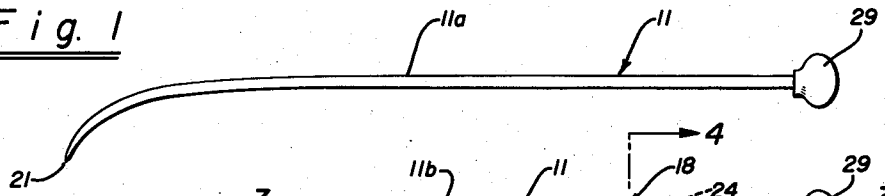
July 22, 1958 W. K. HAGERTY ET AL 2,844,060

METAL BENDING PRY TOOL

Filed Nov. 2, 1956

Fig. 1



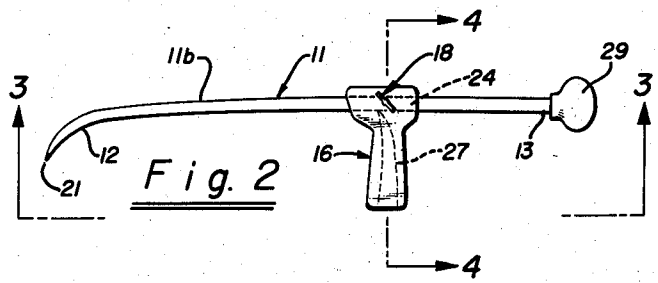


Fig. 2

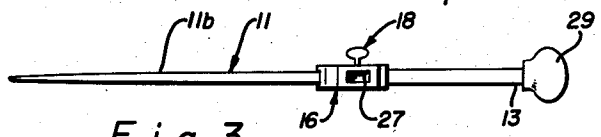


Fig. 3

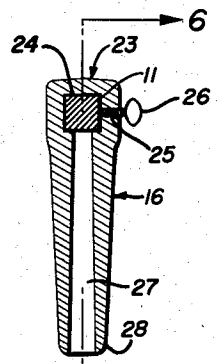


Fig. 4

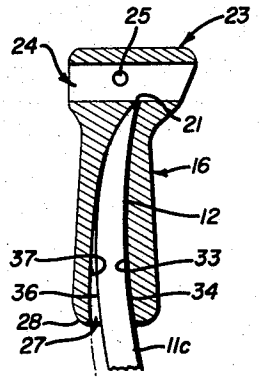


Fig. 6

Fig. 5

INVENTORS
William K. Hagerty &
Charles L. Hagerty

BY Manfred B. Warren
Their Attorney

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METAL BENDING PRY TOOL

William K. Hagerty, Alhambra, and Charles L. Hagerty, El Monte, Calif.

Application November 2, 1956, Serial No. 620,048

7 Claims. (Cl. 81—15)

The invention relates to tools used by mechanics in automobile body repair shops for straightening out body metal and more particularly to an elongated bar type of tool known as a pry tool.

An object of the present invention is to provide a pry tool of the character described with which the user may with ease and facility and while working in a comfortable position, apply to the dented portion of the body to be straightened, and in a most precise manner, a graduated and full range of prying force as may be required to restore the original shape of the metal.

Another object of the present invention is to provide a pry tool of the character above which is so designed and functions as to be effective in very tight and confined working spaces, thereby substantially extending the useful application of a tool of this character to the straightening out of automobile body metal.

A further object of the present invention is to provide a pry tool of the character described which is particularly adapted for production in sets using different sizes of pry bars and with a desired interchangeability and coordinated use of the several parts, resulting in an economical set of tools having a wide range of use.

Still a further object of the present invention is to provide a pry tool of the character described which is composed of a minimum number of simply yet sturdily formed parts designed to withstand the rugged use to which they are put over a long and useful life.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawings:

Figure 1 is a side elevation of a pry bar forming part of the set of the present invention.

Figure 2 is a side elevation of a complete pry tool constructed in accordance with the present invention but showing a different size pry bar forming part of the set.

Figure 3 is a side view of the pry tool shown in Figure 2, taken at 90° from the plane of Figure 2, being substantially the plane of line 3—3.

Figure 4 is a cross-sectional view of the pry tool illustrated in Figure 2 on an enlarged scale and taken substantially on the plane of line 4—4 of Figure 2.

Figure 5 is a side elevation of the pry tool showing a coordinated combination of a pair of pry bars forming the set and with one of such bars shown in position of use within a section of an automobile body.

Figure 6 is a cross-sectional view of the pry tool taken substantially on the plane of line 6—6 of Figure 4 but with the pry bar deleted and with a lever extension bar inserted.

The pry tool of the present invention and as best illustrated in Figures 2 and 5 of the drawing consists, briefly, of an elongated bar **11** having a prying end **12** and an opposite handle end **13** adapted for engagement in one hand of the user for positioning of the prying end **12** in juxtaposition to a dented portion **14** of an automobile body **15** to be straightened, a hand lever **16** mounted for longitudinal reciprocation on the bar **11** to and from the handle end 13 and projecting laterally from the bar for engagement in and by the other hand of the user so as to afford a coordinated leveraging of the prying end **12** against the dented portion **14**; and means **18** for detachably fastening the hand lever in selected longitudinal position on the bar **11**.

