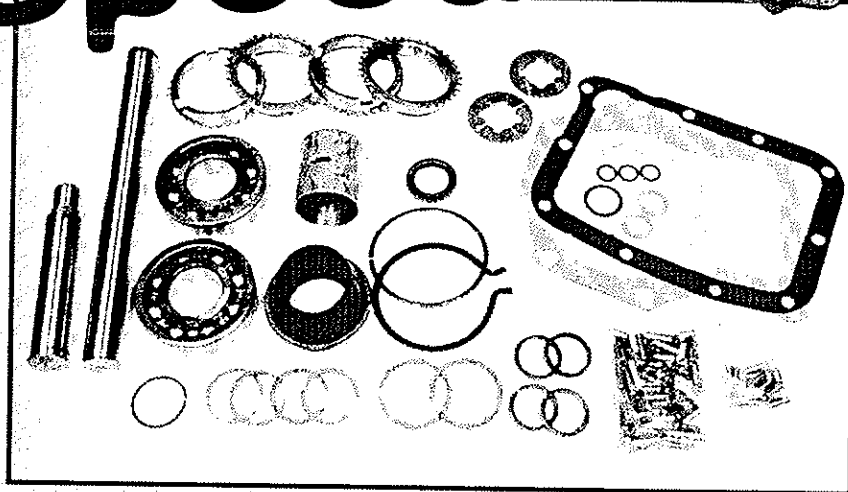
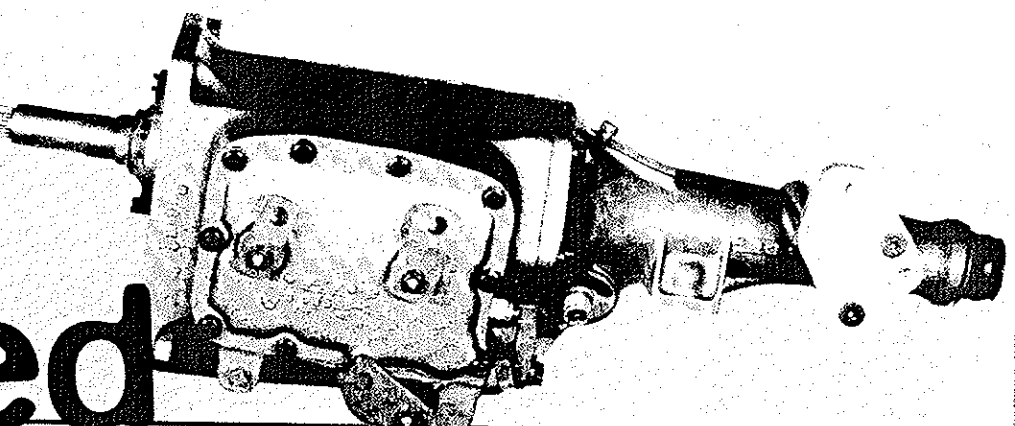


# Built Four Speed



hand, rebuilding a four-speed manual tranny is no tougher than wrenching on other major drivetrain components.

The hardest part is scoring the parts to do the rebuild—Pep Boys won't have a kit for a 30-year-old Mopar tranny. This is where it pays to get hooked-up with a specialist in the type of gearbox you're dissecting. For Mopar 'boxes, one of the best sources we know of is Brewer's Performance Motor Parts. We ordered up a rebuild kit, a couple of new shafts (countershaft and reverse), and the all-important synchro stop rings. Stung again, we didn't realize that our trans was one of the oddball small-output shaft (904 auto-size) 'boxes, so we ended up ordering the wrong rear bearing, bushing, and seal. Parts scrounging netted us a new rear seal (N.O.S. at our local dealer), a PN 207 rear bearing at NAPA, and a small-yoke bushing from a 904 auto at a local trans shop.

We'll show you how we tore it down and bolted it back together without any of the obscure special tools shown in the service manual. The procedures are pretty much the same for any of the many A-833-based gearboxes used by Mopar from 1964 to 1990. If Freiburger manages to grenade it (he'll try), we'll undoubtedly be reading all about it.

Mopar tranny specialist Brewer's Performance Motor Parts stocks the works for an A-833 rebuild. Aside from the rebuild kit, we ordered new counter and reverse shafts (left) to take the dragstrip punishment and keep tranny noise to a minimum—as if we'd even hear it in the Duster.

