May 24, 1932. H. J. HOEG 1,859,443

CENTERLESS GRINDER

Filed Dec. 18, 1928 2 Sheets-Sheet 1

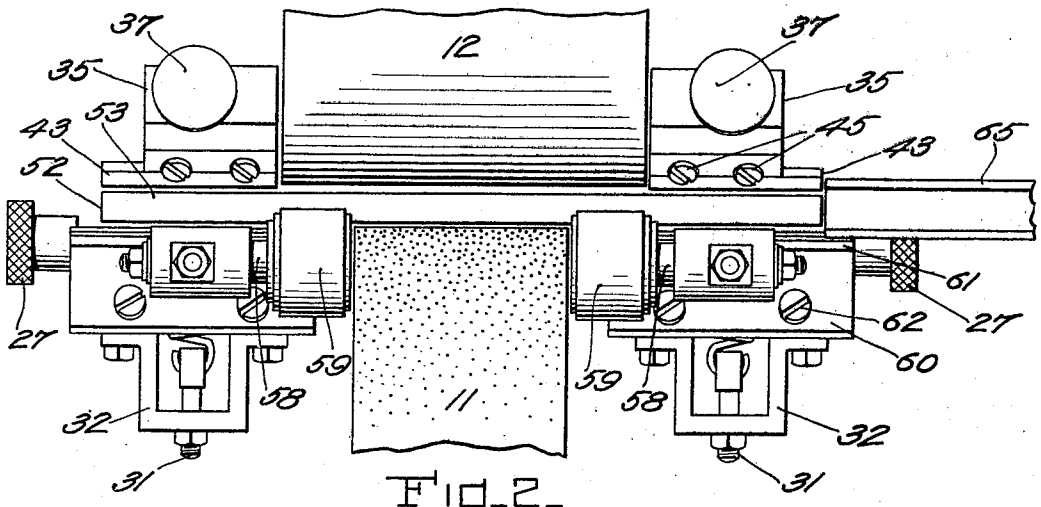


Fig. 2.

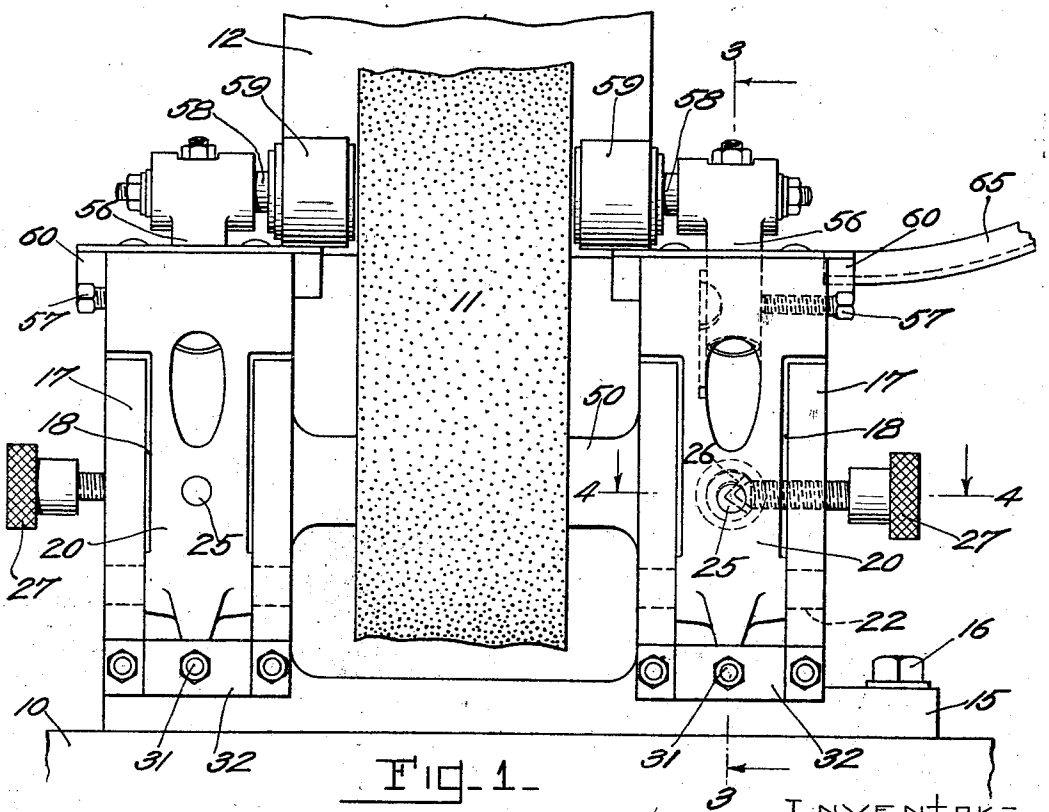


Fig. 1.

