Nov. 29, 1955 F. A. WAGNER 2,724,932

BEARING CAP GRINDER

Filed Dec. 20, 1952

Fig. 1.

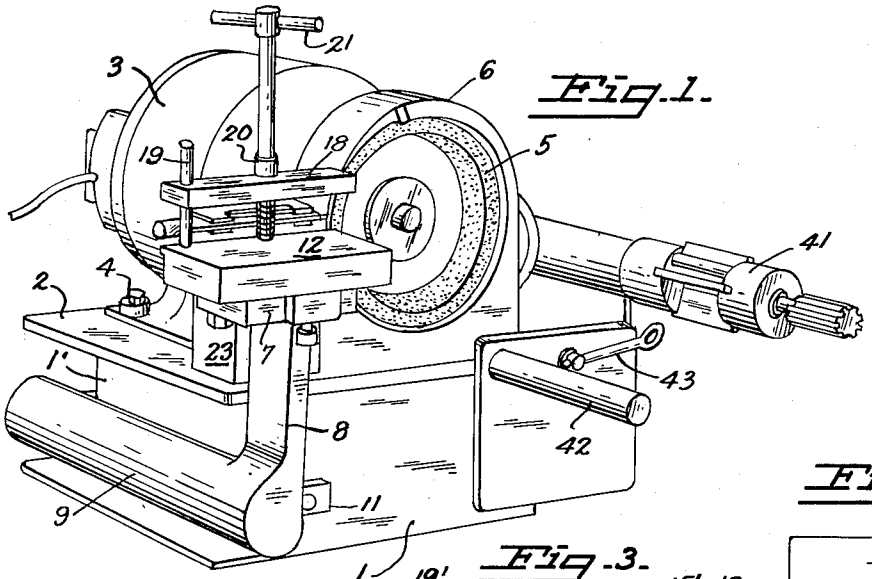


Fig. 2.

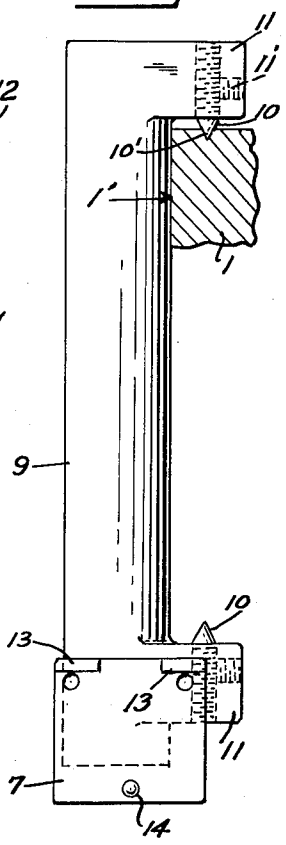


Fig. 3.

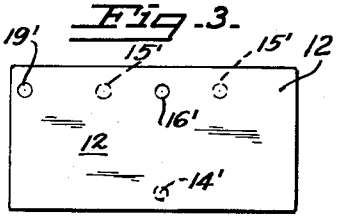


Fig. 4.

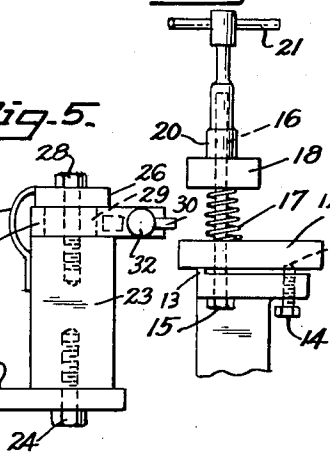


Fig. 5.

Fig. 6.

