United States Patent

Banko et al.

[15] **3,662,732**

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[54] GRINDING WHEEL DRESSER

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[52] **U.S. Cl.** ..... **125/11 R**

[51] **Int. Cl.** **B24b 53/06**

[58] **Field of Search** 125/11

[56] **References Cited**

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[57] **ABSTRACT**

A grinding wheel dresser having a contour block mounted on the grinding wheel spindle housing for reciprocating horizontal movement above and across the upper peripheral face of the grinding wheel to provide a wheel shape that is a mirror image of the contour block.

1 Claims, 7 Drawing Figures

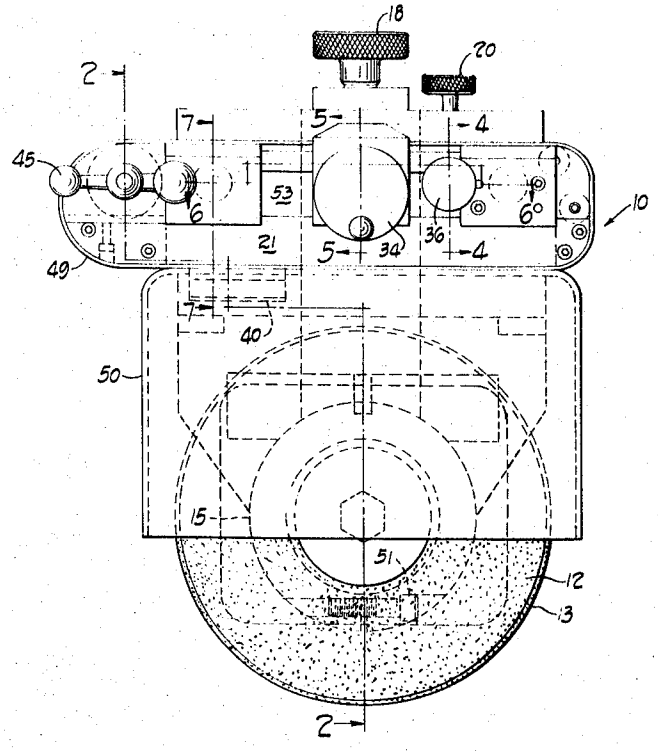
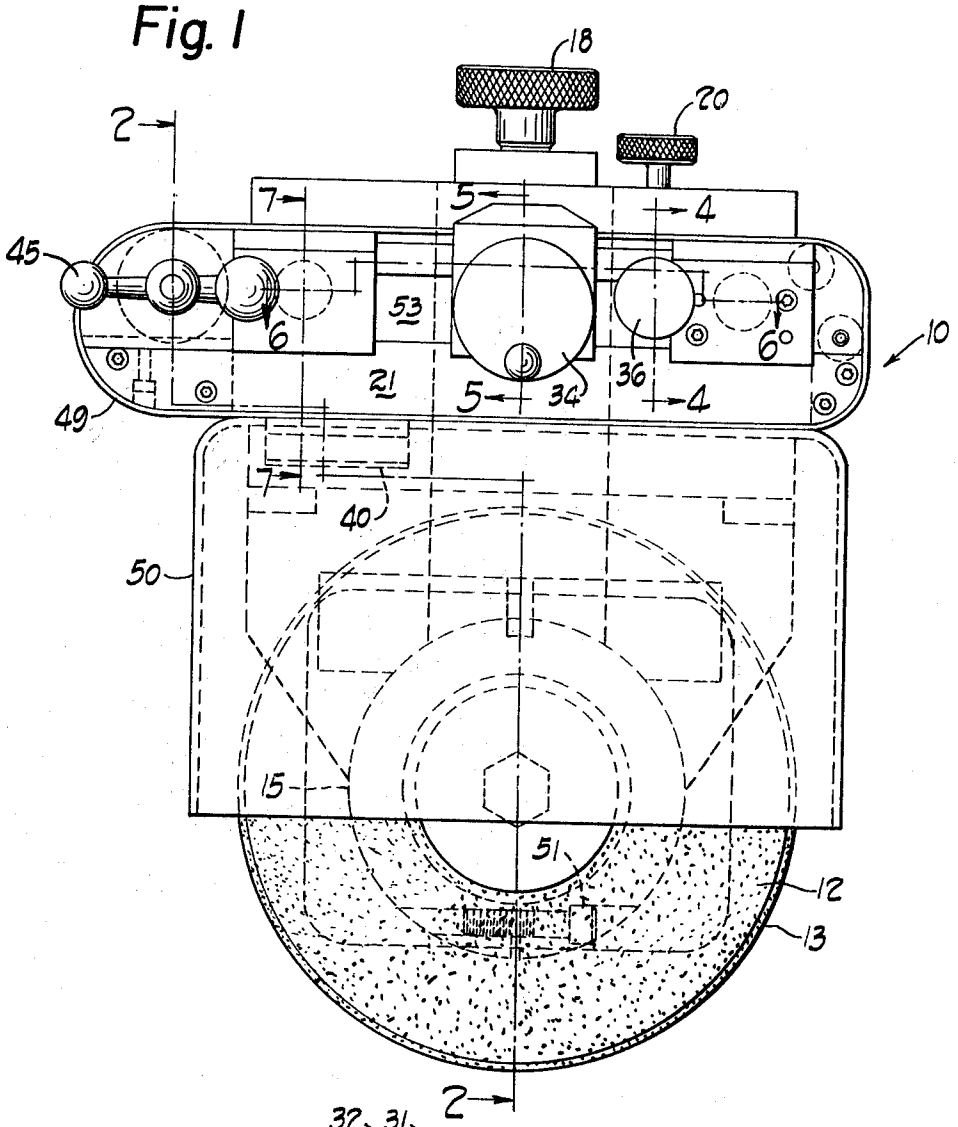


