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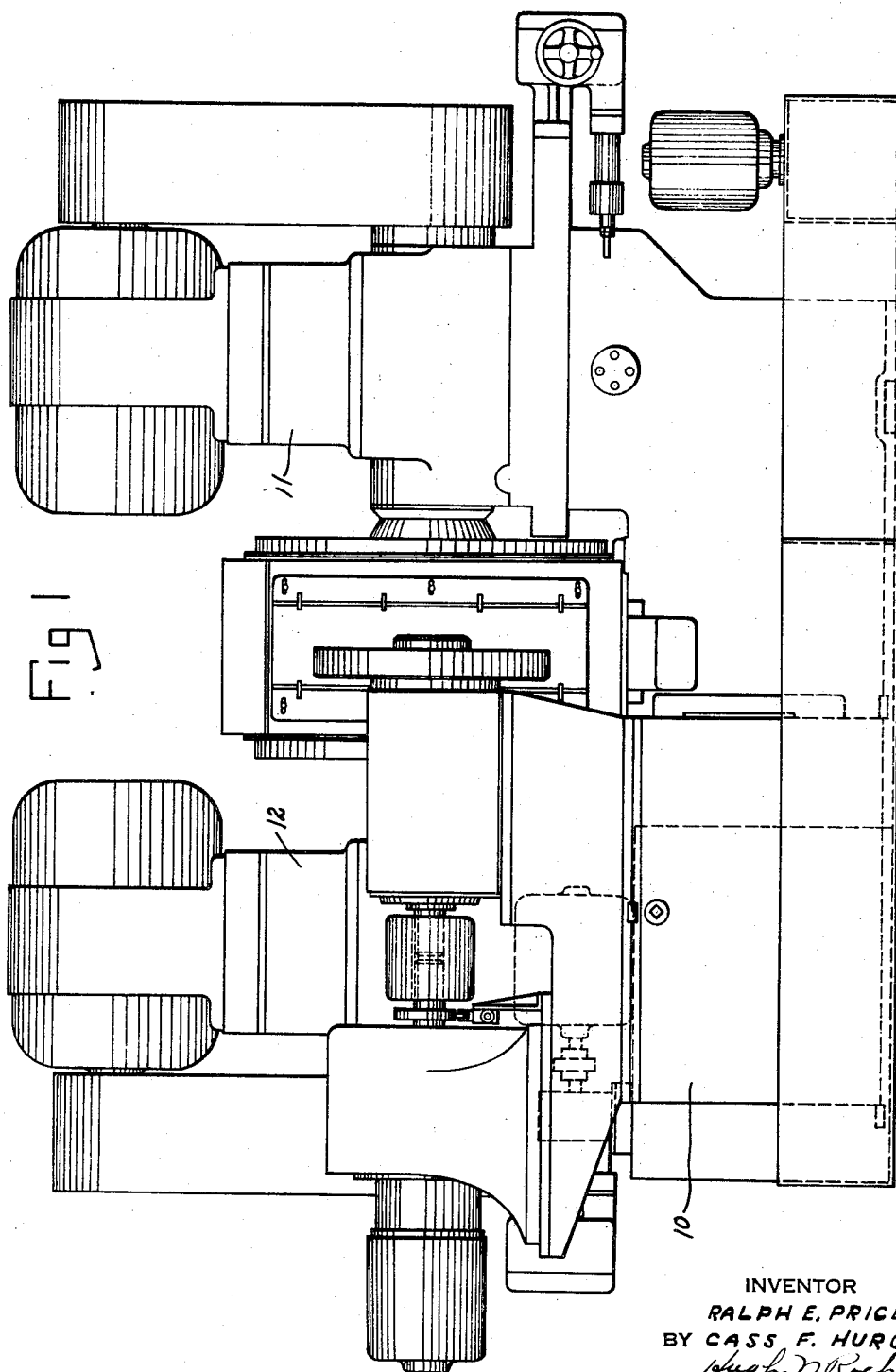
R. E. PRICE ET AL

