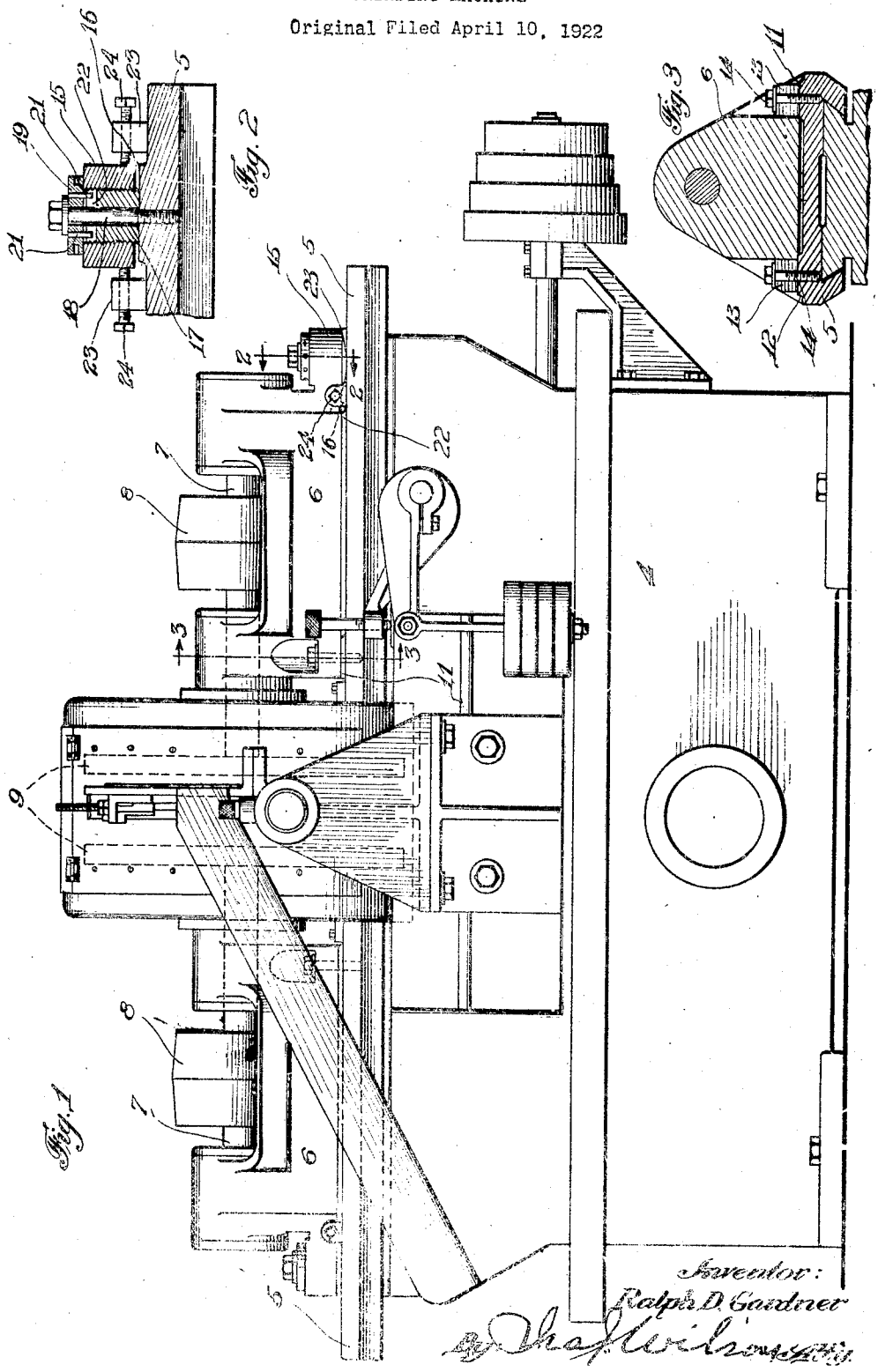
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R. D. GARDNER

GRINDING MACHINE

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UNITED STATES PATENT OFFICE.

RALPH D. GARDNER, OF BELOIT, WISCONSIN, ASSIGNOR OF ONE-THIRD TO EDWARD B. GARDNER AND ONE-THIRD TO JOHN NIELSEN.

GRINDING MACHINE.

Original application filed April 10, 1922, Serial No. 551,008. Divided and this application filed June 28, 1923. Serial No. 648,216.

To all whom it may concern:

Be it known that I, RALPH D. GARDNER, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Grinding Machines, of which the following is a specification.

This invention pertains to grinding machines, and the present application constitutes a division of my prior application, Ser. No. 551,008, filed April 10, 1922.

One of the primary purposes of my present invention is to provide an adjustable mounting whereby the grinding wheel carrying standard of a grinding machine may be adjusted upon its reciprocatory carriage for the purpose of aligning the grinding wheel.

While the principles of my invention may be employed in grinding machines of various characters, the machine herein shown, for illustrative purposes merely, is a grinding machine comprising two opposed grinding wheels adapted to simultaneously grind the opposite faces of piston rings, and the like.

