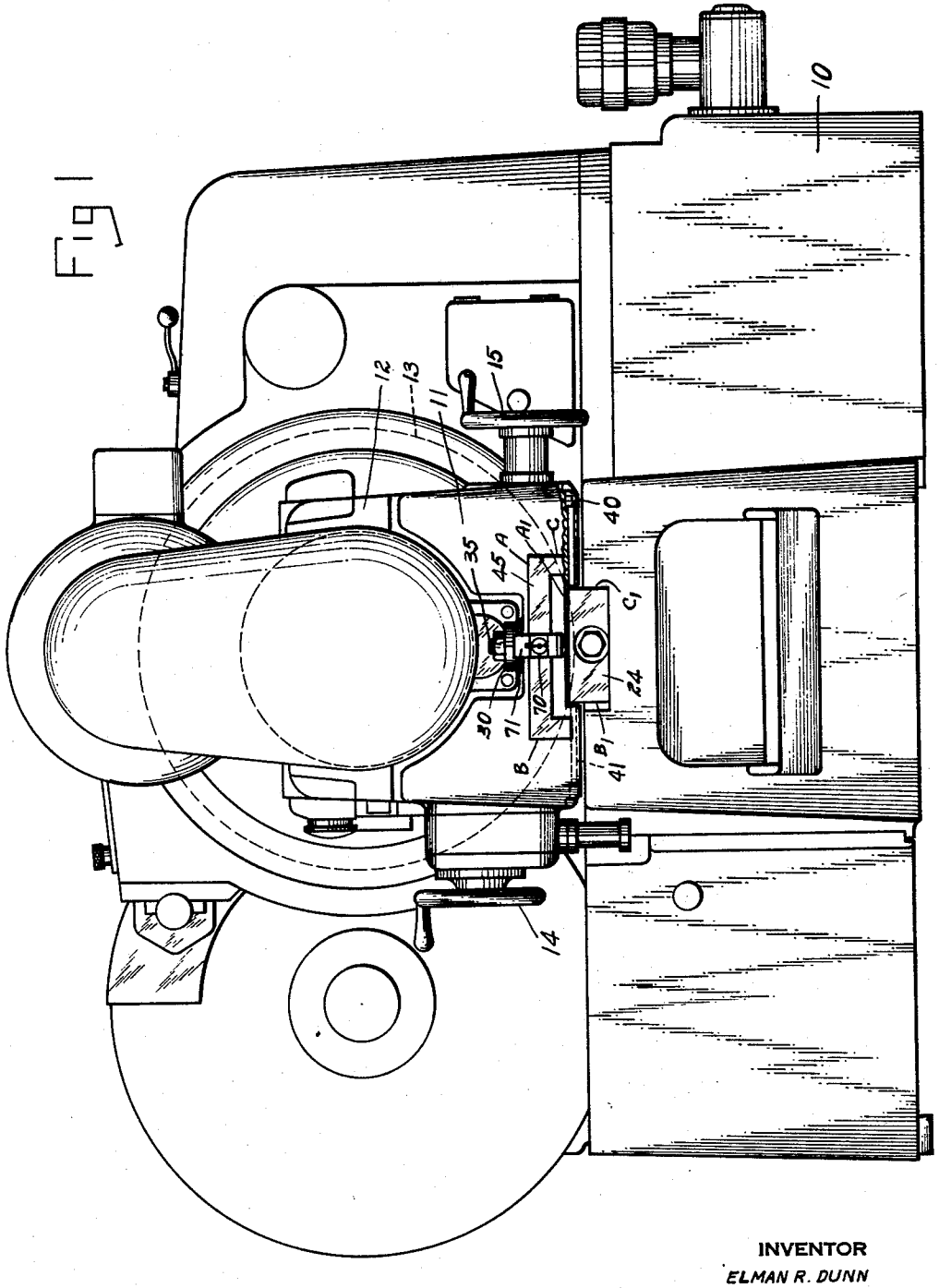
March 1, 1960 E. R. DUNN 2,926,466

GAUGE FOR SETTING ABRASIVE DISCS