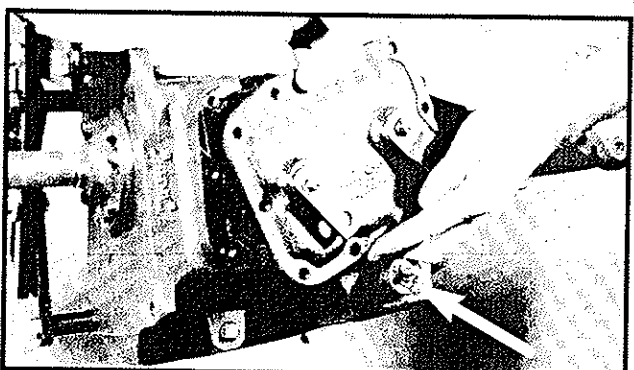
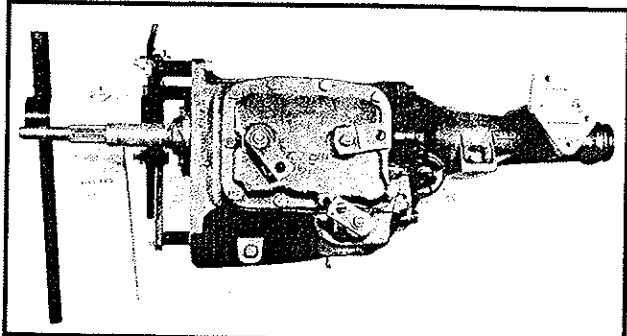
BY STEVE DULCICH

Photos by Steve Dulcich

**When bolting together our budget Duster (Nov. '99), Car Craft Editor David Freiburger came up one throw short**

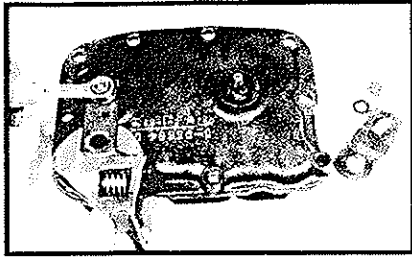
with the Duster's stock three-speed tranny. The three-speed was offed, and a seasoned short-extension A-body A-833 four-gear was wran-

gled under the floorboards. Play the low-buck game long enough and eventually even the best get bit—the four-speed turned out to be a bogus buy. Locked levers meant that, at best, the internal linkage was fragged or, at worst, gears were grenaded. We don't get teary-eyed about trashed parts, but to save our budget the agony, we pulled out the wrenches for an in-house rebuild. With the correct factory service manual at

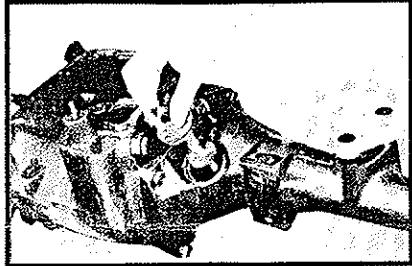


**1** Rather than rolling it around like pizza dough on the benchtop, mount the tranny on an engine stand for the rebuild. Hang it with at least three bolts, and make sure to position it so there is clearance for the countershaft to be driven out the front.

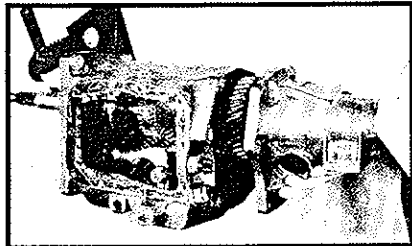
**2** Begin by removing the side cover after the Reverse shift lever is pulled (arrow). Leave the two forward shift levers on the cover or the internal shift mechanism could fly apart.



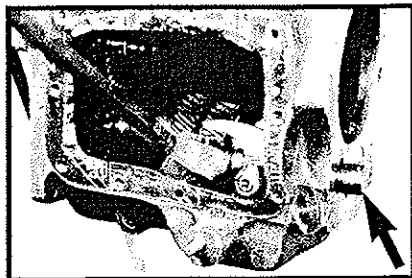
**3** Unbolt the shift levers from the cover and remove the shift mechanism.