The principles of the invention, and many of the inherent advantages thereof will be best understood by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a rear elevation of a grinding machine embodying my invention;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1; and

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

The machine, as illustrated, comprises a base 4, provided with guideways on its upper face on which are mounted to reciprocate longitudinally a pair of carriages 5. Upon each carriage is mounted a standard 6 in which is journaled a shaft 7 equipped with a driving pulley 8, and at its inner end with a grinding wheel 9, the wheels being disposed in opposed relation to grind the opposite faces of objects interposed between them.

In order that the grinding faces of the two wheels may be disposed in exact parallelism, it is desirable to adjust the standards 6 upon their respective carriages 5, and it is desirable that this adjustability provide not only for horizontal angular adjustment, but also for vertical angular adjustment. With this end in view, each carriage 5 is provided adjacent its inner end with a pair of spaced bearing bosses or pads 11 and 12, adapted to support the standard 6 at its inner end. Immediately above each pad the standard is provided with a slot 13 through which a bolt 14 extends into the carriage, as will be apparent from Fig. 3. By loosening these bolts, lateral movement of the inner end of the standard may be effected.

The outer end of each standard is provided with a horizontal extension 15, forming a boss which rests upon an elevated bearing boss or pad 16 formed on the carriage, and this boss forms the support for the outer end of the standard.

The boss is vertically cored and tapped, as will be apparent from Fig. 2, to receive a plug 17, threaded thereinto and adapted to be projected beneath the boss and to rest upon the boss or pad 16. A bolt 18, extending through the boss and threaded into the carriage 5, serves to clamp the parts and lock them securely together. Above the pad, and beneath the head of the bolt, there is disposed a nut 19 constructed to receive a spanner wrench, and provided with pins 21 projecting downwardly into a groove 22, formed in the upper end of the plug 17. It will be apparent that when the bolt 18 is loosened, the plug 17 may be adjusted upwardly or downwardly by simply turning the nut 19, and when the required adjustment has been made, the parts may be locked in adjusted position by tightening up the bolt 18.

The outer end, therefore, of each standard is supported upon a plug 17, while its inner end is supported upon a straight line bearing formed by the pads 11 and 12. Should it be desirable to adjust the outer end of the standard vertically, the bolts 13 and 18 are loosened, whereupon the plug 17 is adjusted vertically to dispose the shaft 7 and the grinding wheel carried thereby in proper position. Should lateral adjustment of the shaft be desirable, the inner end of the standard is moved laterally upon the pads 11 and 12. This movement may be accomplished manually if desired, but I have provided for an accurate adjustment by forming upon the carriage 5 at each side and some little distance inwardly from the

boss 15, an upwardly projecting ear 23, in which is disposed a set screw 24. These set screws engage opposite sides of the standard 6, and by loosening one and tightening the other, the standard may be adjusted about the bolt 18 as a fulcrum infinitesimal amounts so as to secure a fine and accurate adjustment of the standard.

It will be apparent, therefore, that each standard may be adjusted horizontally about the bolt 18 as a fulcrum, and that it may be adjusted vertically about the bearing bosses or pads 11 and 12 as a fulcrum. This universal adjustment, coupled with the fine degree of adjustability which may be secured through the plug 17 and through manipulation of the adjusting screws 24, provides a machine which has great delicacy and accuracy of adjustment, thereby enabling the grinding wheels to be aligned and adjusted with absolute accuracy.

The structural details illustrated and described are obviously capable of considerable modification and variation without departing from the essence of the invention, as defined in the following claims.

I claim:

1. In a grinding machine, the combination of a base, a pair of carriages mounted to slide thereon, a pair of grinding wheels, and means for adjustably mounting said wheels upon their respective carriages so as to permit of adjustment of said wheels about a plurality of axes upon their carriages.

2. In a grinding machine, the combination of a base, a carriage slidably mounted thereon, a standard, a shaft journaled therein, a grinding wheel carried by said shaft, an adjustable connection between said standard and said carriage, and means for adjusting said standard relatively to the carriage about a plurality of axes perpendicular to said shaft.

3. In a grinding machine, the combination of a carriage, a shaft carrying standard, a base, and means for adjustably connecting said standard to said base so as to permit of both vertical and lateral adjustment thereof.

4. In a grinding machine, the combination of a carriage, a grinding wheel shaft supporting standard mounted thereon provided at one end with a hollow boss and at its other end with a pair of slots, bolts extending through said slots into said carriage, an adjustable plug threaded into said boss and projecting beneath the same to form a support therefor, a bolt for clamping said boss to said carriage, and means whereby said plug may be adjusted without removal of said bolt.

5. In a grinding machine, the combination of a carriage, a shaft supporting standard, a vertically adjustable pivotal connection between one end of said standard and said carriage, and a laterally adjustable connection between the other end of said standard and said carriage.

6. In a grinding machine, the combination of a carriage, a standard supported thereby, means for adjusting one end of said standard vertically relatively to said carriage, and means for adjusting the other end of said standard horizontally relatively to said carriage.

7. In a grinding machine, the combination of a carriage provided with a pair of transversely aligned supporting pads adjacent one end and a single supporting pad adjacent the other end, a standard adapted to be supported upon said pads, means for pivotally connecting one end of said standard to said single pad, means for slidably connecting the other end of said standard to said pair of pads, means for vertically adjusting one end of the standard upon said single pad, and means for locking said standard in adjusted position.

RALPH D. GARDNER.