus or fixture embodying features of construction, combination of elements, and arrangements of parts, as exemplified in the structure to be hereinafter described in the following specification, reference being had to the accompanying drawing, in which

Fig. 1 is a fragmentary side elevation of a tool grinding machine with a grinding wheel truing and dressing device according to the invention;

Fig. 2 is an enlarged front view partly in section of the grinding wheel truing and dressing device shown in Fig. 1;

Fig. 3 is a side view of the grinding wheel truing device;

Fig. 4 is a sectional view through the auxiliary frame of the wheel truing and dressing device;

Fig. 5 is a fragmentary sectional view of the right end of the grinding wheel truing and dressing device showing the gage means of said device in its rest position;

Fig. 6 is a fragmentary view of the right end of the wheel truing device showing the gage means locked in its rest position.

Fig. 7 is a fragmentary plan view through the gaging end of a somewhat modified gaging rod to be used for gaging a chisel point diamond dressing tool in the grinding wheel truing apparatus.

Fig. 8 is an end view of the gaging rod shown in Fig. 7.

Referring now to the exemplified form of the invention shown in the drawing, reference numeral 2 denotes a grinding machine embodying a suitably constructed stand 3 which vertically adjustably supports a bed 4. This bed is vertically shiftably mounted on stand 3 by means of a threaded shaft 5 and gearing 6, and mounts a slide 7 carrying a pair of lengthwise adjustable centers 8 and 9 for axial support of a tool. Stand 3 also mounts a grinding wheel 10 secured to a spindle 11 in a head 12, which head is horizontally rotatably secured to stand 3. A scale 14 on stand 3 cooperates with a mark 15 on head 12 and permits of proper setting of the wheel supporting head 12 with respect to the tool to be ground. Head 12 mounts a bracket 16 which adjustably carries a grinding wheel truing device 17 adapted to trim or dress grinding wheel 10 to any desired radius. This grinding wheel truing device embodies a substantially U-shaped frame 18 which is formed with a rearwardly extended slotted arm 19 for adjustably attaching said device to bracket 16. Frame 18 pivotally mounts in its two arms 20 and 21 an auxiliary dressing tool supporting frame 23, the oppositely arranged arms 24 and 25 of which pivotally engage arms 20 and 21 of frame 18. Thus, arm 24 of auxiliary frame 23 is formed with a cone-shaped bearing recess 26 into which extends a pin 27 threadedly engaged with arm 20 of frame 18, and perforated arm 25 of frame 23 extends through a threaded bore 28 in arm 21 and is pivotally mounted in a bearing sleeve 29, the threaded outer face 30 of which engages the threads of bore 28. This bearing sleeve is at its front end formed with a cone-shaped end 31 which extends into a conical recess 32 on arm 25 to take up end thrust on arm 25, center said arm with respect to bore 28, and permit of proper compensation for wear. Preferably, as shown, metal sleeve 33 protects cone-shaped bearing surface 34' of recess 32 from grinding dust and dirt.

The arm 25, as previously stated, is perforated, a bore 34 extending axially through said arm, and this bore axially slidably mounts a gaging device or rod 35, the front end 36 of which is flattened and has its flat surface aligned with the pivot axis of auxiliary frame 23. Gage rod 35 carries a pin 37 which is slidably extended into a slot 38 in arm 25 and prevents rotation of said gage rod when in gaging position, and a handle 39 at the end of gage rod 35 permits of rotation and locking of said rod when shifted to an in-

active position in which pin 37 has entered a half circular recess 40 at the end of arm 25 to permit of rotation of said gage rod to Fig. 5 position, so that handle 39 is in Fig. 6 position. Arm 25 mounts on its end an operating lever 41 rigidly secured to said arm by a set screw 42, and this lever is held in inoperative position by means of a U-shaped spring wire clamp 43 pivotally engaged with arm 21 of frame 18.

The thus described auxiliary frame 23 embodies a dressing tool supporting portion 44, which portion is offset with respect to the pivot axis of frame 23 and axially shiftably supports a diamond carrying dressing tool 45 in a perforated extension arm 46 arranged at a right angle to the pivot axis of frame 23. Extension arm 46 slidably and non-rotatably mounts a rod 47 which at its lower end carries a chuck 48 for gripping dressing tool 45. This rod is non-rotatably held in extension arm 46 by a threaded pin 49 slidably extended into a slot 50 in said rod. The upper end of arm 46 is threaded as at 51 and mounts a threaded tube 52 connected to the upper end of rod 47 by means of adjustable swivel connection on 53, so that rotation of tube 52 effects longitudinal shifting of rod 47 and therewith shifting of the dressing tool 45 with respect to the pivot axis of auxiliary frame 23. The adjustable swivel connection 53 embodies a bushing 54 which is sleeved upon the reduced end 55 of rod 47 and threadedly engaged with the threads 56 in tube 52. This bushing engages with its opposite faces washers 57 and 58 non-rotatably engaged with end 55 of rod 47, and washer 57 is yieldingly forced toward said bushing by a spring washer 59 tensioned by a screw 60 threadedly engaged with the reduced end 55 of rod 47.