Filed April 12, 1956 4 Sheets-Sheet 1

Fig. 1



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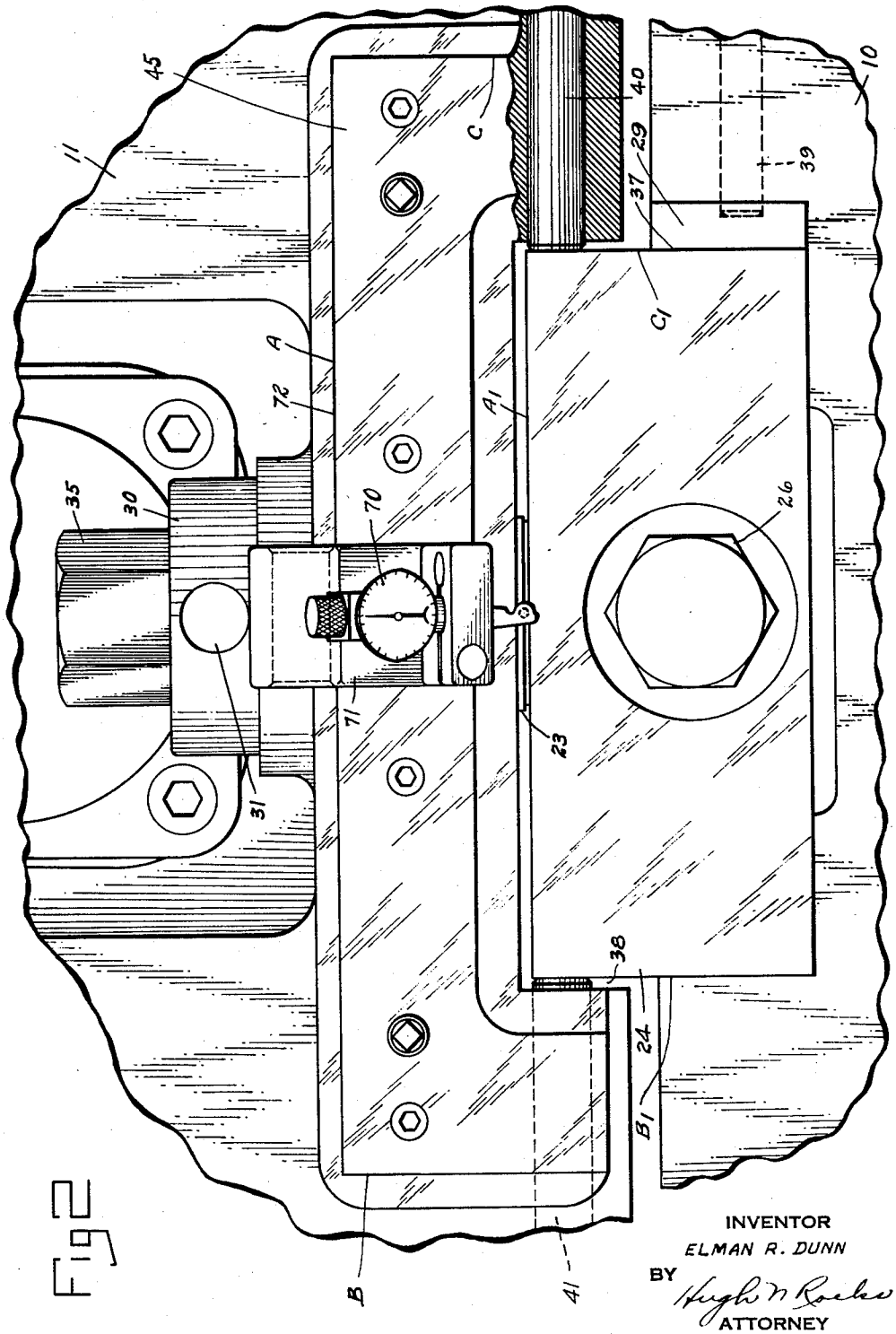