Fig. 1



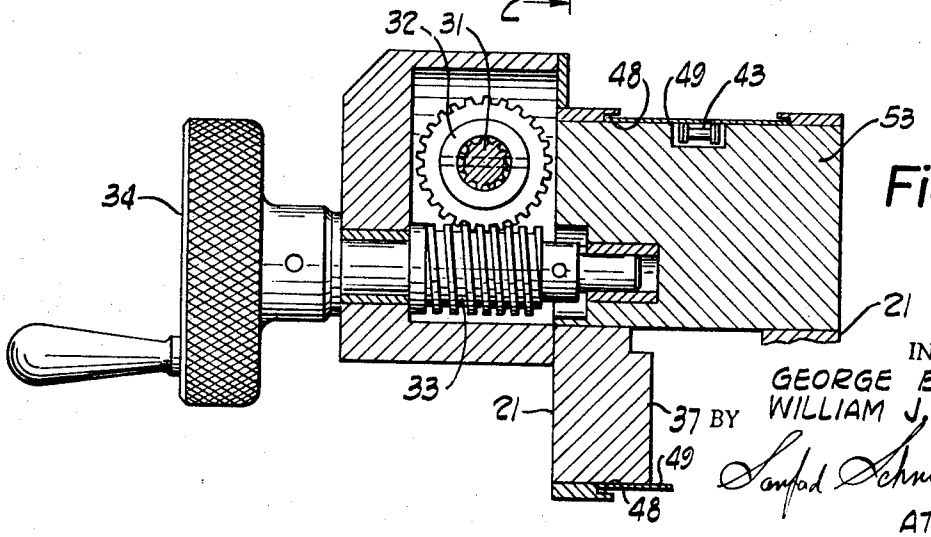


Fig. 5

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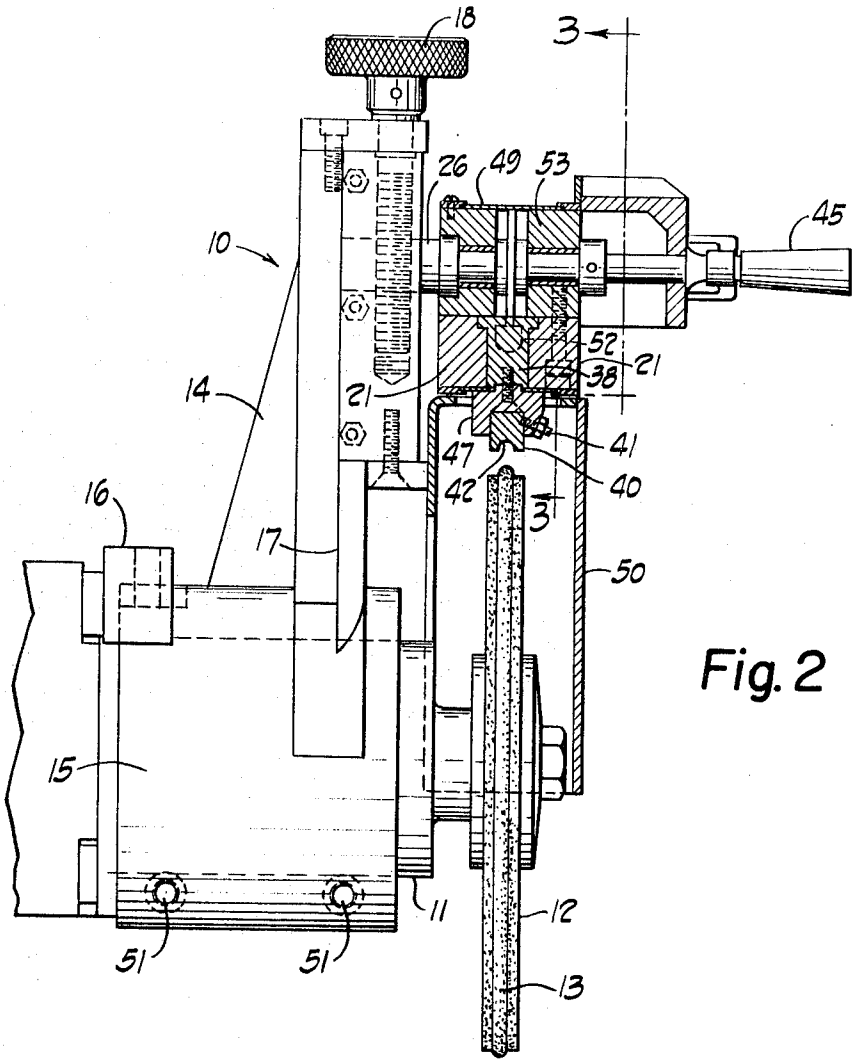