2,882,650

SIZE AND ALIGNMENT CONTROL MEANS

Filed Nov. 18, 1954

3 Sheets-Sheet 1



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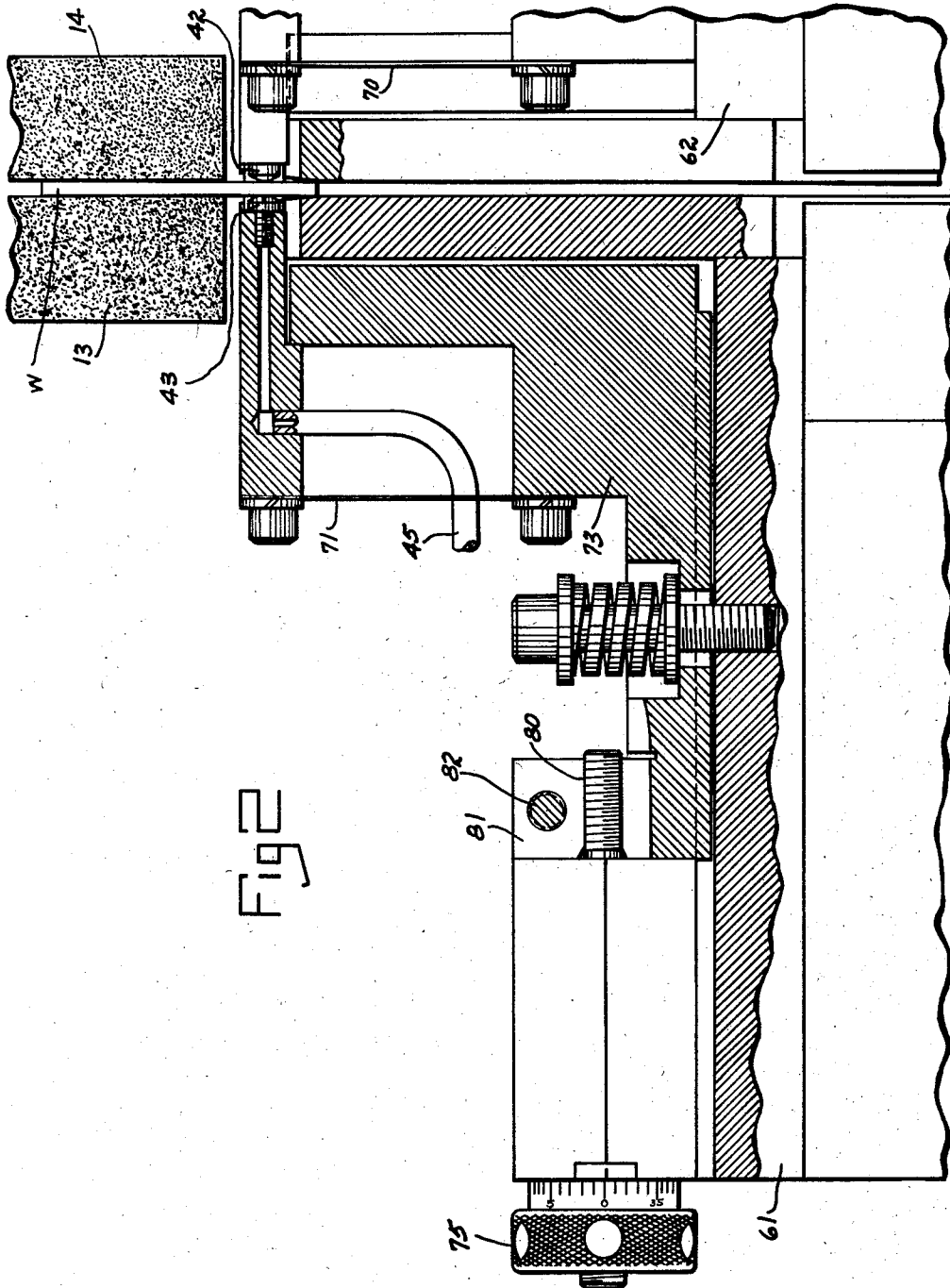
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3 Sheets-Sheet 2