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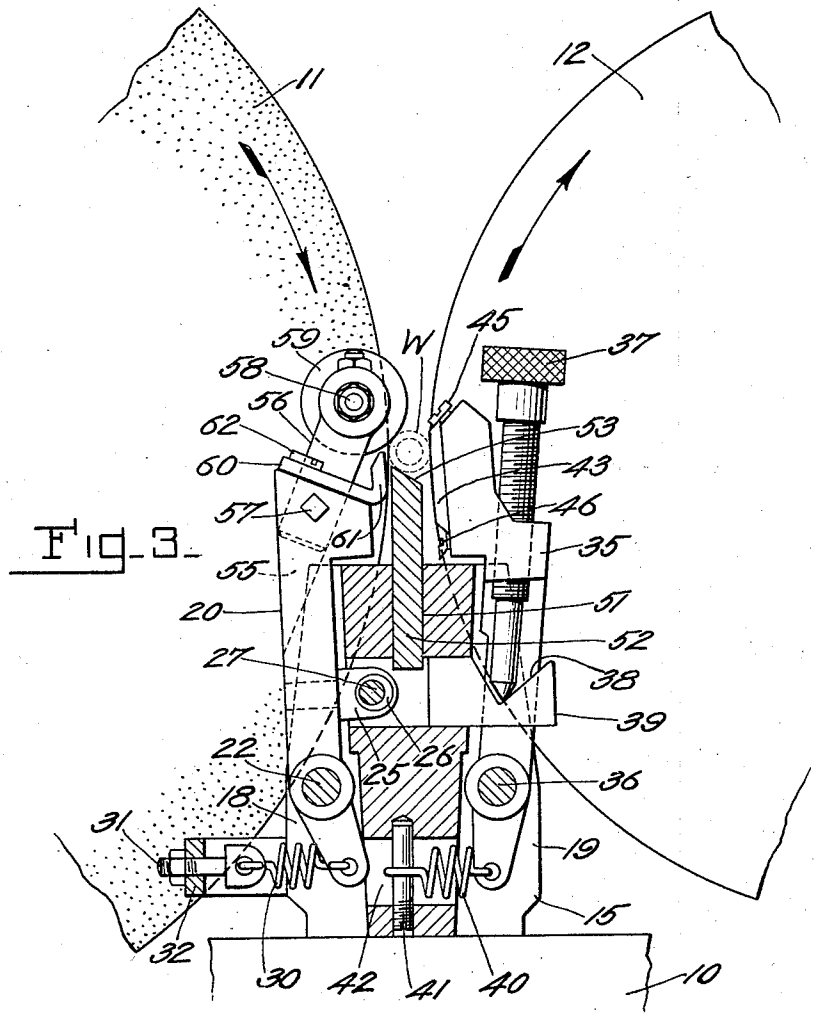


Fig-3-

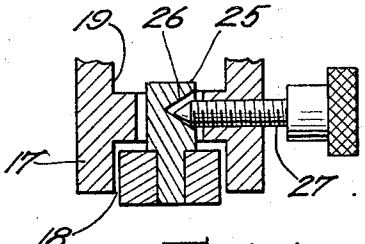


Fig-4-

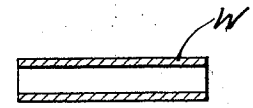


Fig-5-

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UNITED STATES PATENT OFFICE

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CENTERLESS GRINDER

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This invention relates to centerless grinding machines and particularly to a device for use therewith for improving the character of the work produced in such machines.

The conventional type of centerless grinding machine comprises a rapidly rotatable grinding wheel and a slowly rotatable feed wheel together with a bevelled blade for properly positioning the work in its passage between the grinding wheel and the feed wheel. The peripheral edges of the grinding wheel and feed wheels are positioned in opposed relation and the axis of the feed wheel is skewed relative to the axis of the grinding wheel in order to cause the work to rotate and move in an axial direction between the wheels. It has been found in practice that inasmuch as the work is not rotating as it enters the grinding zone a nick is formed in the work which the grinding operation fails to remove. This nick is very objectionable in various types of work, such as wrist pins for automobile engines, and while the defect is sometimes quite difficult to see, it is easily found with an amplifying gauge. A similar result occurs when the work leaves the grinding zone due to the discontinuation of its rotation.

It is an object of the present invention to overcome this difficulty, and with this in view the invention contemplates the provision of means for causing the work to rotate as it is fed into, and to maintain its rotation as it leaves the grinding zone.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended as considered in view of the prior art and the requirements thereof.

The invention will be more clearly understood from the following description in conjunction with the accompanying drawings; in which

Fig. 1 is an elevational view of a centerless grinding machine embodying the invention;

Fig. 2 is a plan view of the same;

Figs. 3 and 4 are sectional views taken upon the lines 3—3 and 4—4, respectively of Fig. 1; and

Fig. 5 is a detail view of the work, such as a wrist pin for an automobile engine.