Fig. 2

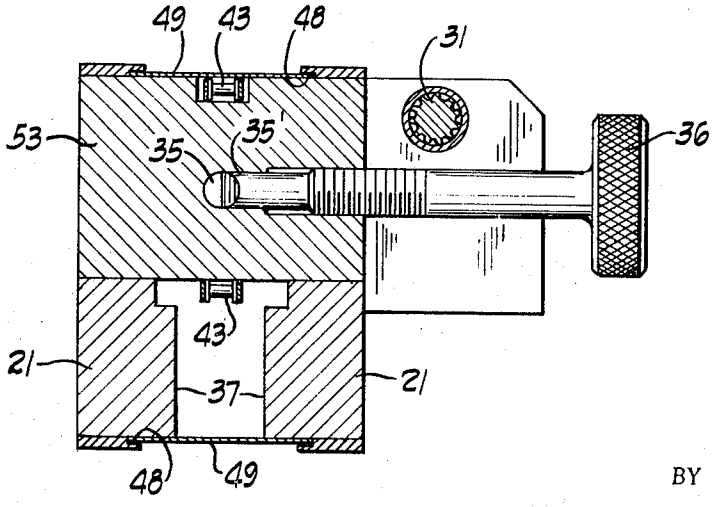

Fig. 4

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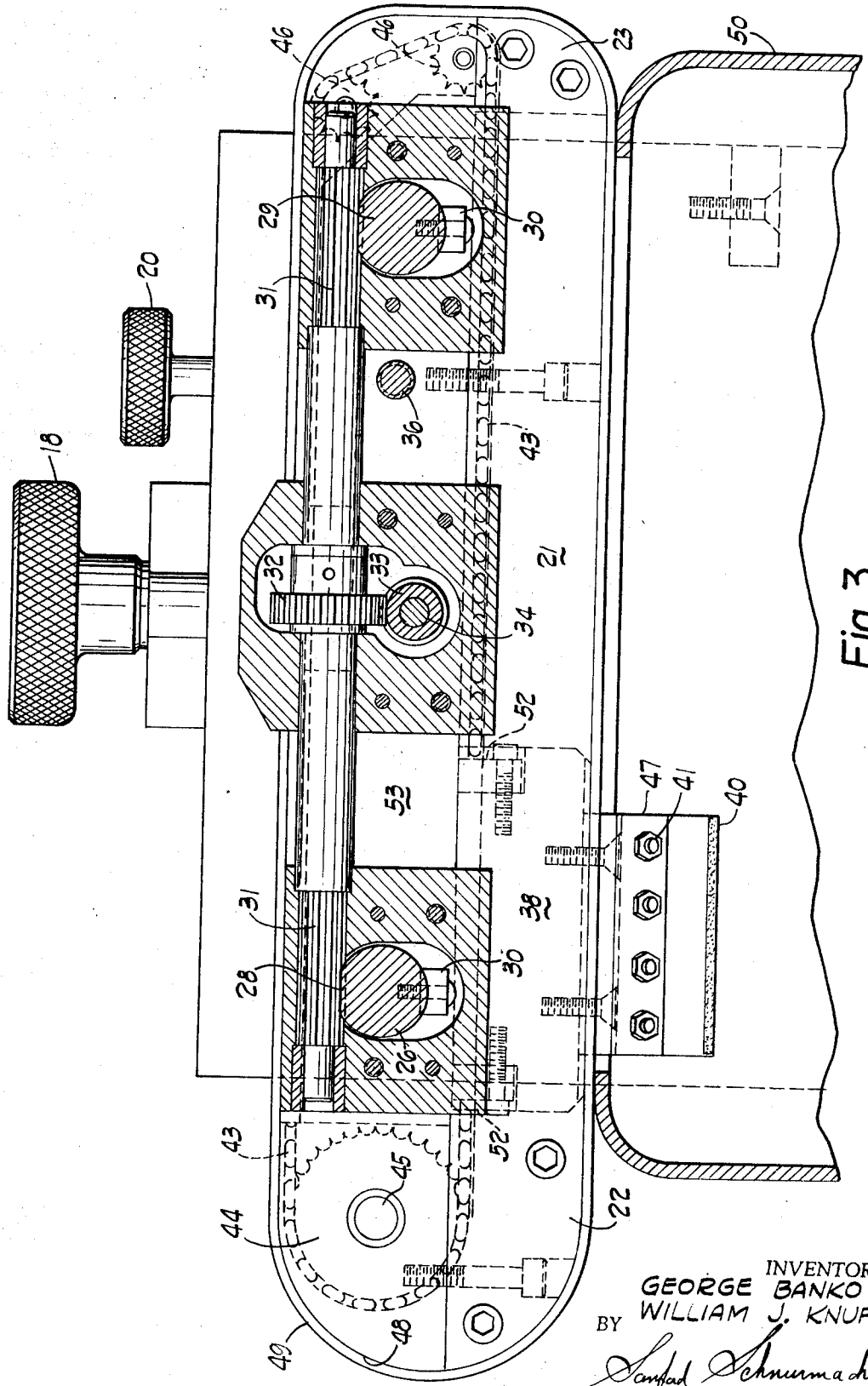