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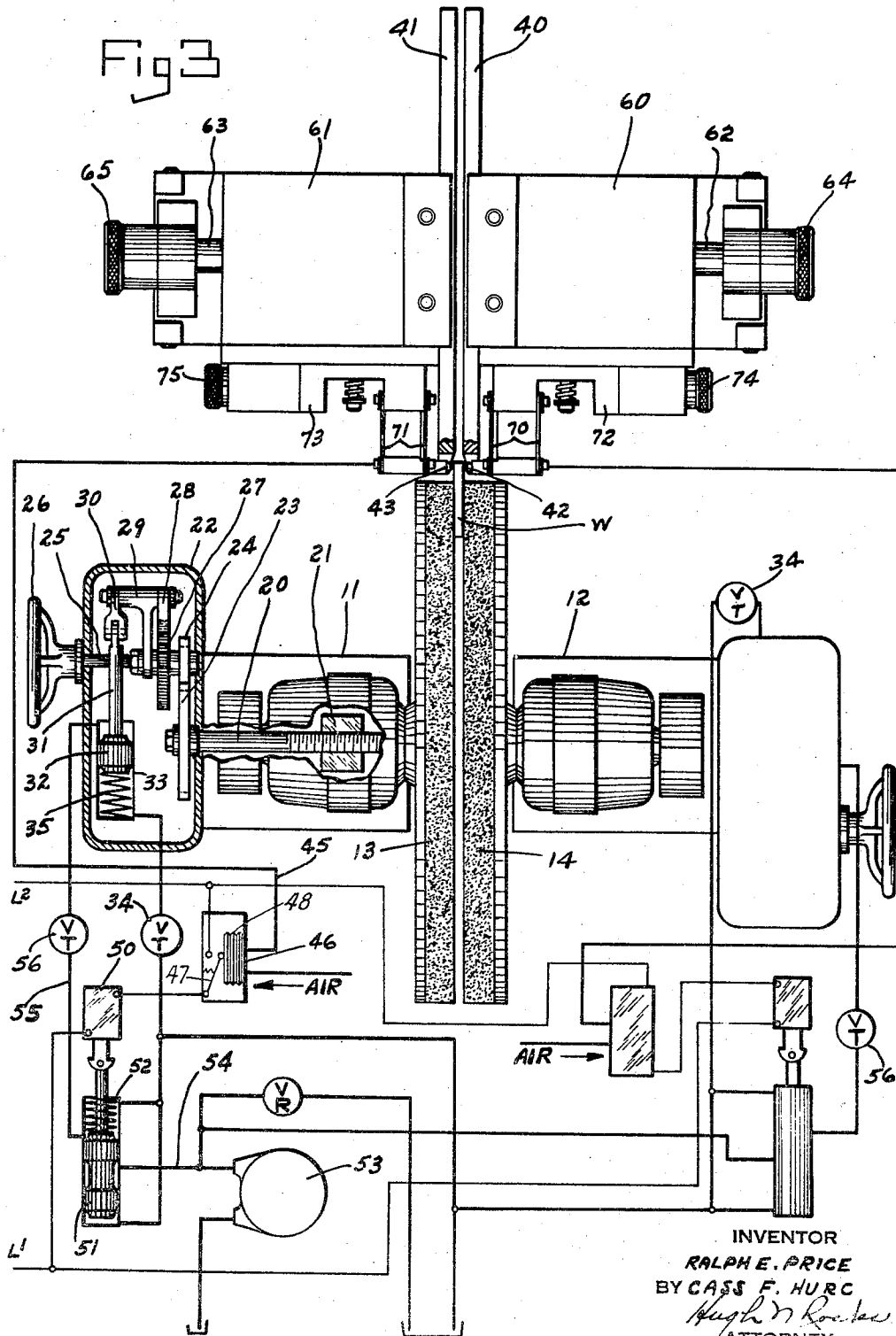
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SIZE AND ALIGNMENT CONTROL MEANS

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5 Claims. (Cl. 51-112)

This invention relates to disk grinders wherein both sides of a flat work piece are ground by passing the work piece between opposed annular faces of two abrasive disks.

