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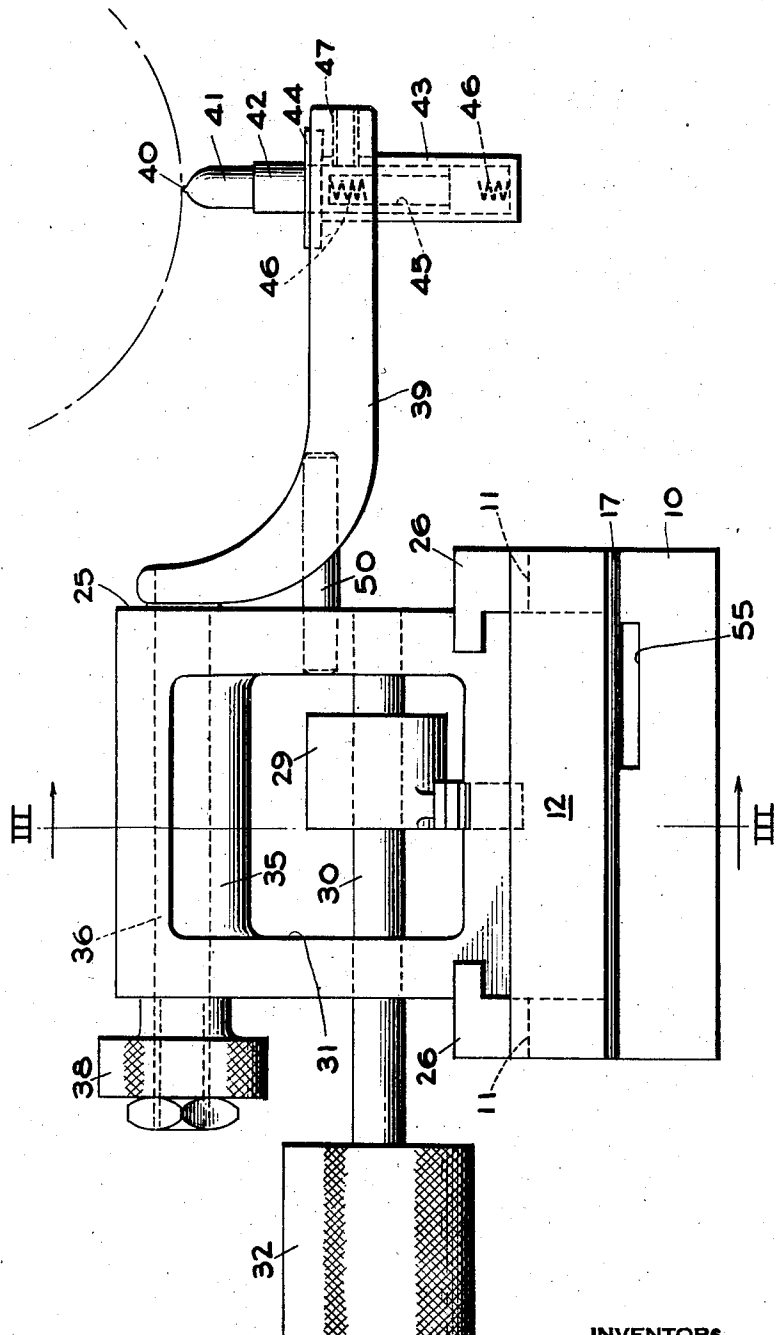
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ABRADING WHEEL DRESSING MEANS

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2 Sheets-Sheet 1

Fig. 1.



