Dec. 19, 1967 J. A. BARES ETAL 3,358,353

BEARING CUP REMOVER

Filed April 8, 1966

FIG. 1

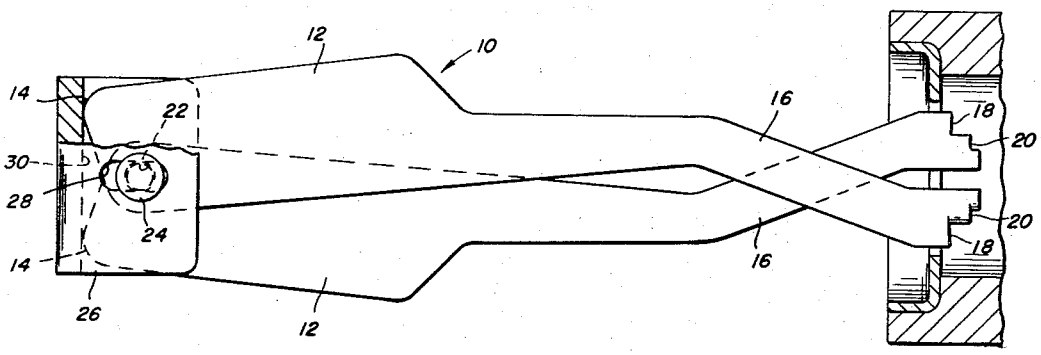


FIG. 3

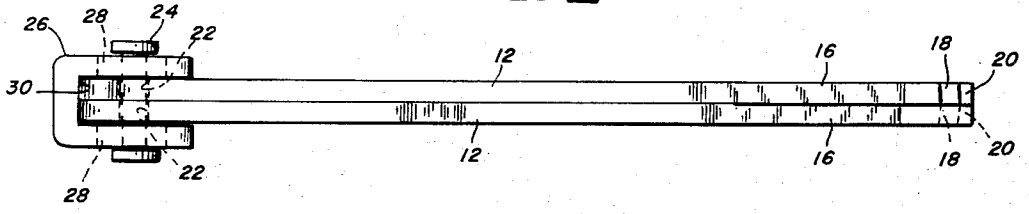
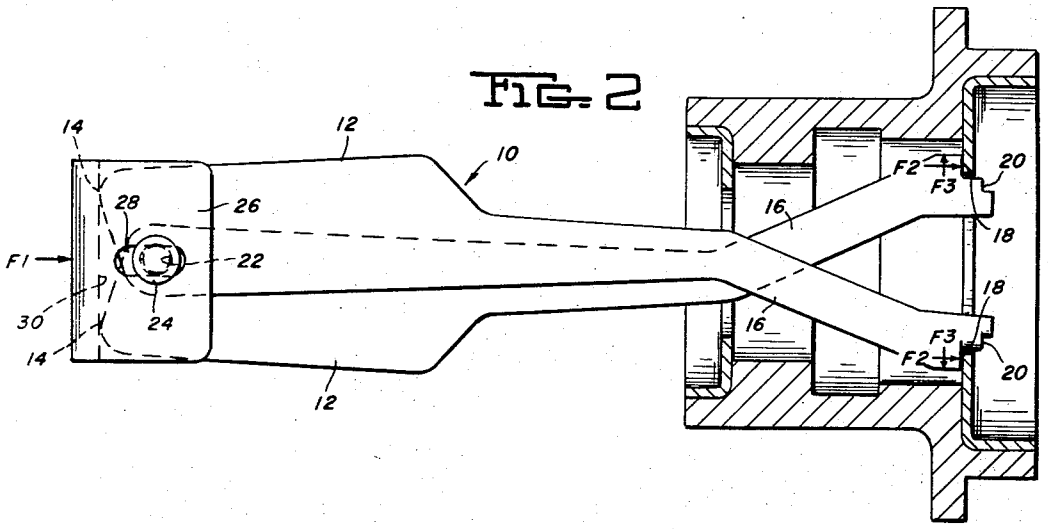


FIG. 2



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BEARING CUP REMOVER

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This invention relates generally to hand tools, and more particularly to bearing cup removing tools.

Although there have been many proposals for bearing cup removing tools, each of them has had certain disadvantages. The most common designs for such tools utilize biased levers wherein the levers are urged to their wide open position by the action of various types of springs. Although for certain applications these types of tools are satisfactory, there are certain situations where the lack of operator control of the opening of the jaws prevents their being used effectively. For example, when a passage through which the tool must pass has any shoulders located in front of the bearing cup, the springs will open the levers causing them to seat against such shoulders and prevent the passage of the tool to the bearing cup. Also, springs tend to lose their resiliency or become filled with dirt necessitating frequent maintenance. Other designs of this type of tool have utilized lever movement which has severely limited the size and shape passages in which they can be used.

The present invention contemplates a bearing cup removing tool, the opening and closing of which are both operator controlled. Further features of this tool include a design which distributes the force of the blows on the tool in such a way that the tool is urged to its open or bearing cup engaging position during the use of the tool. An additional feature of this tool includes a design which will permit it to be opened in a restricted passageway without the space occupied by the handles increasing.