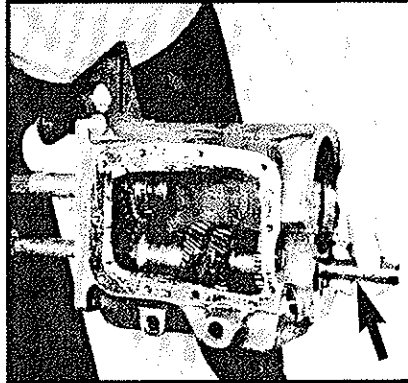
**4** The speedo gear comes out next. The clever swap-meet tape "protecting" the end of the speedo adapter hid stripped-off threads where the cable hooks. No biggie: Common slush-box speedo adapters interchange.



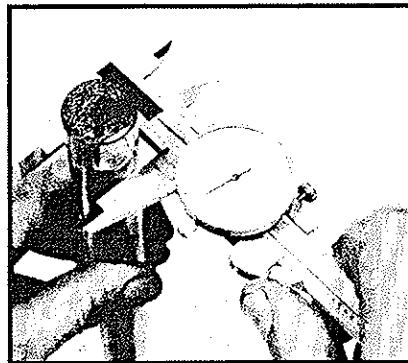
**5** The rear extension assembly comes off next, complete with the mainshaft and all the speed gears and synchros. Move the front (Third-to-Fourth) synchro forward, set the Reverse gear to the center of its shaft, and pull the trans apart. Fortunately, all these gears looked cherry.



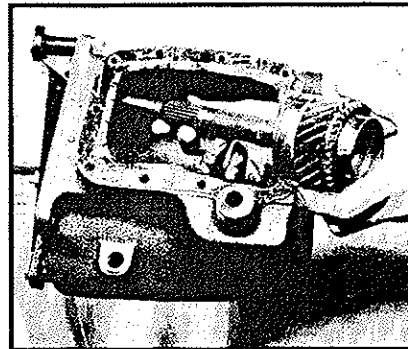
**6** The service manual calls for shaft-pressing tool C-3688 to remove the Reverse shaft (*arrow*) and gear. We wedged ours out with a rusty crowbar. If it's stuck, a setup similar to the factory tool can be rigged or a long brass drift angled in. Slide out the Reverse shift mechanism too.



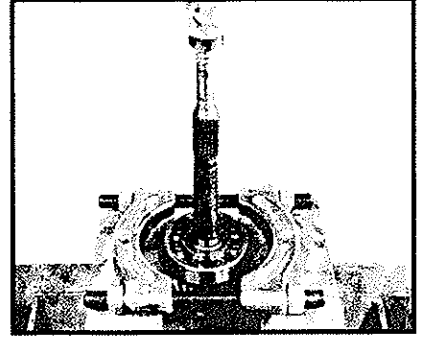
**7** The countershaft (*arrow*) comes out to let the countergears drop down from the pinion gear. A  $\frac{1}{8}$ -inch tube 9 $\frac{1}{2}$  inches long will keep the bearings in place as the countershaft is driven out, but it's not really needed yet since all the bearings are going to be replaced.



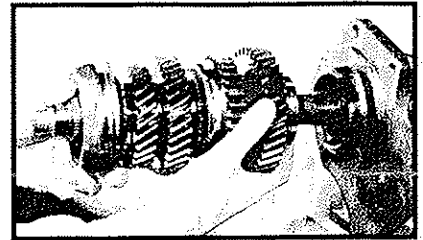
**8** If the trans is noisy in every gear but a direct 1.0:1, a worn countershaft and its bearings are usually the culprits (this goes for most any manual trans). The shaft is hardened only a couple of thousandths deep, and you can actually see the difference in the metal if it's worn through the hard layer. A couple of thou wear, or a maimed bearing surface, and it's time to trash it. If a new shaft is unobtainable, hard-chroming and centerless grinding can save the old part.



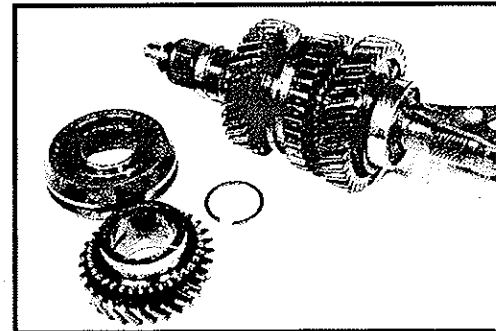
**9** With the countergears sitting on the bottom of the case, remove the bearing retainer and snap ring, then slide out the pinion. Now reach in and lift out the countergears.