The embodiment of the invention illustrated in the accompanying drawings comprises a main frame 10 carrying bearings (not shown) for rotatably mounting a grinding wheel 11 and a feed wheel 12 with the axis of the feed wheel skewed relative to the axis of the grinding wheel. A frame 15 is secured upon the frame 10, as by bolts 16, so as to extend to opposite sides of the grinding and feed wheels and is provided at each end thereof with upright members 17 adjacent the flat faces of the wheels. The uprights 17 are connected by a member 50 which in the form illustrated is provided with a central longitudinal groove 51 adapted to receive and support a work positioning blade 52 having an upper bevelled surface 53 which extends longitudinally between the grinding wheel 11 and feed wheel 12 to a point beyond the opposite flat faces thereof. Each of the uprights 17 is provided with vertical grooves 18 and 19 in its front and rear faces respectively. An arm 20 is pivotally mounted within the groove 18 upon a pin 22 fixed in the upright 17 and is provided with a rearwardly extending lug 25 having a V-shaped notch 26 adapted to receive the end of an adjusting screw 27 mounted in the upright 17. The notched lug 25 on the arm 20 is held against the adjusting screw 27 by a spring 30 having one end secured to one end of the arm 20 and its other end secured to a bolt 31 held in a bracket 32 extending forwardly from the upright 17. The upper end of the arm 20 is provided with an inclined guide opening 55 adapted to receive an arm 56 which is held in any desired position therein by a set screw 57. The upper end of the arm 56 is provided with bearings

in which is rotatably mounted a shaft 58 carrying a roll 59 arranged with its axis parallel to the axis of the grinding wheel. A plate 60 having an upwardly extending portion 61 is secured upon the top surface of the arm 20 as by screws 62. An inclined feed trough 65 extends downwardly to a point adjacent one end of the blade 52 for feeding pieces of work W, such as wrist pins for automobile engines successively upon the bevelled surface 53.

An arm 35 is pivotally mounted within the groove 19 upon a pin 36 in the upright 17. An adjusting screw 37 is provided in the arm 35 to extend downwardly from a portion thereof to engage a notch 38 in a lug 39 extending rearwardly from the upright 17. The end of the adjusting screw 37 is held in engagement with the notched lug 39 by a spring 40 one end of which is attached to the end of the arm 35 and the other end of which is secured to a pin 41 extending upwardly through an opening 42 in the upright 17. A hardened plate 43 is secured to the front face of the arm 35 adjacent the upper end thereof as by screws 45 and 46.

In operation the outer surface of the plate 43 is positioned properly with respect to the blade 52 by adjustment of the screw 37 against the action of the spring 40. The roll 59 is positioned properly with relation to the blade 52 by raising or lowering the arm 56 in the opening 55 of the arm 20 and shifting the position of the arm 20 by the operation of the adjusting screw 27. A column of pieces of work W are then placed in the trough 65 and are carried by their own weight successively upon bevelled surface 53 of the blade 52 so as to rest against the surface of the plate 43 which is arranged to engage the work along a line parallel to the axis of the grinding wheel and position it in a path for its passage between the grinding wheel and feed wheel. The weight of the column of successive pieces of work in the trough 65 causes the work to move between the plate 43 and the roll 59 whereupon the latter maintains engagement between the work and the feed wheel to cause the work to rotate as it is moved past the edge of the grinding wheel.

It will be understood that either or both the roll 59 and plate 43 may be provided for controlling the position and rotation of the work as it enters or leaves the grinding zone. It has been found that the objectionable nick formed in the work can be eliminated by controlling the work so as to position it properly and maintain its rotation as it moves into and leaves the grinding zone.

What I claim is:

1. In a centerless grinding machine, the combination of a grinding wheel, a feed wheel, a blade for positioning the work between the wheels, means for causing the work to rotate as it moves past the edge of the grinding wheel including an arm pivotally mounted adjacent one of said wheels, a roll mounted on said arm adapted to hold the work in engagement with said feed wheel while substantially out of contact with said grinding wheel as the work moves past the edge of said grinding wheel, a stop, and means for holding said arm yieldingly against said stop.

2. In a centerless grinding machine, the combination of a grinding wheel, a feed wheel, a blade for positioning the work between the wheels, means for causing the work to rotate as it moves past the edge of the grinding wheel including an arm pivotally mounted adjacent one of said wheels, a roll mounted on said arm adapted to hold the work in engagement with said feed wheel while substantially out of contact with said grinding wheel as the work moves past the edge of said grinding wheel, a stop, and means for adjusting the position of said roll relative to said blade.

3. In a grinding machine, the combination of a grinding wheel and a feed wheel so arranged as to feed work axially therebetween, a blade for positioning work between said wheels, a member mounted on one side of said blade adjacent said feed wheel, a roll mounted on the other side of said blade adjacent said grinding wheel, said member and said roll cooperating with said blade to align the work in a path for passage between said wheels and hold the work in engagement with said feed wheel while substantially out of contact with said grinding wheel as it moves past the edge of said grinding wheel, and means for mounting said roll for yielding movement away from said member.

In testimony whereof I affix my signature.

HENRY JAMES HOEG.