Still other advantages of the invention, and the invention itself, will become more apparent from the following description of an embodiment thereof which is illustrated by the accompanying drawings and forms a part of this specification.

In the drawings:

FIG. 1 is a front elevational view of the tool of this invention, with parts broken away for clarity, in its closed or access position being inserted to remove a bearing cup;

FIG. 2 is the tool in its opened or bearing cup engaging position and seated against a bearing cup; and

FIG. 3 is a side elevational view of the tool.

Briefly, this invention contemplates a pair of pivotally connected crossed levers each having a handle portion and a cup engaging end. The handles have curved surfaces at their ends and a striking cap is fitted over these surfaces and preferably is retained by the pin connecting the levers, which connection is through the handles near the striking surfaces. The levers are arranged so that when the handles are squeezed the cup engaging ends spread. The curved surfaces are arranged so that they will transmit force, from a blow to the cap, to the cup engaging ends in components which will tend to drive out the cup and tend to maintain the cup engaging ends seated against the cup.

More specifically, the bearing cup removal tool of this invention includes a pair of crossed levers or arms **10**. The levers **10** have handle portions **12** terminating at one end in curved impact receiving surfaces **14**. A shank portion **16** extends at an angle from each of the handle portions **12**, which shank portions have formed at the ends thereof bearing cup engaging shoulders **18** and **20**. These shoulders provide convenient engaging surfaces and

they also limit spreading movement during use, as will be explained presently. A hole **22** is bored in each of the handle portions **12** adjacent the impact receiving surfaces **14** and a pivot pin in the form of a rivet **24** extends through the holes **22** so that a loose fit is provided to prevent the rivet from carrying any of the load during the use of the tool.

A generally U-shaped impact receiving and transmitting cap **26** is provided which fits over the impact receiving surfaces **14** and surrounds a part of the handle portions **12** of the lever **10**. The cap **26** is provided with a pair of slots **28** on opposite sides thereof which slots slidingly engage the opposite ends of the rivet **24**. The heads of the rivet **24** retain the cap **26** and the rivet itself in place. The undersurface **30** of the cap **26** engages the impact receiving surfaces **14** of the levers. With the U configuration and the sliding engagement of the cap **26** with the rivet **24**, the levers **10** are free to pivot about the rivet **24** and surface **30** of the cap will stay in contact with the impact receiving surfaces **14** irrespective of whether the tool is in its access position, as shown in FIG. 1, or its cup engaging position shown in FIG. 2.

Turning now to the operation of the device, in order to insert the device into an opening to gain access to a bearing cup, the handles **12** of the levers are spread which will cause the cup engaging ends to close together into their access position, as shown in FIG. 1. In this position the tool is inserted into the opening until one of the shoulders **18** or **20** on each lever is positioned opposite the edge of the bearing cup to be removed. The handle portions are then squeezed together which will cause the cup engaging ends of the levers to spread and one of the shoulders **18** or **20** will engage the edge of the bearing cup, as shown in FIG. 2. It will be observed that as the handles are squeezed, causing the distance between the cup engaging ends of the levers to increase, the distance across the handles decreases. Hence, any opening through which the handles pass when the tool is inserted will not cause a restriction in the use of the tool, since in this open position the handle spread is actually less than in the access position. As was explained previously, in any position the surface **30** will be in contact with surfaces **14**. The cap is then struck a blow with a hammer or the like which will cause a force **F1** on the levers. The impact receiving surfaces **14** are so positioned and the levers **10** are so constructed and arranged that this force **F1** will be transmitted to the levers and to the bearing cup engaging ends as force vectors **F2** and **F3**. The force vector **F2** tends to drive the bearing cup out and is of a much greater magnitude than force vector **F3**, which tends to keep the cup engaging ends of the lever spread and in contact with the cup. The stepped configuration of the shoulders **18** and **20** prevents the levers from actually spreading which would cause binding against the wall surrounding the bearing cup or damage to this wall by scoring.

Having thus described the invention in an embodiment thereof, we are aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of the invention as defined in the appended claims.

We claim:

1. A bearing cup removing tool comprising, first and second levers, each of said levers including a shank portion having a bearing cup engaging end and a handle portion having an impact receiving surface at the opposite end, means pivotally interconnecting said levers, said levers being relatively movable about said pivot means between a bearing cup engaging position wherein the cup engaging ends are relatively widely spread and an access position wherein said cup engaging ends are relatively

closely spread, said handle portions being configured and arranged to urge said cup engaging ends toward the bearing cup engaging position when the handle portions are squeezed together, an impact receiving and transmitting cap disposed over the impact receiving surfaces of said levers, and means to secure said cap to said levers to permit relative movement of said levers within said cap and maintain contact of said cap and the impact receiving surfaces of said levers.

2. The combination of claim 1, wherein said means pivotally interconnecting said levers includes rivet means extending through the handle portions at the free ends thereof.

3. The combination of claim 2, wherein said cap includes slot means slidably engaging said rivet means.

4. The combination of claim 1, wherein the shank portions extend at an angle from said handle portions and said impact receiving surfaces are positioned to engage the cap to vector a portion force transmitted to the driving ends in a direction urging the cup engaging ends to the cup engaging position.

5. The combination of claim 4, wherein the cup engaging end of each lever includes at least one cup engaging notch.

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