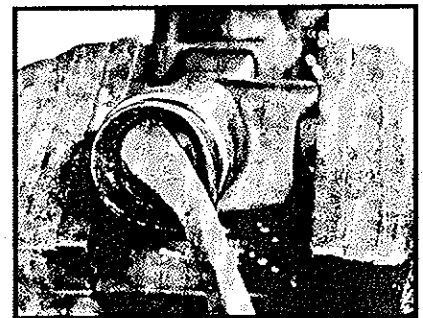
**10** Remove the shaft snap ring and press off the pinion bearing.



**11** Moving on to the tailshaft, remove the gearset and mainshaft after releasing the retaining ring at the front of the extension.

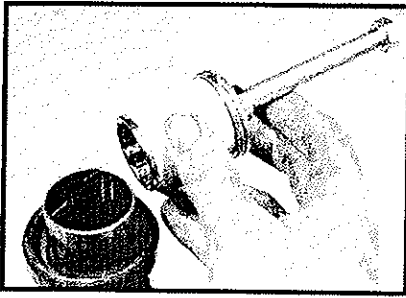


**12** Unloading the gears from the mainshaft is a matter of pulling snap rings and sliding the gears off. At the front, the Third-to-Fourth synchro and Third-speed gear come off. At the rear, the bearing is pressed off, followed by First gear, the First-to-Second synchro, and then Second gear. Make sure you keep track of the order of the parts, or have a detailed service manual handy.

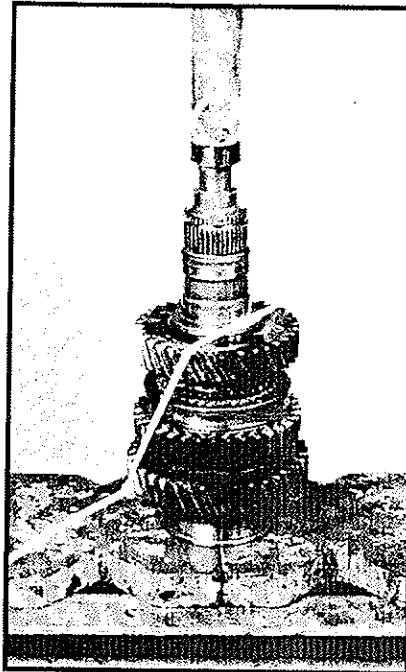


**13** Our Reverse shaft remover also works well on the rear seal.

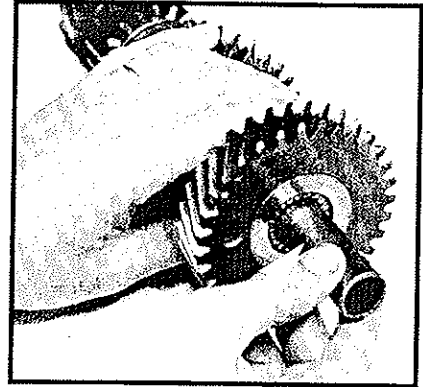
## Built Four Speed



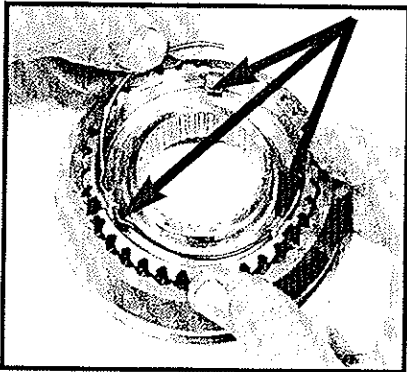
**14** The rear tailshaft bushing was worn down to the steel backing. We didn't have the special tool (PN C-3974), so we made this bushing driver out of a socket, a long 1/2-inch bolt, and some washers. A nut inside the socket holds it together. The washers need to be slightly smaller than the bushing's od to hammer the old bushing out. A couple of winds of masking tape protect the new bushing's inner diameter and have to be a loose fit inside the bushing. Line up the oil hole, hammer in the bushing, then install a new seal.



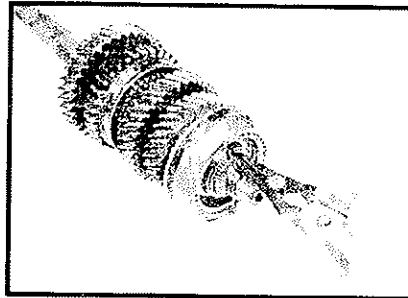
**17** With all of the components loaded to the back of the mainshaft, the new bearing is pressed on (outer snap-ring groove forward with the large PN 308 bearing). To keep the gears from sliding back with the shaft upright, the assembly was temporarily tied back with nylon ties and then loaded into the press. Make sure the press platform supports the bearing at the inner race since pressing the bearings by loading the outer race will trash 'em.