Fig 2

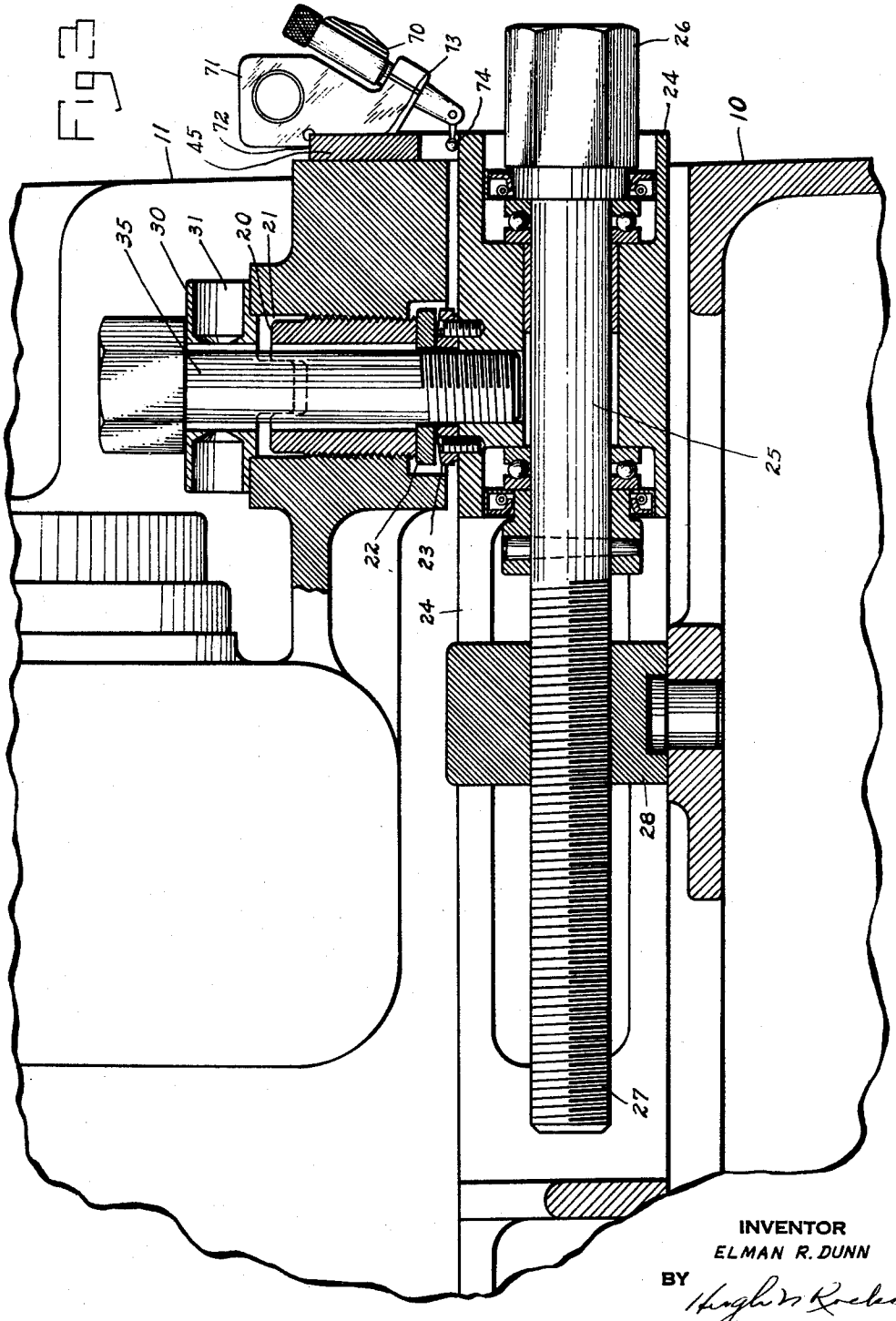
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Fig. 3