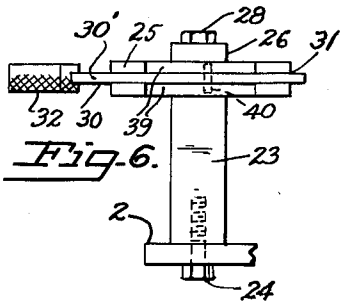
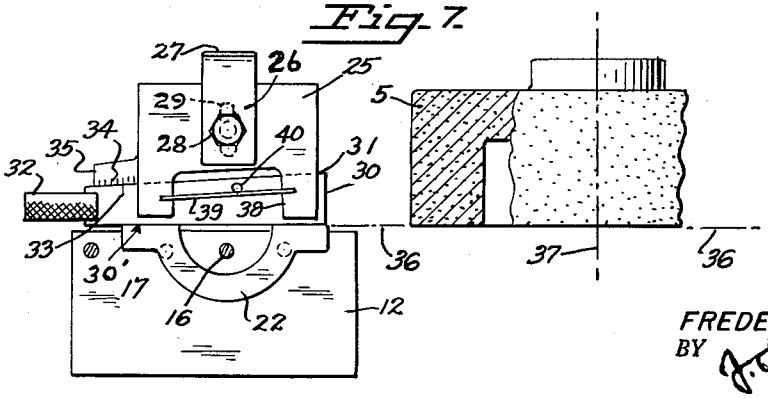


Fig. 7.



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BEARING CAP GRINDER

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Application December 20, 1952, Serial No. 327,077

5 Claims. (Cl. 51—124)

This invention relates to grinding machines particularly arranged and adapted for facing off the edges of bearing caps and blocks, especially the crankshaft bearing ends of connecting rods preparatory to reboring or regrinding and honing such bearings to restore their rotundity.

The principal objects of the invention are to provide improvements in such grinding machines whereby extreme accuracy is assured through simple operations quickly performed.

Briefly described my improved grinding machine comprises a rim or cup shaped motor driven emery wheel or other grindstone operatively mounted on a heavy base, and past the edge of which swings a pivotally mounted carriage or table upon which the bearing block or cap is clamped, to thereby face off the edge of the cap which is adjacent the stone to a degree predetermined by an adjustable contact gauge carried by said base, the swing table being also pivoted to said base and manually operated.

Specific features of novel construction will appear in the following description and accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of my improved bearing cap grinder, as manufactured, and incorporating also a hone for grinding and finishing the bores of the bearings after their blocks have been ground off along their split juncture.

Fig. 2 is a plan view of the swinging carriage, with the table and clamping plate removed.

Fig. 3 is a plan view of the table plate.

Fig. 4 is a side elevation of the upper end of the swinging carriage with table plate and bearing clamp in place.

Fig. 5 is an end elevation of the gage on its pedestal shown in operative relation to Fig. 4.

Fig. 6 is a front elevation of the gage on its pedestal.

Fig. 7 is a plan view of the gage shown in relation to the table plate and to the cupped emery wheel or other grinding stone.

In further detail, and with reference first to Fig. 1, the numeral 1 designates a heavy base block provided with an upper finished surface 2 upon which a driving motor 3 is bolted, as at 4, and which motor is direct connected to drive a cupped grinding wheel 5 partially enclosed in a housing 6 also secured to the surfaced portion 2 of the base. The swinging carriage comprises a bracket 7 carried on a rigid upright arm 8 formed integral with a massive bar 9 which extends horizontally parallel to the axis of the motor and grinding wheel axis, and is supported on conical pivot bearings 10 seated in complementary sockets 10′ formed in opposite sides of the base 1 or secured thereto. The conical pivots 10 are carried on lugs 11 projecting laterally from the bar 9 and threaded therein for adjustability and locked by set screws 11′. The lugs 11 embrace front and back walls of the base 1, and the adjacent end wall 1′ of the base forms a stop for the bar 9 when the carriage is at the left end of its movement, as in Fig. 1.

From the above it will be seen that the carriage bracket 7 may be manually swung back and forth across the forward edge of the cupped grinding wheel 5 and that any bearing block or other piece of work clamped to the carriage and projecting rearward beyond the face of the wheel will be ground off if the wheel is running.