In order to afford an improved leveraging of the end **12** against the dented portion, the end **12** is preferably formed in a lateral offset or curved, as here shown, from the length of the elongated bar **11**. Also to provide a most precise working of the body metal, the prying end **12** is preferably pointed at its tip **21**. Desirably also the length of the pry bar **11** is tapered in cross-section, which tapering cooperates with the curvature selected at the end **12** to permit the sliding of the hand lever **16** over and around the tip onto and from the bar.

In order to best secure the hand lever **16** to the bar against relative rotation about the longitudinal axis of the bar, so that the lever may be effective in applying rotary torque to the bar, the bar and lever are preferably formed with a sliding polygonal interfit, which has the further important advantage of permitting selectable circumferential positioning of the lever on the bar with respect to the lateral direction of offset of the prying end 12. This feature is most important in enabling the tool to be used in certain confined spaces and is here accomplished by forming the bar **11** of polygonal (here square) cross-section, as seen in Figure 4, and by the provision in the base end **23** of the lever **16** of a transverse opening **24** conforming in shape to the cross-section of the bar. Thus the opening **24** is formed with polygonal internal walls which are placed in wall-to-wall sliding engagement with the polygonal external walls of the bar **11** so as to positively prevent relative rotation.

A set screw **25** threaded through the lever end 23 and bearing against the bar **11**, and preferably formed with a finger-engaging head **26** here provides the means **18** for detachably fastening the lever in its selected longitudinal position on the bar. The set screw may be advanced or retracted to grip the tapering cross-section of the bar **11** when the lever handle **16** is set at different points along the length of the bar. It will also be noted, with reference to Figure 2, that the length of the opening **24** is related to the curvature of the prying end **12** and the reduction in cross-section of the bar **11** so as to enable the lever **16** to be slid off from the bar at its tip **21** or reinserted into the bar by threading the tip **21** through the opening **24**.

As a further important feature of the present invention, the hand lever **16** is formed with a socket **27** opening to the outer end **28** of the lever for receipt of a lever extension such as another pry bar **11***c* which may, similar to the handle **16**, be engageable by one hand of the user so as to afford, with the bar end **13**, a coordinated leveraging of the prying end **12** against the dented portion, the extension **11***c* affording the operator greatly increased mechanical advantage and also the opportunity in many instances of working the dented portion from a more comfortable position.

The pry tool is preferably furnished in a set of three lengths of pry bars **11***a* (see Figure 1), **11***b* (see Figures 2, 3 and 5), and **11***c* (see Figure 5). These are desirably of essentially similar shape and having the same cross-sectional size over the majority of their length so as to enable the use of a single lever **16** with any of them

and so as to enable the use of any of the bars as a lever extension insertable in the lever socket **27**. This interchangeability and coordinated use of parts results in a most economical set of tools having a maximum range of application.

In keeping with the foregoing coordinated use of the several parts, the socket **27** is preferably formed of a tapered curved cross-section, as best seen in Figures 4 and 6, so as to conform generally with the typical shape of the prying end **12** of each of the pry bars. This curved interfit between the socket and the pry bar end **12**, as seen in Figure 6, disposes the length of the pry bar at a proper and convenient angle as seen in Figure 5, and also prevents rotation of the pry bar extension **11***c* in the socket **27**. Since very large mechanical advantage is attained with the use of the lever extension **11***c*, care must be exercised to prevent the breaking of the extension **11***c* in use when large forces are applied to its outer end. As an important feature of the present construction the interfit between the socket **27** and bar end **12** permits a limited resilient flexing of the end **12** within the socket when the lever extension is put under load so as to better distribute the strain over the inserted end **12** of the bar. With reference to Figure 6 it will be seen that the inside curved face **33** conforms closely to the juxtaposed curved face **34** of the socket **27**. At its opposite outer curved side **36**, the bar **11***c* recedes away from the opposed curved side **37** of the socket towards the outer end **28** of the lever, leaving clearance for flexing of the bar **11***c* when under load. Preferably the inner end of the bar **11***c* and the inner end of the socket **27** fit rather closely, as illustrated, to provide a firm engagement yet loose enough to permit easy insertion and withdrawal of the bar. Accordingly, as bar **11***c* is placed under load, the inserted end **12** is permitted to resiliently flex, placing the outer curved side **36** of the bar end into progressive face-to-face contact with the inside face **37** on the socket so as to fully distribute the load over the full length of the inserted end. By means of this arrangement, breakage of the bar ends **12** while used as a lever extension is substantially completely eliminated.

