July 23, 1929. F. G. WACKER 1,721,892

TOOL FOR REAMING BUSHED BEARINGS OF ENGINE CONNECTING RODS

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Fig. 1.

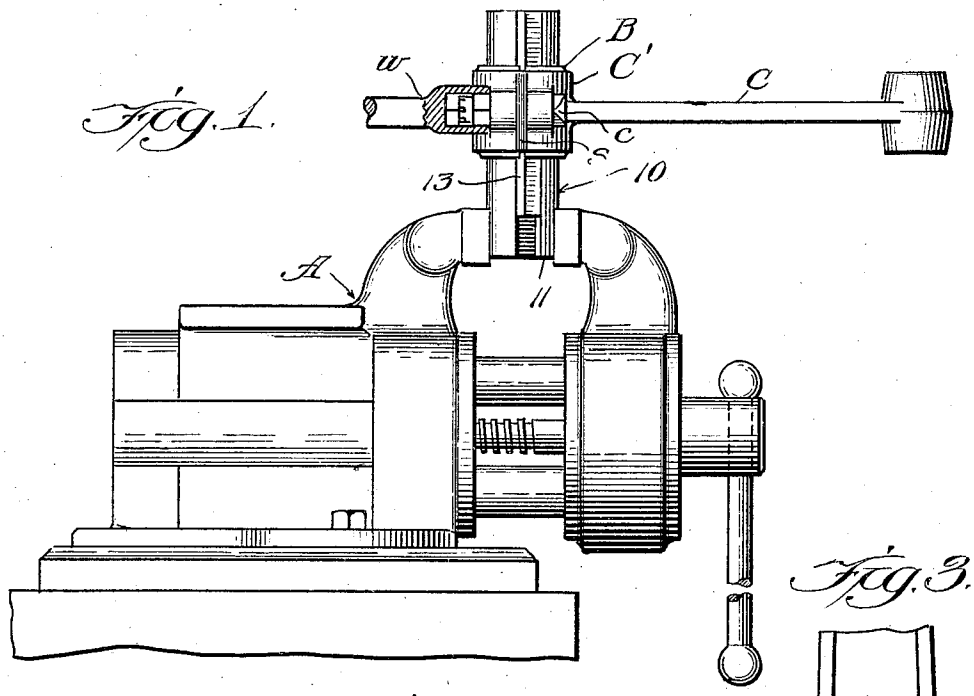


Fig. 3.

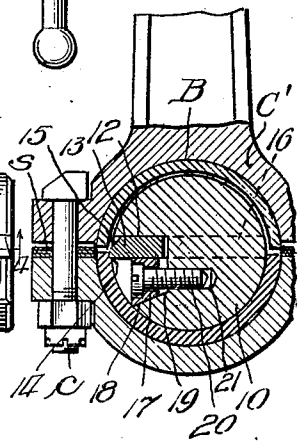


Fig. 2.

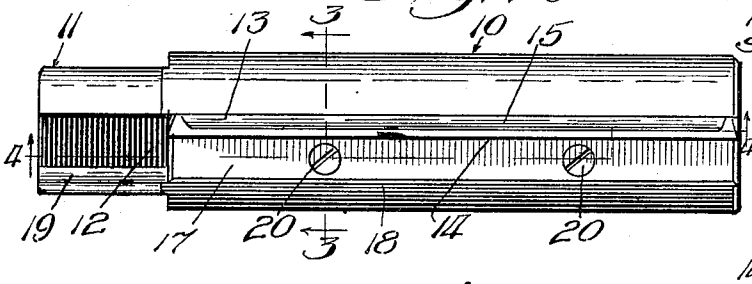
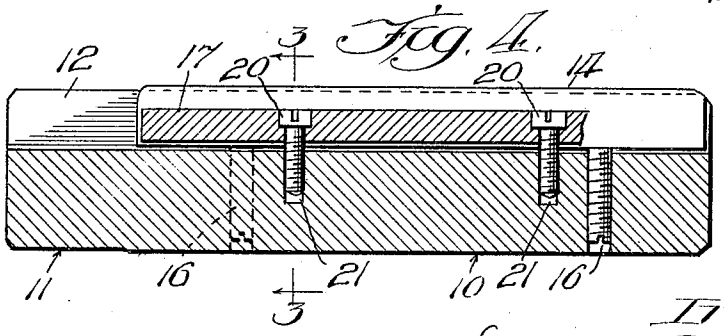


Fig. 4.