Fig. 3

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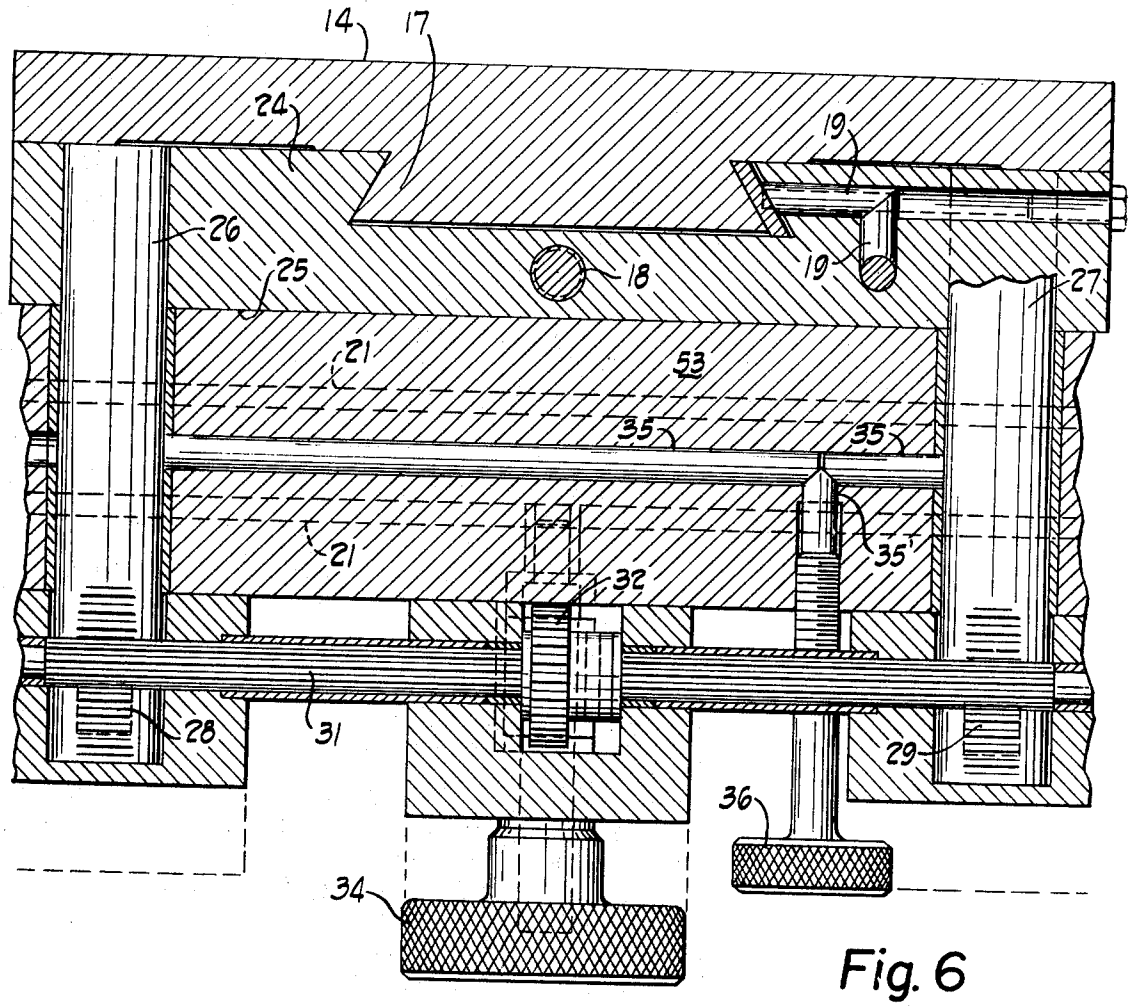

Fig. 6

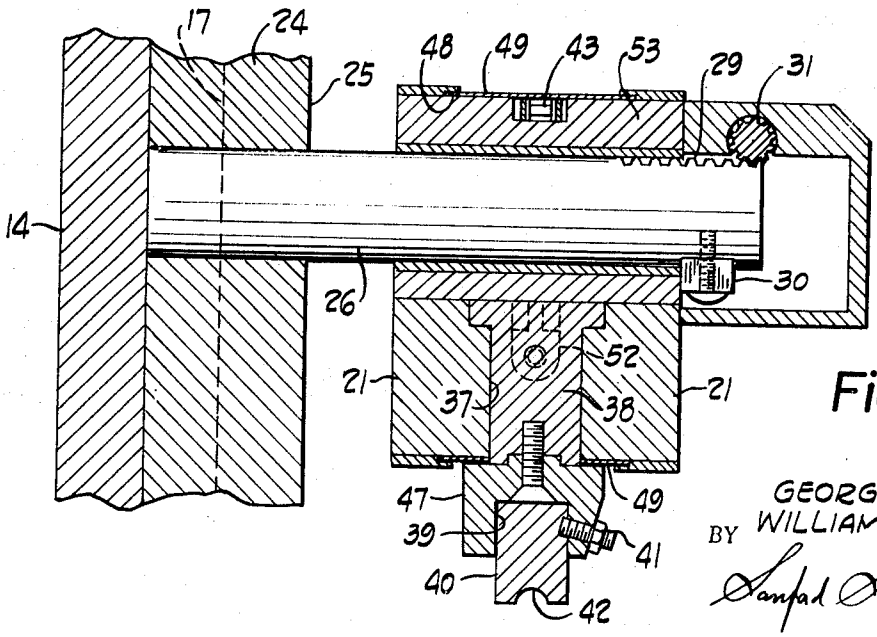

Fig. 7

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GRINDING WHEEL DRESSER

The primary object of the invention is to provide a grinding wheel dresser that is permanently mounted on the spindle housing of a grinding machine, to provide a convenient method of shaping a contour in a grinding wheel, mounted on the same spindle, by means of a horizontaly reciprocating diamond coated contour block.