In one of the important uses of the tool, the pry bar **11** is rotated about its longitudinal axis by force applied to the lever **16** or lever extension so as to swing the pointed end **12** against the portion of the car body to be straightened. In such use the handle end **13** is socketed firmly in one hand of the user for precise holding and positioning of the bar **11** but permitting its rotation about its longitudinal axis. To facilitate this holding and improve the usefulness and effectiveness of the tool, we preferably provide the end **13** with a ball shape, here provided by a ball handle **29** attached to the end **13** and which may be conveniently cupped in the palm of the hand of the user for firm grasping of the ball while journalling the bar for rotation about its longitudinal axis. The selectable positioning of the hand lever **16** along the length of the bar enables the use of the tool as a measuring device, particularly usable where the operator must work blind in reaching a dented portion, in enabling the operator to first measure the distance of the dented portion from a convenient edge of the body metal. Thus the operator may place the lever **16** at an edge of the body and while working at the exterior of the body, slide the bar through the lever opening **24** until the point **12** is at the dented portion to be straightened. The set screw **25** is tightened to set the measurement and the operator may then extend the tool around the under- or back-side of the body metal until the lever **16** is positioned at the indexing edge of the body, when the tip **21** will be precisely located at the dent to be straightened. A most effective use of the tool involving this kind of operation and also one not normally feasible with pry tools, is in straightening out a dent in a door panel, as depicted in Figure 5. In such case an opening **31** may be made in the bottom **32** of the door panel so as to permit the insertion of the bar **11** up through the hollow interior of the panel to position the prying tip **21** at the dent **14**. In effecting this insertion the plane of the curvature of the prying tip may be set parallel to the plane of the door panel, and the lever **16** positioned on the bar so as to extend away from the face of the door panel for convenient manual engagement. The two handles **16** and **29** afford a coordinated rotary and leveraging action which may be applied by the user while in a comfortable position viewing the exterior surface of the door panel to thus permit a most precise working out of the dented portion. After prying out the dented portion and removal of the tool, the small opening **31** made in the door panel may be sealed by leading or other means well known in the art.

We claim:

1. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a prying end and an opposite handle end adapted for engagement in one hand of the user for positioning of said prying end in juxtaposition to said dented portion, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and projecting laterally from said bar for engagement in and by the other hand of the user so as to afford a coordinated leveraging of said prying end against said dented portion, and means for detachably fastening said hand lever in selected longitudinal positions on said bar.

2. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a curved pointed end and an opposite handle end adapted for engagement in one hand of the user for positioning of said curved pointed end in juxtaposition to said dented portion, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and projecting laterally from said bar for engagement in and by the other hand of the user so as to afford a coordinated leveraging of said curved pointed end against said dented portion, and means for detachably fastening said hand lever in selected longitudinal positions on said bar.

3. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a laterally offset prying end and an opposite handle end adapted for engagement in one hand of the user for positioning said prying end in juxtaposition to said dented portion, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and projecting laterally from said bar for engagement in and by the other hand of the user so as to afford a coordinated leveraging of said prying end against said dented portion, said bar and lever being formed with a slidable polygonal interfit permitting selectable longitudinal positioning of said lever on said bar in respect to the lateral direction of offset of said prying end, and means for detachably fastening said lever in selected longitudinal positions on said bar.

4. A pry tool as defined in claim 3 wherein said laterally offset prying end is curved from the length of said bar and tapered in cross-section to a pointed tip, the curvature of said end and reduced cross-section cooperating to permit slidable movement of said hand lever over and around said tip onto and from said bar.

5. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a prying end and an opposite handle end adapted for engagement in one hand of the user for positioning said prying end in juxtaposition to said dented portion, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and having a length projecting laterally from said bar and formed with a lengthwise extending socket opening to the outer end of said lever for receipt of a lever extension engageable by the other hand of the user so as to afford a coordinated leveraging of said prying end against said

dented portion, and means for detachably fastening said lever in selected longitudinal positions on said bar.

6. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a laterally offset prying end curved from the length of said bar and tapered in cross-section to a pointed tip and an opposite handle end having a ball shape adapted for engagement in one hand of the user for positioning said prying end in juxtaposition to said dented portion and for journaling said bar for rotation about its longitudinal axis, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and having a length projecting laterally from said bar and formed with a lengthwise extending socket opening to the outer end of said lever for receipt of a lever extension engageable by the other hand of the user so as to afford a coordinated leveraging of said prying end against said dented portion, said bar and lever being formed with a slidable polygonal interfit permitting selectable longitudinal positioning of said lever on said bar in respect to the lateral direction of offset of said prying end, and means for detachably fastening said lever in selected longitudinal positions on said bar, the curvature of said offset end and the reduction in cross-section thereof cooperating to permit sliding movement of said lever over and around said tip onto and from said bar.

7. A pry tool for smoothing out dented portions of an automobile body and the like comprising, an elongated bar having a laterally offset prying end curved from the length of said bar and tapered in cross-section to a pointed tip and an opposite handle end adapted for engagement in one hand of the user for positioning said prying end in juxtaposition to said dented portion, a hand lever slidably mounted for longitudinal adjustment on said bar to and from said handle end and having a length projecting laterally from said bar and formed with a lengthwise extending socket opening to the outer end of said lever, a second elongated bar formed similarly to said first elongated bar to provide interchangeability therewith and for insertion of its tapered curved end into said socket, said socket being formed to provide a curved interfit with said inserted end having sufficient clearance from a wall of said socket to permit the resilient flexing of said inserted end under load, so as to place said wall in face-to-face contact with the inserted end and distribute said load thereover.

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