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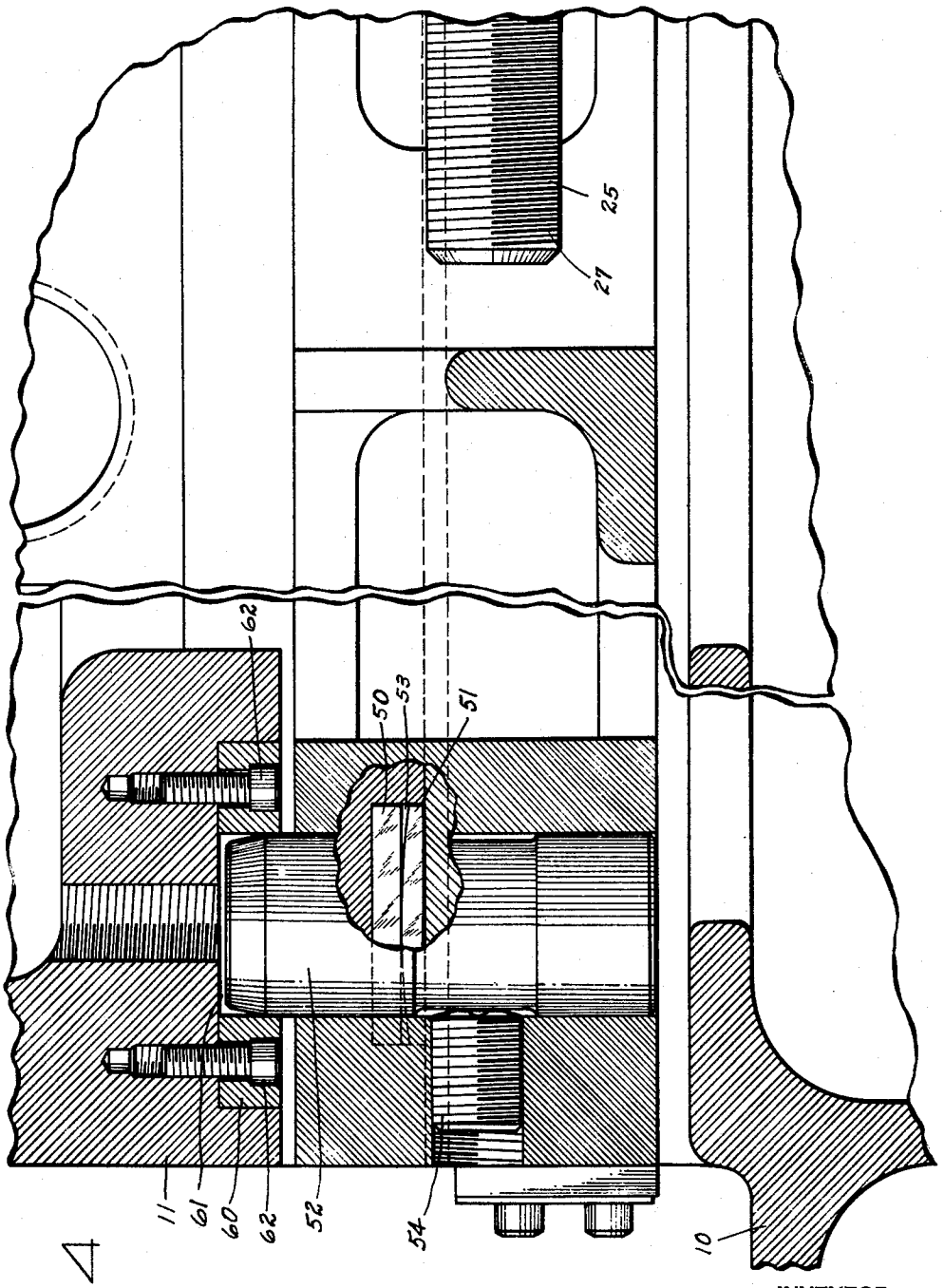


Fig 4

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2,926,466

GAUGE FOR SETTING ABRASIVE DISCS

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Application April 12, 1956, Serial No. 577,865

9 Claims. (Cl. 51—165)

This invention relates to abrasive machines of a type known as disc grinders, particularly double disc grinders.

In this type of machine, it is necessary for most grinding operations to set opposed discs in a predetermined angular relation. The reason for setting the discs in this manner is to provide a greater rate of stock removal than can be obtained when the discs are parallel. It is also neressary to restore the parallel relation from time to time.

