Oct. 21, 1930. J. W. HOWELL 1,778,802

TOOL FOR REMOVING BEARING RACES, BUSHINGS, AND THE LIKE

Filed Jan. 30, 1928

Fig. 1

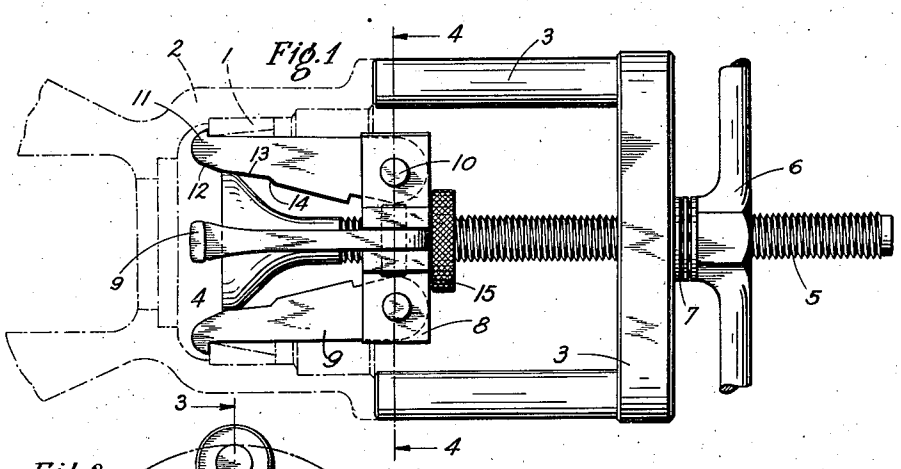


Fig. 2

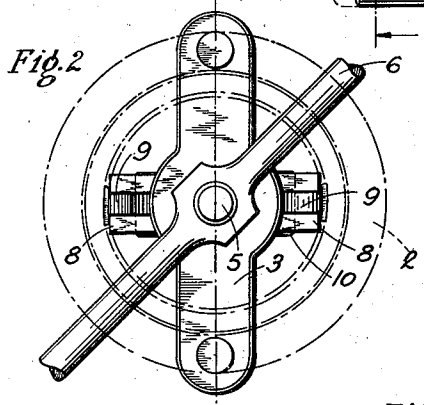


Fig. 6

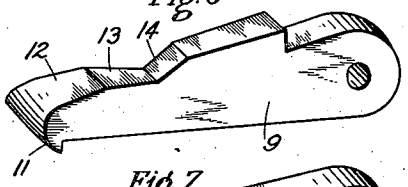


Fig. 7

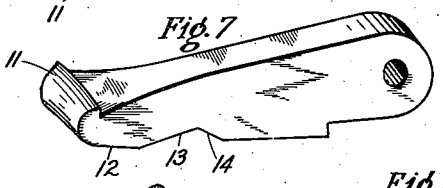


Fig. 3

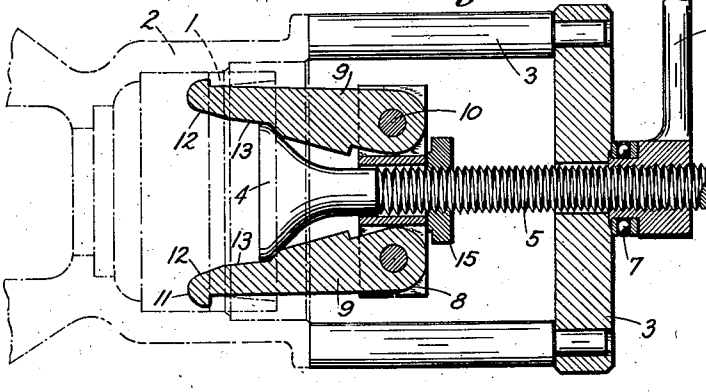


Fig. 4

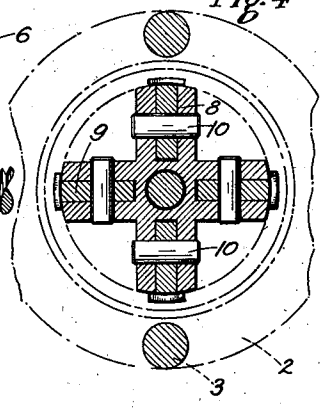
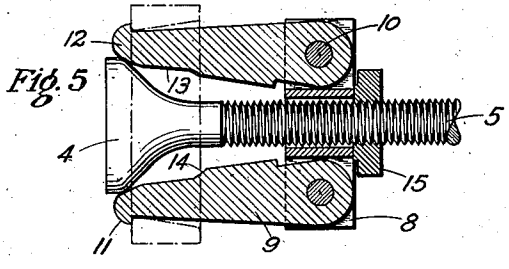


Fig. 5



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Patented Oct. 21, 1930 1,778,802

UNITED STATES PATENT OFFICE

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TOOL FOR REMOVING BEARING RACES, BUSHINGS, AND THE LIKE

Application filed January 30, 1928. Serial No. 250,409.

This invention relates to an improvement in tools of the type employed in removing bushings, rings, races or similar articles from a retaining structure.

Articles such as bearing races, bushings or the like are frequently mounted internally of a retaining means or support such as a shell and are positioned in the retaining means under great pressure. Devices customarily used for removing the annular article have been relatively complicated and inefficient and their use has frequently resulted in breaking, cracking or otherwise weakening the retainer or the annular article.