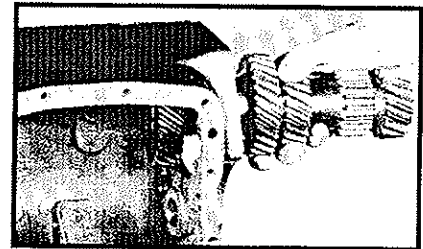
**20** The countergear bore is loaded first with the center spacer, and then with two gangs of new needle bearings with spacer washers between them and at each end. Heavy grease holds the bearings in place. An arbor tool (*arrow*) is needed to keep the bearings from falling out when driving in the countershaft. The arbor needs to fit the id of the bearing packs and be just long enough to hang the thrust bearings at each end. We used to use a sawed-off broom handle shimmed out to the correct diameter with wraps of tape, until we found a jack handle with exactly the right diameter (1 1/8 inch), which we hacksawed to length (9 1/8 inches).



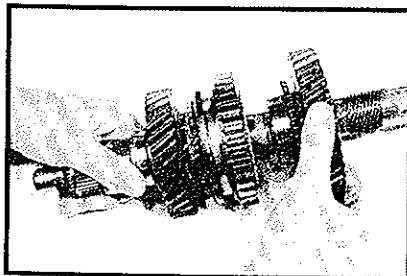
**15** To begin reassembly, we cleaned up and reassembled the synchros. Make sure the inner hub is facing the right way and is matched to the correct outer sleeve. Lay the synchro hub on top of a stop ring to hold the parts in alignment, load in the three synchro struts (*arrows*), and wind in the front and rear springs, centering on two different struts. The new stop rings go in as the gears are loaded on the shaft.



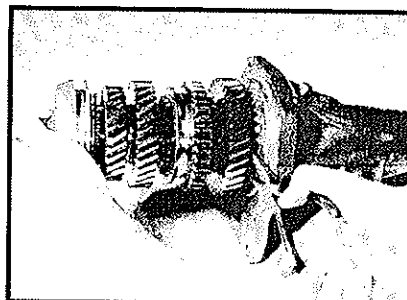
**18** The Third gear and the Third-to-Fourth synchro load from the front of the shaft.



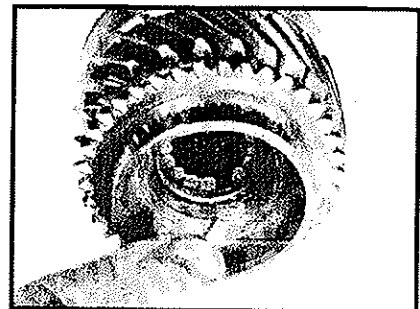
**21** The new thrust bearings were pasted at each end of the gear cluster with grease, while the arbor sticks out just enough to center them with the bearings. The outer tangs on the thrust washers are lined up with the slots in the case, and the cluster is dropped in position at bottom of the tranny.



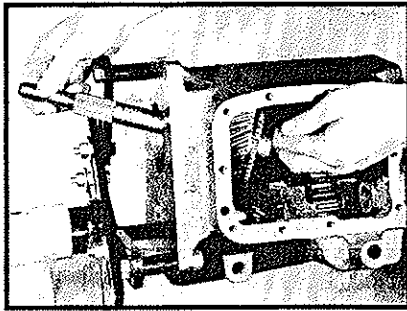
**16** The gears and synchros were cleaned, lubed with gear oil, and reloaded on the mainshaft. Make sure that the lugs or slots in the stop rings line up with the struts on the synchro hub so they seat properly.



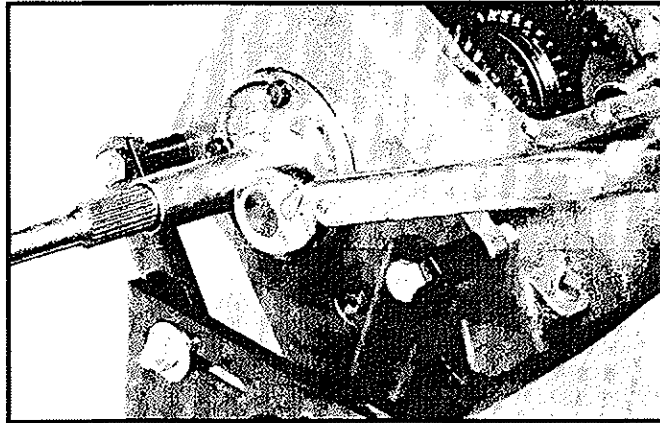
**19** The loaded mainshaft slides into the extension and is held in place by the lock ring behind the bearing.