In the past, in order to position the discs accurately in the desired angular relation, it was necessary to remove the work carrier and other fixtures from the machine and also to remove the abrasive member from the mounting plate. The vertical and horizontal adjustments were then made by means of suitable adjusting screws and the angular position was set by placing an an indicator on each of the mounting plates. The desired position was finally reached by means of alternate adjustments and indicator readings after which the abrasive and fixtures were replaced. Later, if it was necessary to change the angular relation between the discs or return the discs to parallel relation, the above procedure had to be repeated.

It is therefore an object of this invention to provide means whereby the discs of a double disc grinder may be relatively adjusted to a predetermined angular position without dismantling the tooling or removing the abrasive elements.

Another object is to provide a gauging device for indicating the extent of adjustment of a disc both vertically and horizontally.

Figure 1 is an end elevation of a double disc grinder.

Figure 2 is a close-up view of a gauging device.

Figure 3 is a partial front elevation partly in section of a gauging device showing its relation to other parts of the machine.

Figure 4 is a partial sectional front elevation showing the swivelling and tilting axes.

The disc grinder in question consists of two identical wheel supporting assemblies, only one of which will be described in detail.

The machine includes a bed 10 on which is removably and adjustably mounted a sub slide 11 for linear and angular adjustment on said bed. A spindle housing 12 is slidably mounted on suitable supporting surfaces on said sub slide 11 to move an abrasive disc 13 axially toward and from the abrasive disc on the opposite abrasive disc support and thus to adjust the space between said discs through which a workpiece must pass. Movement of spindle housing 12 on sub slide 11 may be effected by either of the hand wheels 14 and 15 through suitable gearing (not shown).

The function of sub slide 11 is to provide means for changing the position of the abrasive disc 13 to accommodate workpieces of different thickness. The means for effecting said adjustment of sub slide 11 consists of a relatively narrow slide member 24 hereafter referred to as a key slide. The key slide is slidably mounted in the bed in a rectangular guide surface 37. A gib 29 held in place by screws 39 prevents any lateral movement which would interfere with the function of slide 24 as part of the disc adjusting gauge. A longitudinal recess 38 is provided on the underside of sub slide 11 to receive the key slide 24 and to permit swiveling said sub slide 11.

The function of guiding or controlling the movement of the sub slide 11 is performed by the key slide 24 which is connected to the sub slide 11 through swivel pin 52 and lock screw 35. Longitudinal adjustment of the sub slide 11, and hence of said spindle housing 12 is effected by means of an adjusting screw 25 rotatably supported in key slide 24 and having a hex head 26 for application of a wrench. Said screw has a threaded portion 27 in operative engagement with a nut 28 secured to bed 10.

The means for effecting angular positioning of a grinding disc includes a tilting means and a swivelling means. The tilting means includes a bushing 20 threaded in a bore 21 in sub slide 11. Said bushing rests on a washer 22 which, in turn, rests on a crowned washer 23 secured to the key slide 24. Bushing 20 may be turned by means of a ring 30 having radial holes 31 for receiving a wrench or bar for turning. Screw 35 passes through said ring and bushing and is threaded into the key slide 24. Said screw serves as a means for locking said bushing 20 in any position of adjustment. Screw 35 is substantially smaller in diameter than the bore of bushing 20 to permit the swivelling movement of sub slide 11.

The tilting means also includes a pair of bearing plates 50 and 51 in sub slide 11 on each side of the swivel pin 52. Bearing plates 50 are inserted in recesses 53 and are rectangular in cross section. The plates 51 are also inserted in said recesses 53 and have a curved surface engaging the plates 50. As the opposite end of the sub slide 11 is raised and lowered by means of threaded bushing 20, bearing plates 50 rock on the curved surface of plates 51. The underside of the plates 51 rests on the bed 10.

The means for swivelling the wheel head consists of adjusting screws 40 and 41 passing through opposite sides of sub slide 11 to engage the sides of key slide 24 which is also the stationary member of the gauge. The movable member of the gauge is a plate 45 in the form of a shallow inverted channel shape, passing across the top and down the sides of the fixed gauge member or key slide 24, and the plate 45 is secured to the sub slide 11. When the discs are parallel, all three outer surfaces A, B, and C of the plate 45 are equally distant from the corresponding surfaces A_1, B_1, and C_1 of key slide 24 and the opposed disc surfaces are parallel. To set the abrasive disc 13 for a specific stock removal, a suitable chart may be used showing indicator readings between each of the three corresponding surfaces for the desired spacing of the discs.