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Fig. 6.

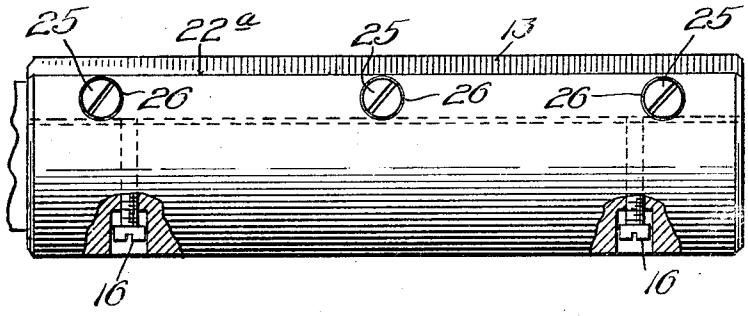


Fig. 5.

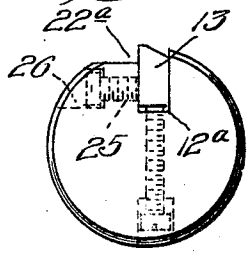


Fig. 8.

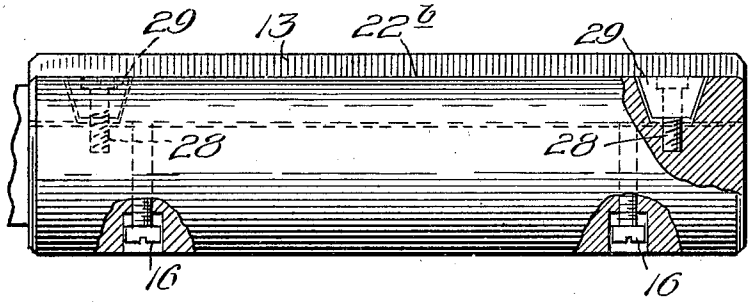


Fig. 7.

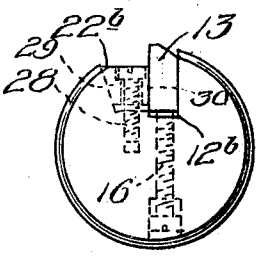


Fig. 9.

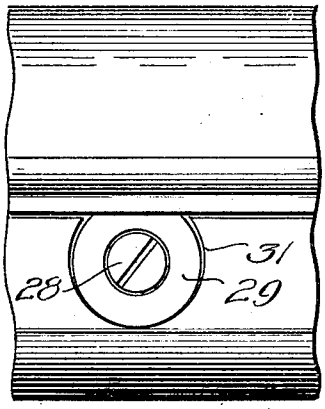
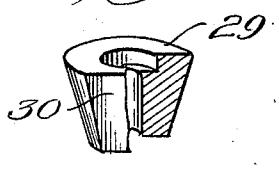


Fig. 10.



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UNITED STATES PATENT OFFICE.

FREDERICK G. WACKER, OF CHICAGO, ILLINOIS.

TOOL FOR REAMING BUSHED BEARINGS OF ENGINE CONNECTING RODS.

Application filed May 14, 1926. Serial No. 109,022.

