E. R. ELLIOTT.

CRANK SHAFT LAPPING TOOL.

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1,375,284. Patented Apr. 19, 1921.

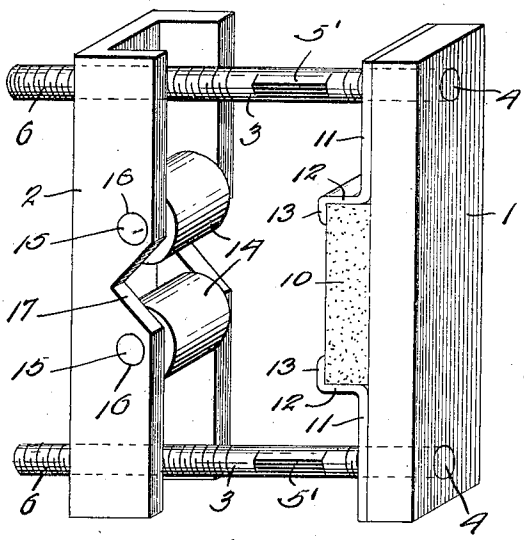


Fig. 1.

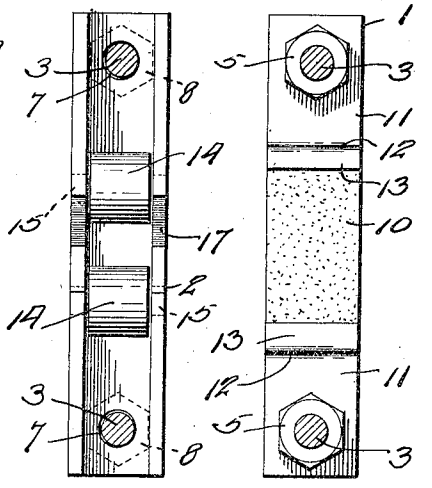


Fig. 3. Fig. 4

Fig. 2.

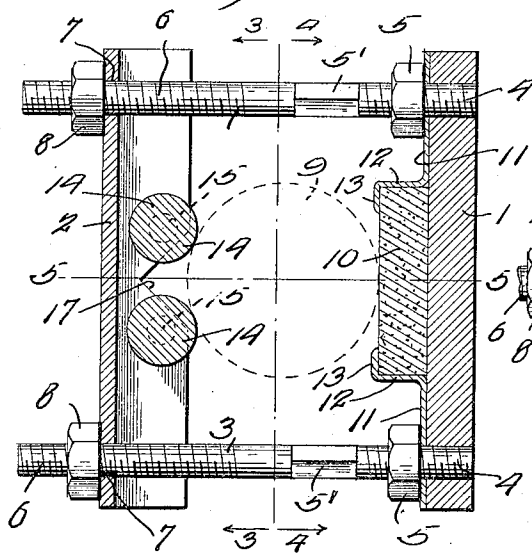
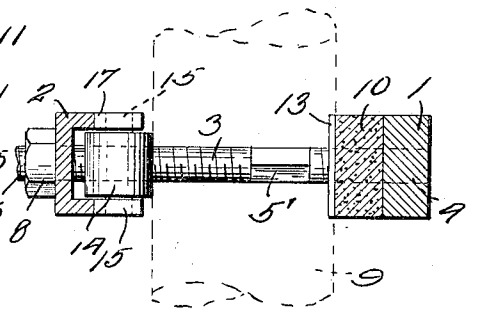


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CRANK-SHAFT-LAPPING TOOL.

1,375,284. Specification of Letters Patent. Patented Apr. 19, 1921.

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To all whom it may concern:

Be it known that I, EDISON REED ELLIOTT, citizen of the United States, residing at Champaign, in the county of Champaign and State of Illinois, have invented certain new and useful Improvements in Crank-Shaft-Lapping Tools, of which the following is a specification.

This invention relates to a lapping tool for smoothing and truing the irregular and scored or worn bearing surfaces of crank shafts, the primary object of the invention being to provide a tool of this character by means of which the worn bearing surface of a crank shaft may be quickly and easily trued so that the proper bearing can again be fitted accurately.

A further object of the invention is to provide a lapping tool which is adapted for operation upon different diameters of crank shafts without the necessity of complex means or operations for adjustments.

A still further object of the invention is to provide a lapping tool which may be applied and operated without the necessity of dismantling the shaft, thus enabling the bearing surfaces of crank shafts in use to be trued with a minimum expenditure of time and labor.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:

Figure 1 is a perspective view of a crank shaft lapping tool constructed in accordance with my invention.

Fig. 2 is a vertical longitudinal section through the tool, showing the same as applied for use.

Figs. 3 and 4 are central vertical transverse sections through the tool looking toward opposite sides thereof.