The means for swivelling the sub slide 11 and spindle housing 12 also includes the swivel pin 52 which is held in key slide 24 by means of a set screw 54. Said member extends upwardly into a bearing ring 60 in a recess 61 in sub slide 11. Said bearing ring is secured to sub slide 11 by means of screws 62. The fit between ring 60 and pin 52 is a tight fit but since contact between said ring and said pin covers such a short distance, the fit does not interfere with the tilting of slide 11.

The means for indicating the extent of adjustment of sub slide 11 consists of a conventional indicator 70 mounted in an indicator block 71. Said block has two surfaces 72 and 73 at right angles to one another for guiding the indicator block along surfaces A, B, and C of plate 45. The feeler 74 of indicator 70 engages the corresponding surfaces A_1, B_1, and C_1 of key slide 24

which is also the stationary member of the gauging device.

Operation.—The machine is originally set up by using an indicator on the backing plates (not shown) for abrasive discs 13. When the backing plates, and hence, the discs are indicated as parallel, the heads will be in zero position both vertically and horizontally. The gauge member A is then mounted on sub slide 11 so that when indicator 70 is mounted in the indicator block 71 having a guide surface 72 adapted to slide along the horizontal edge of plate 45 and each of the vertical edges of said plate, and with feeler 74 engaging the corresponding surfaces of key slide 24, plate 45 is adjusted vertically by screw 35 until the indicator reads the same at both ends as well as the top.

With this arrangement, the discs may be set in any angular relation by adjusting horizontal screws 40 and 41 and vertical adjusting screw 35 of the sub slide 11 and checking them with gauge blocks or indicators. By means of a suitable chart, the discs may be adjusted vertically and horizontally for a predetermined amount of stock removal and thereafter, returned to parallel relation simply by reversing the vertical and horizontal adjustments and by checking the relative positions of the gauge members 45 and 24 by the indicator 70.

I claim:

1. In a grinding machine, a bed, a grinding wheel support having swivelling and tilting adjustments thereon for positioning said wheel support in horizontal and vertical directions, means for indicating the extent of each of said adjustments and for returning said wheel support to zero position comprising a gauge member in the form of an inverted channel member on said swivelling and tilting support, a second gauge member on a non-swivelling and non-tilting portion of said machine, said channel member partially enclosing said second gauge member, means for indicating the spacing between said gauge members both horizontally and vertically including an indicator, a feeler on said indicator, and a mounting block for said indicator having intersecting guide surfaces for slidably supporting and guiding said indicator on said first gauge member with the feeler of said indicator in contact with the corresponding surface of said second gauge member.

2. In a grinding machine, a bed, a grinding wheel support having swivelling and tilting adjustments thereon for positioning said wheel support in horizontal and vertical directions, means for indicating the extent of each of said adjustments and for returning said wheel support to zero position comprising a gauge member in the form of an inverted channel member on said swivelling and tilting support, a second gauge member on a non-swivelling and non-tilting portion of said machine, said channel member partially enclosing said second gauge member, means for indicating the spacing between said gauge members both horizontally and vertically including an indicator, a feeler on said indicator slidably mounted on said first gauge member with the feeler of said indicator in contact with the corresponding surface of said second gauge member.

3. In a grinding machine, a bed, a grinding wheel support having swivelling and tilting adjustments thereon for positioning said wheel support in horizontal and vertical directions, means for effecting said swivelling and tilting adjustments by any predetermined amount and for returning said wheel support to zero position comprising a gauge member on said swivelling and tilting support, said gauge having perpendicular gauge surfaces, a second gauge member on a non-swivelling and non-tilting portion of said machine and having perpendicular gauge surfaces parallel with the corresponding surfaces on said first gauge, means for indicating the spacing between said gauge members both horizontally and vertically including an indicator, a feeler on said indicator, means for mounting said indicator on one of said perpendicular surfaces on said first gauge member with the feeler of said indicator in contact with the corresponding surfaces of said second gauge member.