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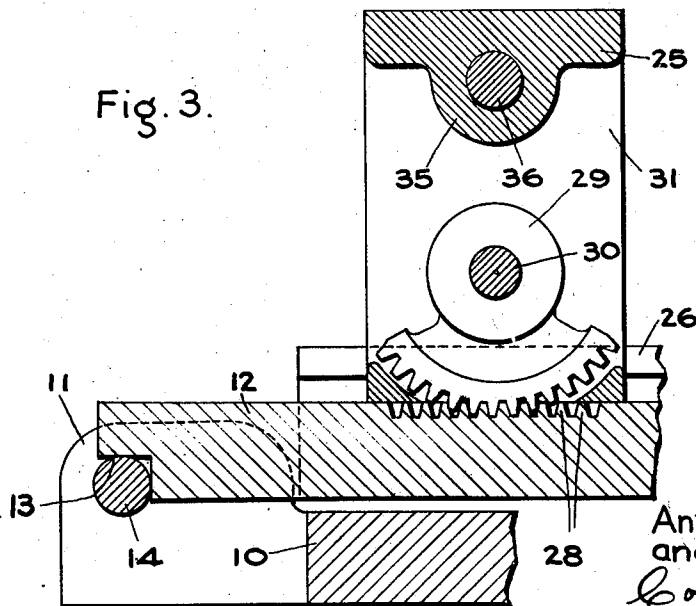
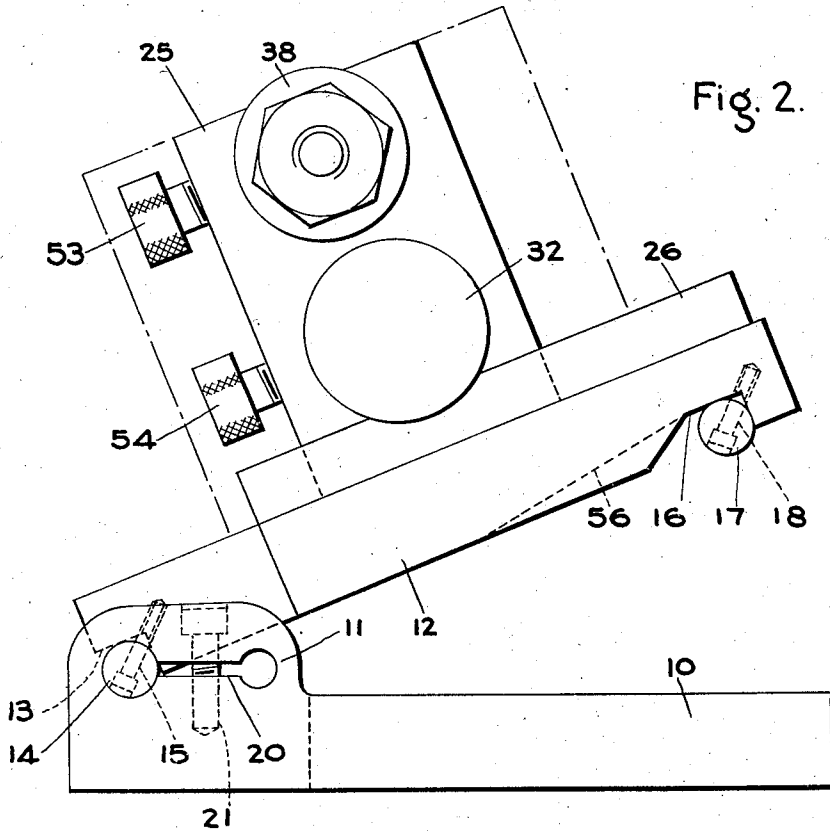
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ABRADING WHEEL DRESSING MEANS

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2 Claims. (Cl. 125-11)

This invention relates to the machine tool art and particularly to means for the precision dressing of abrading wheels.

According to the present invention means are provided which permit the dressing of contours comprising angles and radii, either by themselves or in any desired combination. As a result, forms or contours composed entirely of radii and straight lines, whether the latter be parallel to the axis of the wheel being dressed, or obliquely extending, may be fully dressed in a highly precise, simple and continuous manner.

Basically, the present arrangement of elements is novel in that it superimposes radius dressing elements on angle dressing instrumentalities, whereby a straight line angle dressing operation may be interrupted at any point, without disturbing the precision setting, to merge the line of angle dressing into any desired radius.

The elements of the device of the present invention are so arranged that angle settings may be effected by the sine bar method, whereby precision gage blocks may be employed with reference to suitable sine bar tables, to set the tool for angle dressing of the highest degree of accuracy. The radius setting arrangement of the tool herein disclosed is likewise such that precision gage blocks may be employed in radius setting, although means are also provided for accurate setting by means of micrometer calipers, when desired.

The various elements of the present invention are so arranged as to permit manufacture on an economical and practical basis, despite the fact that the critical surfaces and dimensions of the device may readily be made to the highest degree of accuracy attainable in the toolmaking art. Other objects and advantages, pertaining to both the manufacture and convenient and practical use of the tool of the present invention will occur to those skilled in the toolmaking and machine tool art from a study of the following detailed description, considered in conjunction with the accompanying drawing.

While a full and complete embodiment of the principles of our invention is set forth herein by way of example, it is to be understood that the form illustrated and described is merely by way of example. The spirit and scope of our invention is not to be considered limited, excepting as defined in the appended claims.

In the drawings:

Fig. 1 is an elevational view of a preferred form of the tool of the present invention viewed

along a line parallel to the axis of rotation of the wheel to be dressed;

Fig. 2 is an elevational view at right angles to Fig. 1, viewed perpendicular to the axis of the wheel to be dressed and with the device arranged to dress an angular periphery; and

Fig. 3 is a cross section on the line III-III of Fig. 1.

