

Built-up types of pullers

By GEOMETER

DISMANTLING pulleys, gears and sprockets from shafts generally requires the use of force, as they are commonly fitted by tapers, or on parallel diameters as light interference fits. In the latter circumstance, removal can sometimes be effected with a pair of levers, placed one each side for an even thrust—though care is required not to damage any part at the rear which is serving as a fulcrum for the levers, such as a light pressed-steel timing case which could be dented.

When the fitting is a taper, prising is only likely to be effective in the case of a small sprocket or gear. The securing nut for this can be slackened, and the sprocket or gear then prised from behind while the nut is tapped with a hammer. If it is not fitted too tightly, the sprocket or gear will thus be jarred free—but the method is only applicable to parts of moderate size and tapers of restricted length.

Other parts mounted by interference fits are ball races, and again force is required for removal, though often it is not easy to apply without a special tool. This is particularly so when bearing members must be removed separately as in the case of the type used for magneto armatures, and when a standard ball journal race is worn or damaged so that the balls are lost from between inner and outer members.

Various problems like these met in dismantling, can only be effectively surmounted by suitable pullers. But if these have to be bought, it requires a substantial outlay for tools which may not be used many times—at least by the amateur or private owner. Built-up types made from oddments of material, perhaps from the scrap-box, often serve equally well.

The general purpose type, as at **A** can be made entirely from flat material and bolts. The jaws fit over the further side of the part to be withdrawn, and the pressure screw bears on the end of

the shaft. For a V-pulley the jaws can be V-shape to fit in the belt track when a pull from over the rear flange would be likely to cause damage.

For small car or motor-cycle use, the two side plates can be steel 1/8 in. thick, and the jaws steel 5/16 in. or 3/8 in. thick held by 1/4 in. bolts. The pressure screw can be a 5/16 in. or 3/8 in. BSF bolt (depending on the thickness of the jaws), screwed through a tapped hole in the cross-bar, which is fitted through holes in the side plates made by drilling and filing. The puller can be scaled up or down as required, and the side plates drilled at different positions for a range of diameters.

For removing a duplex sprocket from a camshaft, a puller as at **B** can be made from a similar old sprocket by welding on a bar to take a pressure screw. With an old chain wrapped round the two sets of teeth, the collective resistance of the pins is ample for removing the sprocket—but for extra resistance they can always be riveted further.

The outer member of a damaged ball race can be drawn with a puller as at **C**, and the inner member of a magneto bearing with one as at **D**. For the puller at **C**, a piece of steel tubing is turned to fit in the bearing member, drilled for a circle of balls, and a steel plug is fitted inside. Drilled and filed oblong holes take a cross-bar with two pressure screws. For the puller at **D**, the principle is similar, with a ring slid over the balls; and a tapped plug for a pressure screw is held by screws or by brazing at the end of the tubing. In each case, grease secures the balls when fitting.

An impact puller consisting of a rod with a steel or cast iron sliding weight, as at **E**, is required for removing a shaft with ball race from a housing—a fitting sometimes used for axle shafts. The rod can be attached to the shaft by a nut welded at the end, or by a strap of strip metal. A straight bar can be used on a flanged shaft, and held by wheel nuts, as at **F**. Nuts as at x-x—must always be removed from bearing retainers and backplates.

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