Arm 46 and tube 52 are provided with scales 61 and 62 to permit of micrometer readings of the shifting of dressing tool 45 and therewith accurate dressing of grinding wheel 10 to any convex or concave radius.

For quick and accurate setting of dressing tool 45 shiftable gage rod 35 is rotated from Fig. 6 position to Fig. 3 position by turning its handle 39 and then said gage rod is shifted from Fig. 5 position to Fig. 2 position to locate its flat surface opposite dressing tool 45. When gage rod 35 is thus located, chuck 48 is loosened and dressing tool 45 is shifted downwardly to rest its diamond cutting edge upon the flat surface of gage rod 35. Then tube 52 is rotated to the desired reading on scales 61 and 62 and chuck 48 tightened so that this reading indicates the position in which the diamond cutting edge of the dressing tool is aligned with the pivot axis of auxiliary frame 23. After the above described adjustment the gage rod is shifted back to inactive position and proper settings of the apparatus or fixture to any desired cutting radius can now be made by merely adding or deducting the desired radius from the previously taken reading.

When the grinding wheel truing apparatus or fixture is to be used for dressing wheels with small cutting radii, dressing tool 45 must carry a lapped, chisel point diamond. In this case a gage rod 35', see Figs. 7 and 8, is used which is formed with a V-shaped slot 63 adjacent to the flat surface at its front end 36', which slot properly guides the chisel point diamond during adjustment procedures and insures proper working position of dressing tool 45 for grinding operations.

Having thus described my invention, what I claim is:

1. A grinding wheel dressing fixture comprising a main frame, a secondary frame pivotally supported in said main frame, an axially offset portion on said secondary frame including a supporting arm rectangularly related to the pivot axis of said secondary frame, a dressing tool supporting shaft slidably and non-rotatably mounted in said arm, clamping means at the end of said shaft, a dressing tool longitudinally adjustably held by said clamping means, rotary means threadedly coupled with said arm and in swivel connection with said supporting shaft, and gaging means axially shiftably mounted in alignment with the pivot axis of said secondary frame for adjusting the position of said dressing tool with respect to said dressing tool supporting shaft.

2. A grinding wheel dressing fixture as described in claim 1, wherein said secondary frame includes at one end a perforated bearing portion pivotally mounting said end in said primary frame, and wherein said gaging means slidably extend through the perforation of said bearing portion to selectively shift said gaging means into operative and inoperative positions.

3. A grinding wheel dressing fixture comprising a main frame, a secondary frame with a tubular bearing shaft at its one end and pivotally supported in said main frame, an axially offset portion on said secondary frame including a supporting arm rectangularly related to the pivot axis of said secondary frame, a dressing tool supporting shaft slidably and non-rotatably mounted in said arm, a chuck-like clamping device at the end of said supporting shaft, a dressing tool longitudinally adjustably held by said clamping device, rotary means threadedly coupled with said arm and in swivel connection with said supporting shaft, gaging means axially shiftably extended through the tubular bearing of said secondary frame, and means on said gaging means and said perforated shaft for non-rotatably guiding said gaging means when axially shifted into an active position and for locking such gaging means when in an inactive position.

4. A grinding wheel dressing fixture as described in claim 3, wherein said gaging means consists of a gaging rod slidably mounted in said perforated shaft, wherein said gaging rod and said perforated shaft are non-rotatably coupled with each other by means of a pin and slot connection at one end, and wherein the slot of said pin and slot connection extend at one end into a half circular recess to permit of limited rotation of said gaging rod when shifted to a predetermined position.

5. A grinding wheel dressing fixture as described in claim 3, wherein said dressing tool carries a chisel point diamond, wherein said gaging means consists of a gaging rod axially slidably and non-rotatably extended through the tubular bearing of said secondary frame, and wherein said gaging rod is formed with a wedge-shaped slot to guide the chisel point of said dressing tool and prevent rotary movements of said dressing tool during adjustment procedures when released by said chuck-like clamping device.

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