Fig. 5 is a detail section taken on the line 5—5 of Fig. 2.

In the practical embodiment of my invention as herein disclosed, I provide a lapping tool comprising a pair of opposed frame elements 1 and 2. These frame elements are adjustably connected in any preferred manner. In the present instance I have shown the frame element 1 as consisting of a bar or block of oblong rectangular form, and the frame element 2 as consisting of a channeled body having its channeled side facing the inner side of the bar or block 1. The said two frame elements 1 and 2 have their end portions connected by bolts 3, each having an end portion 4 threaded and secured in the block 1, and carrying on said threaded portion a clamping nut 5. Adjacent to the threaded portion 4 each bolt 3 may be provided with an angular surface 5′ for the application of a wrench or similar tool whereby its threaded end portion 4 may be screwed into and out of its receiving openings in the frame member 1 when required. The major portion of the bolt beyond the angular portion 5′ is threaded continuously toward the opposite end thereof, as indicated at 6, and the latter-named ends of the bolts extend through the channels of the frame member 2 and outwardly through openings 7 in the outer or body walls thereof and are provided with clamping and locking nuts 8. The openings 7 are of somewhat larger diameter than the threaded portions 6 of the bolts 3, thus adapting the frame member 2 to be adjusted toward and from and in relation to the frame member 1 to space said frame member different distances apart for the reception of crank shaft portions 9 of different diameters between them. It will thus be understood that the frame members 1 and 2 may be relatively adjusted according to the size or diameter of the bearing surface of the shaft 9 which is to be acted upon and said members secured in fixed relationship by adjusting the clamping and lock nuts 8 into engagement with the outer surface of the body wall of the frame member 2.

Assuming that the shaft 9 is in normal horizontal position, the tool extends vertically when in use and is positioned so that the frame members 1 and 2 come diametrically opposite sides of the bearing portion of the shaft which is to be smoothed and trued, the shaft extending horizontally and transversely through the space between said frame elements. Provided upon the inner face of the frame element 1 is an abrasive element 10, in the form of a lapping stone, which is disposed to bear upon one side of the surface of the shaft and which is detachably secured in working position by means of metallic clips 11. Each of these clips 11 comprises a body portion bearing upon the inner face of the frame member 1 and provided with a clamping flange 12 and a retaining lip 13. The flanges 12 of the clips bear against the up-

per and lower edges of the stone 10, and thus clamp said stone in position, while the lips 13 thereof extend to a slight degree over upon the working face of the stone and hold the stone from outward displacement. The body portions of the clips are provided with openings for the passage of the threaded ends 4 of the bolts 3 and are arranged so as to be engaged by the nuts 5, whereby said clips are secured in position in such manner as to enable an old and worn stone to be removed and another to be readily and conveniently substituted in its place.

The frame member 2 carries a pair of bearing rollers 14 to engage the surface of the shaft 9 at a point diametrically opposite the surface of the shaft engaged by the stone 10. These rollers 14 extend across and are substantially housed within the channel of the frame member 2, but have their inner peripheral portions projecting beyond the inner edges of the side walls of the channel for bearing contact with the shaft 9. The ends of the rollers are provided with spindles 15 which are journaled in bearing openings 16 in the side walls of the channeled frame member 2, said rollers thus being arranged transversely of the tool and so as to revolve on axes arranged on opposite sides of and parallel with the axis of the shaft 9, the peripheral portions of the rollers being thus adapted to bear upon and turn in contact with the surface of the shaft adjacent to and on opposite sides of the axial line of the shaft. Formed in the sides of the channeled frame member 1 between the axes of the rollers 14 are V-shaped slots or notches 17, which provide with the peripheral portions of said rollers a V-shaped seat between said rollers for the accommodation of the portion of the shaft 9 between the points of contact of the rollers therewith. Provision is thus made for the reception between the lapping stone 10 and the bearing rollers 14 of shaft portions of different diameters without the necessity of complex means or operations for adjustments, it being only necessary to adjust the frame elements 1 and 2 with relation to each other to properly space the stone and rollers according to the diameter of the shaft surface to be acted upon and then to adjust the bolts 8 to hold the parts in adjusted position, a simple manner of adjustment being thus obtained to set the tool for action upon shaft portions of different diameters.