Another object is to provide a device of the type stated whose wheel contouring block maintains its physical alignment with the grinding wheel even when the grinding wheel is operating on a work-piece.

A further object is to provide a wheel dresser whose shaping element reciprocates in a horizontal plane, always above the grinding wheel, so that the wheel can be re-shaped without removing the work-piece which is being operated upon from the machine.

Still another object is to provide results heretofore not obtainable and in a new and beneficial manner.

Other objects, and a fuller understanding of our invention may be had by referring to the following description and claims, taken in connection with the accompanying drawing, in which:

FIG. 1 is a front elevational view of a device embodying our invention;

FIG. 2 is a left end view of the same, partly in section, taken along the line and in the direction of the arrows 2—2 of FIG. 1;

FIG. 3 is a front view, partly in section, taken along the line and in the direction of the arrows 3—3 of FIG. 2;

FIG. 4 is a sectional view taken along the line and in the direction of the arrows 4—4 of FIG. 1;

FIG. 5 is a sectional view, with portions broken away, taken along the line and in the direction of the arrows 5—5 of FIG. 1;

FIG. 6 is a horizontal sectional view taken along the line and in the direction of the arrows 6—6 of FIG. 1; and,

FIG. 7 is a vertical sectional view taken along the line and in the direction of the arrows 7—7 of FIG. 1.

Referring more particularly to the drawing, there is seen in FIG. 1 the Grinding Wheel Dresser, that is the subject of this invention, broadly indicated by reference numeral 10.

The unit 10 is mounted on the grinding wheel spindle housing 11 of a conventional surface, or cylindrical, grinding machine, not otherwise illustrated, through a clamp-type collar 15 which is locked in place by means of bolts 51, as seen in FIGS. 1 and 2. The spindle housing 11 has a flat ground in the upper surface thereof, against which is fitted a flat bar 16, mounted crosswise of the collar 15, which prevents tilting of the unit 10, if the bolts 51 should become loosened, and also serves to position the frame 14 in a vertical position, normal to the axis of rotation of the grinding wheel 12.

Reference numeral 17 indicates a vertical dove-tail located on the forward face of the frame 14, as is seen most clearly in FIG. 6. A slide 24 is mounted on the dove-tail 17. The slide is movable vertically of the frame 14 between adjusted positions by means of a threaded shaft and hand wheel 18, as seen in FIGS. 1 and 2, and is locked in said adjusted positions by means of lock rods 19 which are pressed against the gib of the slide 24 by means of a threaded lock wheel 20, as seen again in FIGS. 1 and 6.

Reference numeral 26 and 27 indicate two spaced and laterally extending horizontal posts mounted on the slide 24, as seen in FIG. 6. Each post 26 and 27 has a toothed rack 28 and 29, respectively, at the free end thereof.

A horizontally extending table member 53 is slidably mounted on the posts 26 and 27 for lateral travel relative to the face 25 of the slide 24, as seen in FIGS. 6 and 7.

The table 53 is movable between adjusted positions by means of the hand wheel 34 which actuates a toothed shaft 31 which engages the toothed racks 28 and 29 of posts 26 and 27, through a worm and worm-gear 33 and 32, respectively, as seen in FIGS. 5 and 6.

The table 53 is locked in adjusted positions by means of a threaded hand wheel 36 which can be rotated to exert pressure on the table lock rod 35', which in turn acts to expand the rods 35— 35 outwardly, to cause their ends to press against the table supporting posts 26 and 27, as seen most clearly in FIG. 6.

A stop block, positioned proximate the free end of each post, determines the maximum lateral movement of the table outwardly from the slide wall 25, as seen in FIGS. 3 and 7.

Two spaced and parallel rails 21 are positioned the length of the lower face of the table 53.

Reference numerals 22 and 23 indicate spacer blocks positioned at the rail ends. The paired rails are shaped along their inner faces to provide a T-shaped travel track, or slot 37.

Reference numeral 38 indicates a T-shaped shuttle fitted in track 37 and free to move lengthwise thereof in both directions.

Movement of the shuttle 38 is effected by a chain 43 anchored at opposite ends of the shuttle by means of mounts 52, and traveling over a drive sprocket and idler sprockets 46—46. The chain driving sprocket 49 is rotated through a crank handle 45.

Rotation of the crank handle in either direction effects corresponding movement of the shuttle 35 lengthwise of the track 37.