Work pieces passing between abrasive disks are received at the exit end thereof by spaced guide surfaces which are in alignment with said annular abrasive surfaces. Since no two abrasive surfaces wear at the same rate, there is a problem involved in maintaining alignment between said abrasive surfaces and said guide surfaces. Wear on the abrasive disks is reflected in the width of the work piece emerging from between the disks and also by the path of the work relative to the guide surfaces. Since the guide surfaces are fixed and since the wheels do not wear uniformly there is a constant tendency for one or both of the wheel surfaces to wear in such a manner that they are no longer in alignment with the guide surfaces. Furthermore, one of said surfaces may be more out of alignment than the other.

It is therefore an object of this invention to provide means whereby alignment between opposed grinding disks and work guide surfaces may be maintained.

A further object is to provide gauging means applicable to opposite sides of a work piece so that any change in the position of the surface of the work piece as it emerges from the grinding wheels will reflect the amount of wear on the respective wheels.

Another object is to provide means responsive to said gauges for adjusting each of the grinding wheels independently to correct any change in position of the finished work surfaces by adjusting each of the wheels by the amount of such change.

In the drawings, Figure 1 is a front elevation of a horizontal double disk grinder.

Figure 2 is an enlarged view partly in section of a portion of the gauging device showing the adjustable mounting thereof.

Figure 3 is a diagram of the wheel feeding means and the controls therefor.

Numerals 10 indicates the bed of the machine. Grinding wheel supports 11 and 12 are slidably mounted thereon for axial movement toward and away from one another. In this view the grinding wheels 13 and 14 are enclosed by suitable guards through which an opening may be provided to introduce work pieces such as piston rings, into the space between said wheels. Means for conducting such work pieces through the grinding zone is disclosed in Patent 2,657,504, granted November 3, 1953.

The means for feeding said wheel supports axially toward and from one another is disclosed more or less diagrammatically in Figure 3. Only one of these means is shown in detail since the feeding mechanism for both wheels is substantially identical. This feeding mechanism consists of a feed screw 20 rotatably mounted in a suitable manner in bed 10 and operatively engaging a nut 21 in wheel support 11. One end of said feed screw extends into a housing 22 and has a gear 23 mounted thereon. Said gear 23 is in operative engagement with a gear 24 on

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hand wheel shaft 25. Said shaft may be rotated manually by hand wheel 26 or automatically by means of a ratchet wheel 27 on shaft 25. A pawl 28 on arm 29 is rotatably mounted also on shaft 25. Arm 29 is connected through link 30 to a piston rod 31 attached to a piston 32 slidably mounted in cylinder 33. Said piston may be actuated downwardly by fluid under pressure and upwardly by a spring 35. A throttle valve 34 serves as an adjustable restriction to control the rate of movement of piston 32 so that said piston need not travel its complete stroke instantly. In this device the ratchet wheel 27 is actuated by pawl 28 on the downward stroke of piston 32.

As a work piece emerges from between the wheels 13 and 14 and before it passes between the guides 40 and 41 it must pass between two nozzles 42 and 43 from each of which is discharged a jet of air or other fluid against the surface of a work piece W. Since both of these nozzles and associated parts for controlling the position of the wheels 13 and 14 are identical, only nozzle 43 and its associated parts will be described in detail.

The air which emerges from nozzle 43 against the work surface is supplied through line 45 from a unit 46 consisting of a pressure-operated element 48 which may be a bellows or a diaphragm. Said unit has electrical contacts 47 which are actuated by a suitable change in air pressure in response to a change in the surface of the work piece to energize a solenoid 50. Said solenoid is connected to a valve 51 which it shifts against spring 52 to direct fluid from pump 53 through lines 54 and 55 and throttle valve 56 to the upper end of cylinder 33.

Guide surfaces 40 and 41 are mounted in adjustable slides 60 and 61 suitably mounted on bed 10. Said guide surfaces may be adjusted in setting up the machine, by adjusting screws 62 and 63 which may be rotated manually by knobs 64 and 65.

Nozzles 42 and 43 are supported on parallel leaf springs 70 and 71 which in turn are mounted on slide members 72 and 73. Said slide members are slidably mounted on guide supporting slides 60 and 61 and adjusted thereon by screws 80 and knobs 74 and 75. Said screws are operatively mounted in split nuts 81 having clamping screws 82 for locking screws 80 and therefore the corresponding nozzle in adjusted position.