4. In a grinding machine, a bed, a sub slide mounted on said bed for longitudinal adjustment relative to said bed, a key slide mounted for longitudinal adjustment in said bed, and means for effecting said adjustments including a connection between said key slide and said sub slide, means for effecting a tilting adjustment of said sub slide relative to said key slide and said bed including co-acting flat and convex supporting members in one end of said sub slide, and vertical adjusting means at the other end of said sub slide, a spindle housing slidably mounted for longitudinal feeding movement on said sub slide, a spindle rotatably mounted in said spindle housing, an abrasive disc on said spindle, and means for effecting said longitudinal feeding movement of said spindle housing and abrasive disc.

5. In a grinding machine, a bed, a sub slide mounted on said bed for longitudinal adjustment relative to said bed, a key slide mounted for longitudinal adjustment in said bed, and means for effecting said adjustments including a connection between said key slide and said sub slide, means for effecting a tilting adjustment of said sub slide relative to said key slide and said bed including co-acting flat and convex supporting members in one end of said sub slide, and vertical adjusting means at the other end of said sub slide, means for effecting a swivelling adjustment of said sub slide relative to said key slide and said bed including a swivelling bearing at the same end of said sub slide as said tilting means, and horizontal adjusting means at the other end of said sub slide, a spindle housing slidably mounted for longitudinal feeding movement of said sub slide, a spindle rotatably mounted in said spindle housing, and abrasive disc on said spindle, and means for effecting said longitudinal feeding movement of said spindle housing and abrasive disc.

6. In a grinding machine, a bed, a sub slide mounted on said bed for longitudinal adjustment relative to said bed, a key slide mounted for longitudinal adjustment in said bed, and means for effecting said adjustments including an adjustable connection between said key slide and said sub slide, a spindle housing slidably mounted for longitudinal feeding movement on said sub slide, a spindle rotatably mounted in said spindle housing, an abrasive disc on said spindle, and means for effecting said longitudinal feeding movement of said spindle housing and abrasive disc, means for effecting a tilting adjustment of said sub slide relative to said key slide and said bed including coacting flat and convex supporting members in one end of said sub slide, and vertical adjusting means at the other end of said sub slide.

7. In a grinding machine, a bed, a sub slide mounted on said bed for longitudinal adjustment relative to said bed, a key slide mounted for longitudinal adjustment in said bed, and means for effecting said adjustments including a connection between said key slide and said sub slide, means for effecting a tilting adjustment of said sub slide relative to said key slide and said bed including co-acting flat and convex supporting members in one end of said sub slide, and vertical adjusting means at the other end of said sub slide.

8. In a grinding machine, a bed, a sub slide mounted on said bed for longitudinal adjustment relative to said bed, a key slide mounted for longitudinal adjustment in said bed, and means for effecting said adjustments including a connection between said key slide and said sub slide, means for effecting a tilting adjustment of said sub slide relative to said key slide and said bed including co-acting supporting members in one end of said sub slide, one of said co-acting members having a flat operative surface, the other of said co-acting members having a curved operative surface, and vertical adjusting means at the other end of said sub slide, means for effecting a swivelling adjustment of said sub slide relative to said key slide and

said bed including a swivelling bearing at the same end of said sub slide as said tilting means, and horizontal adjusting means at the other end of said sub slide.

9. In a disc grinder, means for adjusting annularly opposed abrasive discs to a predetermined angular relation for spacing and grinding a workpiece to a predetermined size comprising a grinding wheel support having adjustments thereon for swivelling said support in a horizontal plane and for tilting said support in a vertical plane, means for indicating the extent of each of said adjustments and for returning said support to a position in which said abrasive discs are parallel comprising a gauge element in the form of an inverted channel member on said swivelling and tilting support, a second gauge member on a non-

swivelling and non-tilting portion of said machine, said channel member partially enclosing said second gauge member, and means for determining the spacing between the adjacent surfaces of said gauge members including an indicator adapted for mounting on one of said gauge members and a feeler on said indicator for engaging the adjacent surface of said other gauge member.

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