To hold such a bearing or other similar piece of "work" in place on the carriage a table plate 12 is provided. This plate is relatively thick and accurately surfaced and rests at its rear lower margin on two finished lugs 13 projecting slightly upward from the carriage bracket 7, and at its forward margin on an adjusting or leveling screw 14 and is fastened down by two cap screws 15 projecting upwardly through the bracket 7 and screwed into threaded holes 15′ in the under side of the plate 12 only, while firmly screwed into the upper rear margin of plate 12, centrally thereof is a vertical rod 16 coiled about which is a compression spring 17 bearing against the under side of a clamping plate 18 through which rod 16 passes, and which plate 18 is kept from turning about the rod 16 by another rod 19, which is screwed into a corner hole 19′ in plate 12 and projects upward through a matching hole in clamping plate 18.

Rod 16 is threaded from its upper end down a sufficient distance to permit the application thereto of a long tubular threaded wrench-like member 20 provided with a handle 21 for screwing down against the clamping plate 18 to force it down and clamp a half bearing, cap or block (as indicated at 22 in Fig. 7), firmly in place against the table plate 12.

The gage which determines the amount to be ground off of the work comprises a pedestal 23 secured to the machine base 2 as by a cap screw 24 and on top of which pedestal is a flat plate 25 adjustably held in position by an overlying block 26 welded at its rear edge to the upper end of a stiff bowed spring arm 27 in turn welded at its lower end to the pedestal, while a cap screw 28 passes downwardly through a hole in the block 26 and through a slot 29 in plate 25 to screw into the upper end of the pedestal, thus providing for turning the plate 25 about the vertical axis of screw 28 and also moving the plate bodily either rearwardly or forwardly and clamping it firmly in adjusted position.

At the forward edge of plate 25 is a flat gage blade or strip 30 slidably fitting within a slot 31 in the forward edge of the plate 25, the blade being tapered toward the left (in Fig. 7) and preferably provided with a suitable finger grip 32 for pushing the blade back and forth in the slot to bring a gage line 33 scribed on the blade to any desired point along a scale 34 scribed along the edge of a lug 35 extending from plate 25 in contact with the tapered rear edge of the blade, it being understood that the slot 31 terminates in plate 25 at the same angle as the tapered blade 30 so that with the rear edge of the blade in contact with the rear wall of the slot the forward edge 30′ of the blade will be in line with the front and rear edges of plate 25 and parallel to the plane 36 of the cutting face of the grinding wheel 5, or in other words, at right angles to the axis 37 of the motor and wheel shaft.

Slotted plate 25 which carries the gage blade 30 is formed with a U-shaped gap or cut-out 38 in its forward edge and spanning which gap are two flat spring strips 39, the opposite ends of which are tightly pressed into slots formed in the forwardly extending horns or edges of the gap. These two flat springs are in line one directly above the blade 30 and the other below it and both extend at the same angle parallel to the tapered rear edge of the blade, while a small pin 40 projecting tightly through both sides of the blade slidably contacts the rear sides of both springs to thereby resiliently urge the tapered edge of the blade against the rear wall of the slot 31 as the

blade is slid back and forth to any desired point along the scale 34. The scale graduations may be such that a longitudinal movement of the tapered gage blade one division will displace the forward or gaging edge of the blade, a thousandth of an inch, or 2 or $^{3}/_{1000}$, as may be desired. Therefore, if any bearing cap or other block be clamped to the carriage in position so that as the carriage is swung to grind a little off of it, then swung back to starting position in front of the gage, and the gage clamping screw **28** be released sufficiently to move the forward edge of the gage blade **30** into contact with the freshly ground surface of the block and locked in such adjusted position, the forward straight edge of the gage blade will be in absolute alignment with the grinding wheel, so that if the edge of the blade be moved rearwardly a trifle, say two one-thousandths of an inch by sliding the tapered blade to the right (in Fig. 7) one division of the scale **34**, and any piece of work be laid on the table plate **12**, moved into contact with the so adjusted blade, then clamped to the table and passed over the grinder, exactly that much will be faced off.