Work W may be passed through the space between abrasive discs 13 and 14 by any suitable carrier means. The opposed surfaces of said discs are originally positioned in alignment with the surfaces of the guide members 40 and 41. As the work emerges from the grinding discs, it passes between air nozzles 42 and 43 which direct a flow of air against the workpiece. If the wear is uniform on both grinding discs, the emerging workpiece will eventually be oversize to the point that it will reduce the flow of air from each of said nozzles. This reduction of flow will be effective to actuate the feed piston 32 to shift the wheel 15, and the corresponding feed piston (not shown) for actuating disc 14. If one of the discs wears more rapidly than the other, the one surface of the workpiece, as it emerges from the grinding position, will be closer to the corresponding nozzle than the other. The reduced flow from said nozzle will result in actuating the associated feed mechanism to compensate for wear on the wheel so that succeeding workpieces will pass both nozzles at the same distance. Another result of non-uniformity of wear of grinding discs is that the space between the discs gets out of alignment with the guide members 40 and 41. As indicated above, this out of alignment will cause a corresponding actuation of the feed mechanism to the proper disc to restore the condition of alignment. Thus the invention performs a dual function, maintaining correct size of work and also correct alignment between discs and guide members.

We claim:

1. In a machine for grinding opposed parallel surfaces of a workpiece, a bed, a pair of wheel supporting means slidably mounted for axial movement on said bed, a grinding wheel rotatably mounted on each of said supporting means in axially opposed relation to one another, means for moving said supporting means toward and from one another, guide means for receiving a workpiece as it passes from between said wheels, and means responsive to variation in the position of either surface of the workpiece in relation to said guide means as the work passes from between the wheels for adjusting the corresponding supporting means to maintain alignment between said wheels and said guide means.

2. In a machine for grinding opposed parallel surfaces of a workpiece, a bed, a pair of wheel supporting means slidably mounted for axial movement on said bed, a grinding wheel rotatably mounted on each of said supporting means in axially opposed relation to one another, guide means for receiving a ground workpiece as it passes from between said wheels and means for maintaining alignment between said wheels and said guide means comprising means co-operating with the ground surfaces of said workpiece for determining the relative position of said wheel surfaces and said guide means, said co-operating means being responsive to any variation from a predetermined relationship between said ground surfaces and said guide means for actuating said wheel support moving means corresponding to said out-of-relation work surface to restore said predetermined relationship.

3. In a machine for grinding opposed parallel surfaces of a workpiece, a pair of wheel supporting means slidably mounted for axial movement, a grinding wheel rotatably mounted on each of said supporting means with its grinding surface in opposed relation to that of the other grinding wheel, means for moving said supporting means toward and from one another, guide means for receiving the work as it passes from between the wheels, and means responsive to variation in position of either surface of the workpiece in relation to said guide means as the work passes from between the wheels for adjusting said wheel supporting means corresponding to the out-of-position

work surface to restore alignment between said wheel and said guide means.

4. In a machine for grinding opposed parallel surfaces of a workpiece, a bed, a pair of wheel supporting means slidably mounted for axial movement, a grinding wheel rotatably mounted on each of said supporting means in axially opposed relation to one another, means for moving said supporting means, guide means for receiving the ground workpiece as it passes from between the wheels and means for maintaining substantially exact alignment between said wheels and said guide means comprising separate means co-operating with each of the ground surfaces of said workpiece for determining the relative position of said wheel surfaces and said guide means, said co-operating means being responsive to any variation from a predetermined relationship between said ground surfaces and said guide means to actuate said wheel support moving means corresponding to the out-of-position work surface to restore said predetermined relationship.

5. A machine for grinding opposed parallel surfaces of a workpiece, a pair of wheel supporting means slidably mounted for axial movement, a grinding wheel rotatably mounted on each of said supporting means in axially opposed relation to one another, means for moving said supporting means toward and from one another, guide means for receiving the work as it passes from between the wheels and separate gauge means in operative relation to each of said opposed surfaces of the workpiece for determining the position of said surfaces relative to said guide means as the work passes from between the wheels, means actuated by each of said gauge means for adjusting the corresponding wheel supporting means to restore alignment between said wheels and said guide means.

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