

## **Tools & Production, Inc.**

### **D. GEAR ADJUSTMENTS**

**RADIAL TIMING** Under normal operating conditions, it will not be necessary to adjust the radial timing gear (i.e.: the die gear). However, if the relationship between the punch and die gears must be changed, all punches should first be removed from the punch cylinder. Then complete the following:

1. Use two blocks and a 6" C-clamp to block both gears.
2. Loosen all but one of the hex head bolts on the die gear face.
3. Determine the direction which the die cylinder or ring is to be moved. A dial indicator can be used (i.e.: placed in one of the dies) to keep track of the die cylinder or ring movement.
4. Loosen the remaining hex bolt, and move the die cylinder or ring as required.
5. Rotate the 3/8 square "radial timing cam" on the die gear face.
6. Retighten the bolt which was loosened in Step (4), and remove the two gear blocks.
7. Install one punch in the punch tooling, and check for correct shearing.
8. Repeat Steps (4) through (6) above until the proper shear pattern is obtained.
9. Tighten all hex bolts.

### **GEAR BACKLASH**

Gear backlash cannot be effectively felt with the punches engaged. To properly check for and correct for an excessive backlash condition do the following:

- Remove all punches.
- Rotate the punch unit around by hand and note the rotational resistance or lack of resistance.
- Tighten the gear backlash per instructions below. It is important to observe the movement between the two gear halves. If no movement is observed then the gear halves have bonded together and must be removed and cleaned.
- Rotate the punch unit around by hand and note the additional rotational resistance. If no additional resistance has been noted then backlash is probably still present. It may be necessary to remove the backlash 2 or 3 times until satisfied with the rotational resistance.
- Replace and shear in only one punch at a time.

To remove backlash, complete the following:

1. Loosen all hex bolts on the punch gear face.
2. Block that half of the punch gear which is closest to the frame on the right side.
3. Rotate the "backlash cam" clockwise using a 3/8" wrench. Torque required to remove backlash: 75 in-lbs. The split gear (anti-backlash) gear segments must move freely for this torque to be effective.
4. Tighten all "hex bolts" while applying clockwise pressure on the "backlash cam".