In the use of the tool, it will be understood that the tool may be slid endwise upon the shaft, if the shaft is in condition for its reception in such manner, and the frame member 2 and nuts 8 then properly adjusted, or upon the removal of the frame member 2 and nuts 8 the bolts 3 may be brought into position to straddle the shaft and the frame member 2 and the nuts 8 then applied and properly adjusted to bring the stone 10 and rollers 14 into bearing engagement with opposite sides of the shaft. The tool may then be rotated about the shaft, or oscillated thereon as may be required, according to conditions, to effect the smoothing or truing action, the rollers 14 turning in contact with the shaft and allowing the device to be readily manipulated, while at the same time centering the device in position so as to secure a true working motion thereof. By proper operation the worn or scored portion of the shaft may be readily and conveniently smoothed and trued, with the expenditure of a minimum amount of time and labor, since the device may be quickly and conveniently applied and adjusted and operated for a working action.

It will be understood, of course, that the described arrangement of the bearing rollers 14, which lie on opposite sides of the transverse center of the stone 10, not only permits the device to be easily oscillated or rotated on the shaft, but also provides for the quick and accurate centering of the device on the shaft and its maintenance in such position during the truing action, so that rocking or wobbling of the lapping tool will be prevented, enabling the shaft surface to be readily trued so that the proper bearing can again be fitted accurately. Also it will be seen that the channeled frame member 2 provides for the proper partial housing of the rollers 14 and the formation of a seat of such shape as to secure the centering action and enable shaft portions of different diameters to be received and operated upon with accuracy and facility. By simply loosening the clips 11 the stone 10 when worn may be easily slipped out and a new one conveniently inserted in its place.

Having thus fully described my invention, I claim:

1. A crank shaft lapping tool comprising opposed relatively fixed and sliding frame elements, an abrasive element carried by the relatively fixed frame element, bolts having threaded ends secured in the relatively fixed frame element and opposite threaded ends passing loosely through the relatively sliding frame element, said bolts also having intermediate angular portions, fastening means for the abrasive element engaging said abrasive element and secured in position upon the first-named threaded ends of the bolts, a pair of transversely disposed rollers carried by the relatively sliding frame element and arranged on opposite sides of a line passing through the transverse center of the abrasive element, and

nuts engaging the second-named threaded ends of the bolts for maintaining said frame elements in relatively adjusted position.

2. A crank shaft lapping tool comprising a pair of opposed frame members, bolts for connecting and holding said frame members in adjusted relation to each other, clips associated with one of the frame members and engaging said bolts, nuts engaging the bolts and clamping said clips in position, an abrasive element removably secured in position by said clips and arranged to engage one side of the surface of the shaft, and a pair of transversely disposed rollers carried by the other frame member and arranged in parallel relation on opposite sides of a line passing through the transverse center of the abrasive element.

3. A crank shaft lapping tool comprising a pair of opposed frame elements, an abrasive element carried by one of the frame elements, bolts fixed to the ends of said frame element and extending loosely through the ends of the other frame element, the latter being slidably mounted thereon for adjustment toward and from the first-named frame element, clips engaging the bolts for removably holding said abrasive element in position, nuts upon the bolts for holding said clips in clamping position, nuts upon the bolts for holding said sliding frame element in adjusted position with relation to the said relatively fixed frame element, and transverse bearing rollers carried by said sliding frame element in spaced relation to each other and on opposite sides of a line passing through the transverse center of the abrasive element.

4. A crank shaft lapping tool comprising a pair of opposed frame members, an abrasive element carried by one of the frame members, bolts fixed to said frame member and extending loosely through the other frame member, the latter being slidably mounted thereon for adjustment toward and from the first-named frame member, nuts engaging said bolts for holding the second-named frame member in adjusted position thereon, and a pair of bearing rollers carried by the sliding frame member, said rollers being arranged transversely of said frame member in spaced relation to revolve on axes parallel with the axis of the shaft and to contact with said shaft on opposite sides of the axial line thereof.

5. A crank shaft lapping tool comprising a pair of opposed frame members, one of said frame members being of channeled form and having V-shaped recesses in the sides thereof, rollers partially housed within the channel of said channeled frame member and arranged on opposite sides of said V-shaped recesses, said rollers being mounted to revolve on parallel axes, an abrasive element carried by the other frame member in opposing relation to said rollers, bolts fixed to the latter-named frame member and extending loosely through the channeled frame member, said channeled frame member being slidably mounted on said bolts for adjustment toward and from its companion frame member, and nuts engaging said bolts for holding the channeled frame member in adjusting relation to its companion fixed frame member.

6. A crank shaft lapping tool comprising a pair of frame members, one of said frame members being of channeled form and having V-shaped recesses in the sides thereof, rollers partially housed within the channel of said channeled frame member and arranged on opposite sides of said V-shaped recesses, said rollers being mounted to revolve on parallel axes, an abrasive element carried by the other frame member in opposing relation to said rollers, and means for adjustably connecting said frame members.

In testimony whereof I affix my signature in presence of two witnesses.

EDISON REED ELLIOTT.

Witnesses:

WALTER E. PRICE,

FRED M. PRICE.