Wear on the face of the grinding wheel is compensated for by merely loosening screw **28** and moving the upper part of the gage structure including plate **25** rearward and retightening the screw. For some kinds of work other than split bearings where the position for clamp screw **16** as shown would be in the way, the screw can be positioned anywhere else on table plate **12**, or loose clamps can be used.

When worn or distorted connecting rod bearings have had the cap portion and the rod portion faced off as above described, they are bolted together again and of course the opening will be slightly elliptical, and they are then ground internally or honed to perfectly round form on this same machine by passing them over a forwardly extending expansible grinding mandrel **41**, with the other end of the connecting rod supported on a forwardly projecting guide or stud shaft **42**. This grinding mandrel is driven by the same motor **3** and may be thrown into and out of driving connection by a control handle **43**. The specific details of this expansible mandrel is the subject of a copending patent application filed by me on date of December 20, 1952, Serial 327,076, now Patent No. 2,718,103, dated September 20, 1955.

Having thus described the preferred construction of my improved bearing grinding machine and the manner of its principal use, what I claim is:

1. In a grinding machine having a base with a grinding wheel rotatably mounted thereon, and a work table movable mounted thereon to move back and forth with one edge adjacent to and parallel to the grinding face of said wheel to carry a work article across said face for grinding off said article, and means for securing a work article on said table, the improvement which comprises an elongated gage for predeterming the position of a work article secured to said table, said gage mounted on a fixed portion of said base adjacent said edge of the table and provided with an elongated straight-edge extending along normally parallel with the movement of said edge of the table above and rearwardly thereof, and against which straight-edge the work article is aligned for securing to the table and may move therealong as the table is moved across the grinding wheel, said straight edge comprising a blade tapered in width and slidably supported in a guide in a manner so that upon sliding the blade longitudinally its work contacting edge will be parallel to and recede or advance with respect to the grinding plane, and a scale designating the amount of displacement of the work contacting straight edge of said blade.

2. In a grinding machine of the character described including a rotatable grinding wheel and a work table movably mounted to carry a work article into the path of the wheel for grinding off a portion overhanging the table, a stationary gage for predetermining the amount to be ground off comprising a flat elongated blade tapering in width toward one end, a supporting plate slotted to form a guiding seat for said blade with one long edge seated against the bottom of the slot, spring means urging edge of the blade to contact the bottom of the slot while permitting the blade to slide longitudinally in the slot, a finger grip provided on said blade for sliding the blade back and forth, a fixed scale carried by said plate along and adjacent one edge of the blade cooperating with designating indicia on the blade to indicate the movement of the blade when slid longitudinally, the outer long edge of said blade extending out of the guiding slot and forming a straight edge positioned adjacent said work table for contacting by a work article for positioning it on said table to predetermine the amount to be ground off of the article secured to said work table in contact with said straight edge.

3. In a structure as set out in claim 2, means for rigidly supporting the slotted plate while permitting its adjustment toward and from said work table.

4. In a structure as set out in claim 2, means for rigidly supporting the slotted plate while permitting its adjustment toward and from said work table and also for angular adjustment with relation thereto.

5. In a grinding machine having a base with a grinding wheel rotatably mounted thereon, and a work table movably mounted thereon to move back and forth with one edge adjacent to and parallel to the grinding face of said wheel to carry a work article across said face for grinding off said article, and means for securing a work article on said table, the improvement which comprises an elongated gage for predetermining the position of a work article secured to said table, said gage including a pedestal rigidly secured to said base, a plate adjustably secured to the top of the pedestal, and a flat tapered straight edged blade longitudinally slidable in a slot formed in the edge of the plate with one long edge seated against the bottom of the slot and the opposite edge extending freely adjacent the work article for contacting and aligning the work article against the straight edge of the blade when on said table in locating it thereon, the adjustability of said plate providing for movement of the plate bodily toward and away from said work article, and the tapered gage blade mounting effecting a parallel displacement of its free straight edge when the blade is slid longitudinally.

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