Reference numeral 49 indicates an elongated, flexible, dust guard attached to opposite ends of the shuttle, which travels in a continuous slot 28, with the shuttle 38, serving to prevent dust, dirt and chips from entering the track cavity 37.

An adapter 47 is bolted to the lower surface of the shuttle 38, and extends below the guard 49. The adapter 47 has a cavity 39 along its lower surface, adapted to receive a grinding wheel dressing tool 40 therein, which is maintained in place by a plurality of anchoring bolts 41, as is seen most clearly in FIGS. 3 and 7.

In the form illustrated the tool 40 is a diamond coated contour block. The diamonds being plated or hand set in a matrix, as is well known to those skilled in the art.

The formed contour 42 is a mirror image of the shape to be imparted to the cutting face of the grinding wheel 12.

As shown in FIG. 2, the grinding wheel edge 13 is shaped to grind gear teeth on a cylindrical work-piece, not illustrated.

It is to be understood that instead of using a diamond coated contour block, other suitable materials can be used such as tungsten carbide for shaping copper wheels, or tool steel for brass wheels.

A grinding wheel protective shield 50 covers the upper half of the grinding wheel 12 and the travel path of the tool 40, as seen in FIGS. 1, 2 and 3.

It will be evident that the table 53 is always in a horizontal plane spaced upwardly of the grinding wheel 12

To bring the contour block 40 into its operational wheel dressing position the block 40 is positioned on its travel-track 37 above the projected axis of rotation of the grinding wheel spindle, by rotating the crank handle 45.

The table 53 is then moved laterally of the slide 24, on its support posts 26 and 27, by rotation of the hand wheel 34, after loosening the lock wheel 36, until the wheel dressing surface 42 of the contour block 40 is in alignment with the peripheral edge of the grinding wheel 12 at the point where the convex surface 13 is to be developed. The lock wheel 36 is then re-tightened to lock and hold the table 53 at this position.

The lock wheel 20 of the slide 24 is loosened and, by rotating the hand wheel 18, the slide 24 and its supported table 53 is lowered until the contour block 40 is brought into proper travel alignment with the upper edge of the grinding wheel 12. The wheel 20 is then re-locked.

The grinding wheel 12 is then made to rotate, and the contour block 40 is caused to travel back and forth across the upper edge of the revolving wheel 12 in a horizontal path the length of the table travel-track 37, by rotation of the hand wheel 45 in alternate clockwise and counter-clockwise directions.

As the shaping proceeds the table 53 is lowered by small increments, by appropriate manipulation of the slide hand wheel 18 and lock wheel 20

When the dressing operation is complete the contour block **40** merely has to be positioned at one end of the travel-track **37**, clear of the wheel **12**, as seen in FIG. **1**, where it remains until needed again

The so dressed grinding wheel **12** is immediately ready to operate on the work-piece, which need not be disturbed during the dressing operation just described.

It will be noted that the contour block remains in alignment with the grinding wheel edge **13**, while it is out of use between dressing operations, so that no time is lost in dismantling the dresser structure when it is not in use, or repositioning and re-aligning the contour block **40**, when the grinding wheel **12** has to be re-dressed.

It will now be clear that there is provided a device which accomplishes the objectives heretofore set forth.

While the invention has been disclosed in its preferred form, it is to be understood that the specific embodiment thereof, as described and illustrated herein, is not to be considered in a limited sense, as there may be other forms or modifications of the invention which should also be construed to come within the scope of the appended claims.

We claim:

1. In combination with a surface, or cylindrical, grinding machine having a grinding wheel spindle journaled in a housing and a grinding wheel mounted at the free end of the spindle, a grinding wheel dresser, comprising:

a. an upright frame member permanently mounted on the spindle housing;

b. a slide member mounted on the frame for vertical movement relative to the spindle and supported grinding wheel;

c. a horizontally extending table member mounted on the slide, including means for moving the table laterally in a horizontal plane toward and away from the slide, above the upper peripheral edge of the grinding wheel;

d. a pair of spaced and parallel rail members mounted on the under surface of the table, defining a track extending the length of the table;

e. a shuttle member slidably mounted on the track for reciprocating movement the length thereof;

f. reciprocating means mounted on the table and engaged with the shuttle; and,

g. a contour block dependently mounted on the shuttle, said contour block having a cutting surface that is a mirror image of the configuration to be imparted to the grinding wheel.

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