It is an object of this invention to provide a tool for removing articles from a retainer structure, whereby the disadvantages heretofore encountered are eliminated. A further object of this invention is to provide a tool which shall be capable of exerting a maximum of force upon the annular ring with a minimum of effort by the operator.

Other objects will be apparent from the accompanying specification and from the drawings in which latter;

Figure 1 is a side elevation of the tool shown in position to begin the pulling operation;

Figure 2 is an end elevation of the tool;

Figure 3 is a transverse section through the tool upon the line 3—3 of figure 2 showing the article partly removed from its supporting structure;

Figure 4 is a section upon the line 4—4 of Figure 1;

Figure 5 is a section of a detail of the tool showing the article engaging arms operating upon a ring of reduced diameter.

Figures 6 and 7 are detail perspective views of the article engaging arms.

Referring particularly to the drawings the tool is shown as applied for the removal of an annular article 1 from the hub structure or support 2 with which it has tight engagement. In its preferred embodiment the tool comprises an abutment 3, a portion of which is adapted to bear against the outer end of the hub structure 2. A wedge member is provided which is adapted to cooperate with the abutment, said wedge member comprising a conical head 4 and a screw threaded shank 5. The screw threaded shank passes loosely through the top of the abutment member. Longitudinal movement of the wedge with respect to the abutment member is effected by means of the handle 6 which has screw threaded engagement with the shank 5 upon the opposite side of the abutment from the head 4. Thrust bearings 7 are provided between the abutment and handles and the handle is turned during the pulling operation.

The shank of the wedge carries loosely a frame 8 upon which the article engaging arms or members 9 are pivotally supported at 10. In the specific embodiment illustrated there are four of the arms 9 which arms are of identical construction. The outer face of each arm 9 is provided at the end thereof with a laterally projecting shoulder 11 which is adapted to engage behind the rear of the ring to be removed. The inner face of each arm 9 is provided at the end thereof with tapered or cam surface 12 which is adapted to be engaged by the head 4 of the wedge. Engagement of the head 4 with the cam surfaces serves to move the arms 9 laterally projecting the shoulders 11 into alignment with the article. The face 13 of each arm 9 extends uninterruptedly longitudinally at a reduced angle to the longitudinal extent of the arm from the cam surface 12 to shoulder 14 which projects laterally from the arm and functions as an abutment limiting longitudinal movement of the head 4 of the wedge. A knurled locknut 15 is provided which has screw thread engagement with the shank 5. This nut is adapted to be screwed tightly against the frame 8 when the head 4 has been drawn into abutting engagement with the cam surfaces 12, 13 or 14. A function of the locknut 15 is to prevent relative rotation between the wedge member and the arms 9 and thereby overcome any rotative strains which may be placed upon the wedge member during rotation of the handle 6.

In utilizing the tool for removing an article of the relative size shown in Figures 1 and 3 the wedge member is advanced beyond the outer ends of the arms in order to facilitate the admission of the shouldered portions 11

within the annular article to be operated upon. The tool is then positioned with the abutment resting upon the outer end of the hub structure and the arms extending into and protruding beyond the annular article. The handle 6 is then rotated, thereby drawing the head 4 into engagement with the arms and forcing them laterally so that the shoulder 11 projects behind the article. Further longitudinal movement of the wedge member draws the head 4 against the shoulders 14 and subsquently withdraws the arms 9 and the ring 1 from the hub member 2. When the tool is utilized for removing an article of the relative internal diameter shown in Figure 5, engagement of the head of the wedge with the cam surfaces 12 of the arms both spreads the arms and effects longitudinal movement of the arms. It will be obvious that surfaces 13 will cooperate with the wedge to produce a similar result when articles of other sizes are operated upon. While a specific form of device has been shown and described it is obvious that various modifications may be made therein and it is not intended to limit the invention otherwise than is indicated by the scope of the appended claims.

I claim:

1. A device for removing an annular article from a support comprising members engageable with the annular article, said members having tapered and shouldered portions, an abutment adapted to bear against the support, a wedge, the face of the shouldered portions being inclined toward the wedge in the direction of the pull means for causing relative movement between the wedge and the abutment whereby the wedge successively engages the tapered portions to spread the members and the shoulders to cause longitudinal movement of the members and outward pressure thereon.

2. A device for removing an annular article from a support comprising members engageable with the annular article, said members being shouldered intermediate their ends, an abutment adapted to bear against the support, wedge means, the face of the shoulders being inclined toward the wedge means in the direction of the pull means for causing relative movement between the wedge means and abutment whereby the wedge engages the shoulders to cause longitudinal movement of the members and outward pressure thereon.

3. A device for removing an annular article from a support comprising members engageable with the annular article, said members being shouldered intermediate their ends, an abutment adapted to bear against the support, wedge-shaped means having a screw threaded portion extending through the abutment, means adjustably threaded upon the screw-threaded portion of the wedge for drawing the latter longitudinally with respect to the abutment whereby the wedge spreads the members into engagement with the annular article, and anti-friction bearing means interposed between the abutment and the adjustably threaded means.

4. A device for removing an annular article from a support comprising members engageable with the annular article, an abutment adapted to bear against the support, wedge means having a screw threaded portion extending through the abutment, means adjustably threaded upon the screw threaded portion of the wedge for drawing the latter longitudinally with respect to the abutment whereby the wedge spreads the members into engagement with the annular article, and a lock nut for locking the wedge means nonrotatably with respect to the members.

In testimony whereof I hereunto affix my signature this 25th day of January, 1928.

JAMES W. HOWELL.