Throughout the several figures of the drawings like characters of references denote like parts and the numeral 10 designates a base plate having a precision-ground lower surface. For convenience, the tool will be described with reference to use with a surface grinder having a magnetic chuck, whereby the precision lower surface of the tool base plate 10 may be placed directly on the magnetic chuck table for setting the angles and radii to be dressed.

The base plate 10 has a pair of upwardly extending lugs 11 at one end thereof, the lugs being at opposite sides of the base plate 10 to serve as hinging lugs for a further support element 12, the latter comprising a support for the dressing means proper and being settable in highly precise angular relationship with respect to the base plate 10, in a manner which will presently appear.

The hinged edge of support element 12 is provided with a right-angle groove 13 and a hinge pin 14 is held intimately seated in groove 13 and against both surfaces thereof by screws 15 which extend obliquely through the pin 14 and into the support element 12. The lower surface of support element 12 has a second groove 16 spaced from the groove 13, parallel thereto, and preferably adjacent the opposite edge of support element 12. The groove 16 has a pair of right angle surfaces corresponding to those of groove 13 and an identical pin 17 is held thereagainst by oblique screws 18.

The foregoing arrangement provides a convenient and practical means of insuring highly precise horizontal disposition of support element 12 when in the position illustrated in Fig. 3, the lower surfaces of hinge pins 14 and pin 17 being tangent to a common horizontal line lying in the plane of the flat upper surface of base plate 10.

The support element 12 may be held firmly in any angular position of adjustment with respect to base 10 by virtue of the particular construction of hinge lugs 11. The openings in lugs 11 which receive the ends of hinge pin 14 each have lateral slots 20 extending therefrom and screws 21 pass freely through the lug portions

above the slots 20 and thread into the lug portions below the slots, whereby the hinge assembly may be securely locked or readily freed for adjustment by merely tightening or loosening screws 21, as the case may be.

The upper surface of base 10 is precision formed and the right hand surfaces of the grooves 13 and 16 are spaced at a precise distance from each other. Because of this the support element 12 may be set at any desired angle about hinge pin 14 by loosening screws 21 and, with appropriate reference to sine tables, setting the support element 12 so that a predetermined precise dimension exists between the upper surface of base 10 and the lower surface of pin 17. The manner in which these elements are arranged permits ready use of the highly accurate gage block method of setting the device. While the use of Johanson blocks is preferred, any other precision measuring means may be employed, such as a height gage, micrometer calipers, or the like.

The upper surface of support element 12 is formed to support a block 25 for accurately guided lineal movement thereon. To this end a pair of undercut guide bars 26 are secured to opposite sides of the upper surface of support element 12 and engage complementary groove formations in block 25 to guide the same for movement in a direction at right angles to the axis of pivot pin 14.

It is desired that lineal movement of block 25 along support element 12 be under convenient and certain external manual control and for this reason rack teeth 28 are formed in the upper surface of support element 12 as appears from Fig. 3. A sector gear 29 is mounted on a control shaft 30 journaled in opposite side walls of block 25, the latter having an open central portion, as appears best at 31 in Fig. 1. Externally of the block 25 the control shaft 30 is extended and has a manipulating knob 32. The sector gear 29 meshes with rack teeth 28 to provide accurate guided movement of block 25 along the support element 12 through manual control and manipulation of knob 32.

It will be noted that the ends of the series of rack teeth and the arcuate extent of the sector gear 29 are so proportioned that a positive limit of movement in either direction is provided by engagement of end teeth of the sector gear 29 with untoothed portions of the support element 12. In Fig. 2 the limits of movement of the block 25 are illustrated in dot and dash lines, the full line position of Fig. 2 being a mid-position.

At its upper portion the block 25 has a bearing 35 which receives a shaft 36 journaled on an axis parallel to the axis of control shaft 30 and to the axis of hinge pin 14. Shaft 36 has a manipulating knob 38 secured to one extending end thereof, at the same side as knob 32, and at its other side has an offset bracket 39 which has at its outer end a diamond or other abrading wheel dressing element 40 set in a holder 41 in conventional manner.

The holder 41 has a cylindrical shank 42 which fits in a sleeve 43. The sleeve 43 has a collar 44 which seats in the bracket 39 and the sleeve 43 preferably has a press fit in the opening formed in bracket 39 to receive it. The shank 42 is hollow, as at 45, and a compression coil spring 46 normally urges holder 41 outwardly of sleeve 43 (upwardly as viewed in Fig. 1). A set screw 47 extends through the end of the bracket 39 and through sleeve 43 and engages against the shank 42 of holder 41 to retain it in adjusted position.