My invention relates to a tool for reaming to exact desired diameter, and to true cylindricity, the Babbitt-metal bushings of split-bearing connecting rods such as are commonly employed in automobile construction. Accuracy of full-area fit between the bushed connecting-rod bearing and its coacting crank-pin is of recognized importance, and in the repair-servicing of automobiles the re-conditioning of an engine-crank, by dressing its crank pins to remove the results of wear or distortion, makes it necessary to re-bush the corresponding connecting rod bearings and dress them to fit the slightly-undersized crank-pins. Tools have been provided for the reaming of such bearings, widely adjustable to accommodate a considerable range of recognized crank-pin diameters, but with complexities of construction and operation, and with substantial chance of error in attempting to adjust for desired diameter; and one of the general objects of my invention is to provide a tool so simple and inexpensive in construction, requiring so little adjustment, insuring such accurate excellence of performance even in inexpert hands, and so facilitating the work, that a set of such tools, respectively of diameters appropriate to the several recognized commercial sizes of crank-pins may most economically afford best service-station equipment for this work, increasing the efficacy and facility of performance.

Other and further objects of my invention, of constructional and operative advantage, will more fully appear from the following description taken in conjunction with the accompanying drawings, wherein—

Figure 1 is an elevation of a tool embodying my invention, in course of use. Figure 2 is an enlarged elevation from the cutting side. Figure 3 is a cross-section on line 3—3 of Figures 2 and 4; Figure 4 is a longitudinal section on the broken line 4—4 of Figure 2. Figure 5 is an end elevation of a modified tool embodying features of my invention, and Figure 6 is a side elevation thereof taken from the left of Figure 5. Figure 7 is an end elevation of another modified tool embodying features of my invention; Figure 8 is a side elevation thereof taken at the left of Figure 7; Figure 9 is a plan view of a fragment of the tool shown in Figure 8, showing the clamping means for the blade, and Figure 10 is a perspective detail of a clamping block employed therein.

The tool comprises a solid steel body 10 of true cylindrical form (save where interrupted) and having a tang extension 11, the flattened cheeks of which are for engagement in a vise A, for the tool is to be held rigidly while the connecting rod C to be reamed is manually rotated about it to dress the bushing B, under a procedure of which more will be said.

Longitudinally the body 10 is deeply recessed, as at 12, to receive the cutting blade 13, which is preferably nearly of full-body length, and of rectangular form in cross-section except at its outer edge-surface which is slightly beveled from the forwardly-facing straight cutting edge 14 and then more abruptly beveled as at 15 toward its rear face; the flat rear surface of the blade bearing smoothly against the rear face of the recess 12 and the front surface of the blade preferably lying parallel to and slightly in front of a diametrical plane of the cylindrical body.

It is purposed, for most effective operation, that the cutting edge 14 shall protrude only a minimal cutting distance beyond the cylinder surface of the body, its protrusion being of the order of about a thousandth of an inch, (say, from a half a thousandth to two thousandths) and to facilitate accurate positioning of the blade for uniform protrusion, as well as to permit slight adjustment (primarily to take care of slight change of depth of the blade as its cutting edge is resharpened from time to time) adjusting screws 16 are provided, extending through the body 10 near opposite ends of the blade and with their kerfed outer ends below the cylindrical surface of the body. Of course the blade should bottom firmly on these positioning screws.

In front of the blade the body is cut away to provide chip-receptive space or clearance, and means are provided for locking the blade firmly in position, and preferably in arrangement that tends to draw the blade firmly

down upon its positioning screws 16 as well as to force it firmly into contact with the back wall of the recess 12. In the construction shown in Figs. 1 to 4, the body is cut away in front of the blade to form practically an enlargement of the recess 12 adequate to receive a locking bar 17 which is preferably substantially full blade-length, is considerably wider than the blade is thick, and is preferably of rectangular cross-section except at its forward edge 18, which is beveled to converge inwardly and to interfit with a correspondingly beveled front wall 19 of its receptive recess. Machine screws 20 countersunk into the outer face of the locking bar and passing therethrough with a slight looseness of fit, are threaded into the holes 21 of the body, so that the screw axes are preferably parallel with the plane of the front face of the blade. Thus, as the screws 20 are tightened, the locking bar is both drawn inwardly and wedged rearwardly, tending to draw the blade 15 down firmly into engagement with its bottoming screws 16 as well as to force the blade into tightest contact with the rear face of recess 12. Of course, when drawn home the locking bar lies wholly within the cylindrical confines of the body so that there is left open a space 22, beyond the locking bar and in front of the blade, adequate for chip-receptive purposes.

