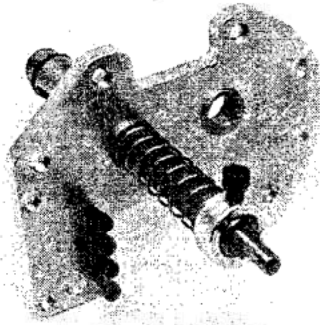


## ZIPPER'S TWIN CAM® CAM RELIEF TOOL



This cam relief tool provides clearance for the cams by removing material from the engine case, a necessity when installing almost any aftermarket cam. Up until now, technicians have generally used die-grinders to clearance the case. This method works, but is very messy, sometimes damaging to the case and time consuming. Use the cam relief tool to provide an easy and professional method of machining the engine case, even with the engine installed in the frame. It may also be used when assembling an engine from scratch, eliminating the need to set-up the case half on a milling machine. The cam relief tool makes quick work of metal removal, and leaves a very professional looking, machined finish.

### Thank you for purchasing a Zipper's Performance Product.

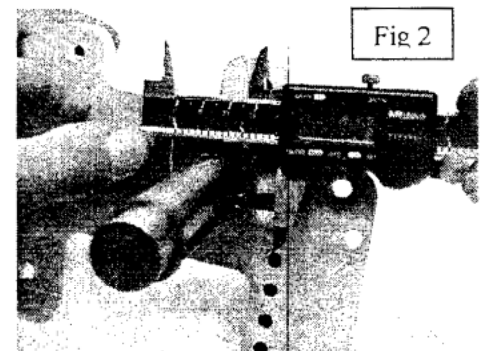
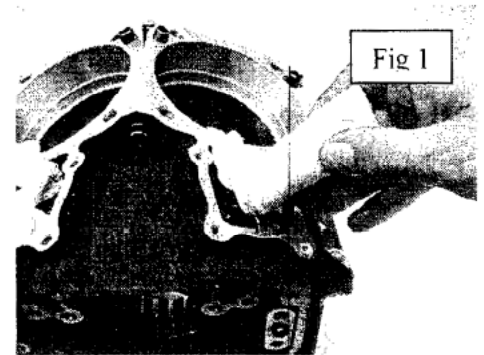
Prior to using this tool for the first time, and periodically thereafter, disassemble the spindle and sleeve assembly, and lubricate the spindle shaft.

### PLEASE READ AND UNDERSTAND THESE INSTRUCTIONS THOROUGHLY BEFORE USING YOUR TOOL!

1. Disassemble the gearcase following the instructions in the appropriate Service Manual.
2. Use contact cleaner to remove all oily residue in the gearcase, thoroughly tape or plug all exposed areas and holes, including tappet bores, to keep any chips that are produced during machining from entering the engine. *Note: A rolled up paper towel will adequately protect the tappet bores. Install from the top, only deep enough in the bore to cover the oil holes. (Fig 1)*
3. Install the spindle assembly in the rear camshaft position. Install the lock collar finger tight, positioning the screw over the recess in the spindle.

NOTE: Tool is designed so a spindle change can be performed without using a hex key wrench. Tightening the lock collar screw with a wrench is not necessary, nor is it recommended.

4. Adjust diameter of the spindle and tool bit to 1.560". Securely



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tighten the set screw holding the tool bit. (Fig 2) This adjustment allows the installation of cams up to .660" valve lift, depending on base circle diameter.

5. Install the .065" shim(s), included in the Relief Tool kit, on the cam bearing side of the sleeve. (Fig 3)
6. Install fixture over dowel pins protruding from engine case. Secure with four 1/4-20 cap screws. (Fig 4)
7. Attach a 3/8" or larger drill motor to the end of the spindle. (Fig 5)
8. With the drill motor turning the spindle at full speed (1200+ rpm works best), gradually feed in to remove material from the engine case until the tool bottoms out. Remove the drill motor.
9. For single spindle tools - Remove the tool from the engine case and remove the spindle assembly by loosening the lock collar by hand. Slide the lock collar from the spindle shaft and remove the spindle assembly from the cam plate. Lubricate the shaft. Reinstall the spindle and sleeve assembly in the front cam position. Reassemble the spindle assembly into the collar and reinstall the tool onto the engine case. Note: Position the lock collar screw over the recess in the spindle.
10. For two-spindle tools – Make sure the tool bit and lock collar screw for the second spindle is clear of the tool being used to cut.
11. When machining is complete, remove the tool and .065" shim(s) from the case. Thoroughly clean out any chips and carefully remove the tape, taking extra care to not allow metal chips to enter the engine. When changing cams, it's always a good idea to install new cam bearings in the case, using Jim's® Inner Cam Bearing Removal Tool, Zipper's P/N 758-279 and Jim's® Inner Cam Bearing Installer, Zipper's P/N 758-7-278. This should be done AFTER the machining is complete!
12. Install the cam support plate, with camshafts installed. Rotate the camshafts, checking to ensure proper clearance.
13. Reassemble the cam chest according to the Service Manual.

### ... NOTES...

Since only a small portion of the engine case gets cut away, your cut will be an "interrupted cut". Don't let this bother you, just keep a smooth, steady feed rate. Take your time using the tool until you are comfortable with it. If the tool bit gets dull, use a "green" wheel (for carbide) on your bench grinder to re-sharpen. Replacement tool bits are available from Zipper's, part # 713-903.

Fig 3

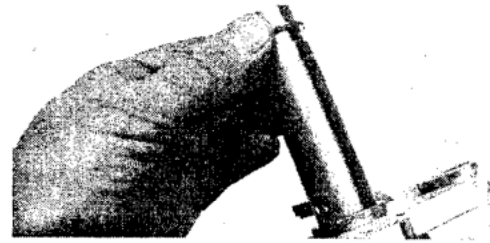


Fig 4

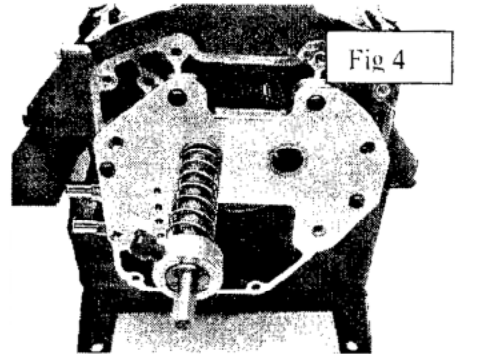


Fig 5