It will be seen from the foregoing that the dressing element 40 may be placed at various distances from an extension of the axis of rotation of shaft 36 and that such distance will determine the radius through which the dressing face of the dressing element will travel upon manual rotation of shaft 36 through knob 38. Further it will be seen that for dressing convex radii on an abrading wheel the dressing element 40 will be set the desired distance below the axis of shaft 36, as viewed in Fig. 1, whereas for dressing concave radii the dressing element will be set above such axis.

The bottom of sleeve 43 is adjusted to a precise, exact and known distance from the axis of bearing 35 and shaft 36, so that the dressing element may be set the desired distance from such axis by setting a micrometer caliper and placing it over the bottom of sleeve 43 and the dressing element 40. The set-screw 47 is then merely loosened, if it is not already so, and spring 46 will urge the dressing element 40 and the bottom of sleeve 43 into engagement with the opposite jaws of the calipers. Further, the upper surface of block 25 is formed flat and true and in accurate parallelism with the axis of shaft 36 and a given precise and known distance therefrom. The dressing element 40 may thus also be set for radius dressing by inverting the entire assembly and placing it on a surface plate or on the magnetic chuck table of a grinding machine. Gage blocks may thus be employed between the surface plate and the dressing element as in the setting of angles.

To enhance and facilitate accuracy of control, means are provided for maintaining the radius dressing shaft 36 and dressing element 40 in rigidly fixed relation with respect to block 25 during angle dressing operations. It is desired that the dressing element holder 41 be perpendicular to the support element 12 during such operations and accordingly the block 25 is perforated at opposite sides of bracket 39 to receive stop pins 50. The pins are readily removable to perform radius dressing operations and one of the pins may remain in position to insure accurate tangency between a radius dressing component and an angle dressing component.

The radius dressing bracket 39 may be arrested and locked in any desired position with respect to its supporting block 25 by a hand screw 53 which threads into block 25 and whose end engages against shaft 36. Likewise, the quadrant and rack 29 and 28 may be similarly locked in any desired relative position by a hand screw 54 which threads into block 25 and is engageable against shaft 30.

A groove 55 is formed in the upper surface of base 10, as appears in Fig. 1, and this groove is of a highly precise and known depth, say one hundred one thousandths, for convenience. This permits the use of gage blocks of material thickness even though the distance to be gaged between the bottom of pin 17 and the upper surface of base 10 is extremely minute.

A medial angular groove 56 is also formed in the under surface of the support element 12 to permit the stacking of gage blocks under pin 17 when the angle between the base plate 10 and support element 12 approaches 90°, without interference from the lower surface of element 12 adjacent the groove 16. The grooves 55 and 56 are preferably offset horizontally in the plane of Fig. 1, so that the presence of groove 55 does not

interfere in any way when large angles are being gaged.

What is claimed is:

1. Grinding wheel dressing means comprising a base having a flat relatively unobstructed precision formed upper surface portion, a member pivotally connected thereto for adjusting movement about a horizontal axis and having a portion offset from said axis disposed above said surface portion, a precision gage pin rigidly associated with said offset portion in predetermined precise relationship with respect thereto, a lower portion of said pin being exposed whereby angularity of said member with respect to said base by pivotal movement therebetween may be accurately determined by gaging between the upper surface portion of the base and said gage pin, a support mounted for lineal guided movement along said member at right angles to the axis of said pivotal connection, a dressing element and means mounting the same for rotation relative to said support about an axis parallel to the axis of said pivotal connection, and means for adjusting said dressing element relative to said mounting means in a direction transverse to its axis of rotation.

2. Grinding wheel dressing means comprising a base having a flat relatively unobstructed pre-

cision formed upper surface portion, a member pivotally connected thereto for adjusting movement about a horizontal axis and having a portion offset from said axis disposed above said surface portion, a precision gage pin rigidly associated with said offset portion in predetermined precise relationship with respect thereto, a lower portion of said pin being exposed whereby angularity of said member with respect to said base by pivotal movement therebetween may be accurately determined by gaging between the upper surface portion of the base and said gage pin, a support member mounted for lineal guided movement along said member at right angles to the axis of said pivotal connection, a gear element mounted on one of said members for free rotation on an axis parallel to said horizontal axis and a meshing rack fixed to the other of said members, manual means for rotating said gear element to control lineal movement of said support member, a dressing element and means mounting the same for rotation relative to said support about an axis likewise parallel to said horizontal axis, and means for adjusting said dressing element relative to said mounting means in a direction transverse to its axis of rotation.

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