From Figure 1 and the (greatly exaggerated) illustration of Figure 2, the intended dressing operation may readily be understood. The split bushing B is positioned in the two halves of the split bearing-annulus C′, the two halves of which may be drawn together by the usual bolt and nut arrangement *c* as desired, the customary shims *s* being removed or reduced as desired. The mechanic places the bushed connecting rod around the reamer with its cutting edge engaging the edge of one of the bushing-halves, and tightens the nuts *c* as suggested by the illustration of wrench *w* in Figure 1. Then he turns the connecting rod manually halfway around the reamer, producing a cut of one bushing-half as exaggeratedly shown in Figure 3. Then he tightens the nuts *c* to bring the fresh-cut bushing surface into engagement with the cylinder surface back of the cutting blade (contact being substantially complete because of the fineness of the cut), and then makes his first cut on the other half of the bushing. Continuation of this procedure dresses the bushing with great accuracy and uniformity to the predetermined size for which the tool is appropriate and which, in commercial "reconditioning" practice, will usually represent a diameter slightly less than some standard crank-pin diameter to fit the reconditioned crank-pin—although sizes appropriate to standard, "new" work may be provided, of course.

In the construction shown in Figures 5 and 6, the blade-recess 12^a is of width quite snugly to receive the thickness of blade 13, the chip-space 22^a in front of the blade is formed by cutting a flat surface in the body at right angles to the front edge of the recess 12^a, and the clamping of the blade against the rear wall of the recess is effected by a suitable series of screws 25 extending through a portion of the body substantially at right angles to the front face of the blade and with their heads countersunk in suitable recesses 26 in the body.

In Figures 8 to 10 the blade-recess 12^b is likewise made narrow, quite snugly to receive the blade 13, and the chip-space is afforded by forming a flat 22^b, as above described, and the blade-locking arrangement includes screws 28 entering the body in substantial parallelism with the front face of the blade near opposite ends of the latter, each such screw being countersunk in a clamping plug 29 of tapering or frustro-conical shape save that its blade-engaging surface is a flat face 30 parallel to the axis of the screw. Such plug 29 seats within a corresponding conical recess 31 that intercepts the blade-recess 12^b and permits the plug-face 30 to engage the blade. When the plug is drawn down by the screw 28, its slight looseness of fit about the screw and also within the recess 31 causes it to draw the blade inwardly upon the bottoming screws 16 as well as to force the blade against the rear wall of its recess 12^b.

While I have herein described in some detail modified embodiments of my invention for purposes of full disclosure and to indicate that in some of its details changes may readily be made, it will be understood that other changes in details of construction may be made without departure from the spirit of my invention within the scope of the appended claim.

I claim:

A tool for the purpose described, which comprises a generally cylindrical, rigid body which serves as the sole support for the tool in the bore to be reamed, said body having a recess extending longitudinally substantially throughout the length of the body with its bottom surface paralleling the axis of the body, and one of the side walls of said recess being straight and its other side wall tapered inwardly, a rectangularly shaped cutting blade having its bottom edge paralleling the bottom of said recess and its one side edge paralleling and abutting the straight wall of said recess, which straight wall is so located as to position said blade radially in said body, a plurality of adjustable abutment screws carried by said body opposite said blade, the inner ends of said screws extending through said recess bottom to support said blade, and a clamping device which serves as the sole means of holding said blade in said recess on said screws which comprises a block

mounted in said recess at one side of said blade, said block having a straight side engaging a straight side of said blade and having a tapered side engaging the tapered wall of said recess, and screws freely passing through said block and entering threaded openings in said body parallel to said blade for drawing said block downwardly to adjustably force said blade laterally and downwardly into its clamped cutting position.

In testimony whereof, I have subscribed my name.

FREDERICK G. WACKER.