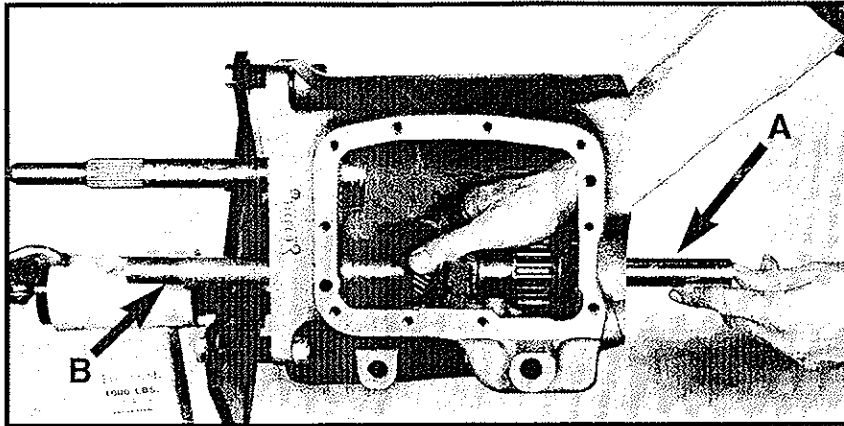
**22** A new bearing is pressed onto the front of the pinion (outer snap-ring groove forward) and locked down with a snap ring. Then, new rollers are loaded in the flip side and held in with grease.



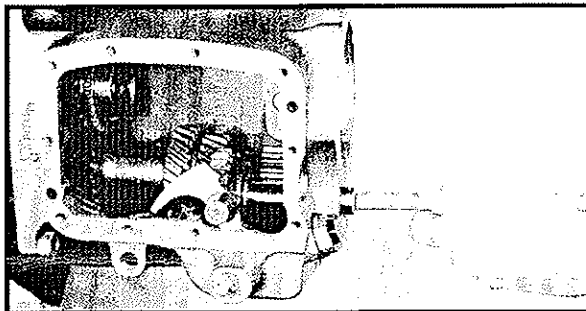
**23** The pinion is installed from the rear on this tranny. With large-bearing trannies, the pinion goes in from the front.



**27** A new seal is installed in the front bearing retainer and lubed (lip to the tranny side), the snap-ring is installed on the bearing, and the retainer torqued in place. Use seaant on the bolts to keep oil from drooling out.



**24** Next, the countergear cluster is lifted to mesh with the pinion, and the countershaft is pushed in. Make sure the thrust bearings are lined up. As the countershaft (A) goes in, the arbor (B) slides out, so the bearings are always held in place. A Woodruff key goes at the end of the shaft to keep it from spinning in the case. Some hammer-and-drift work is required to seat the shaft once it reaches the opposite side of the case. Seal the bellhousing side of the bore flush with silicone once the shaft is in.

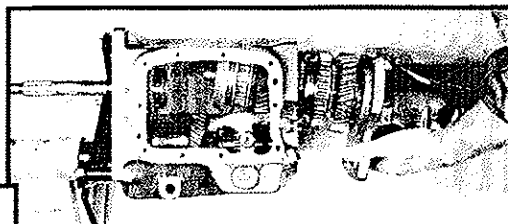


**25** Now for Reverse. Start with the shift mechanism, a new O-ring, and grease. Line up the gear with its collar engaged in the shift fork and install the shaft. Finish off with the reverse detent parts and the back-up light switch.

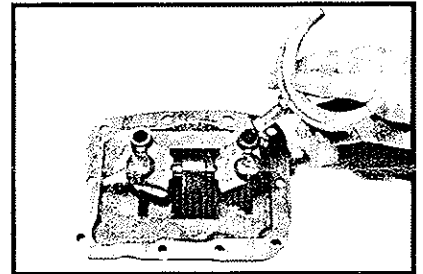
**26** Now it all goes back together. To gain clearance, pull the pinion shaft as far forward as it'll go, slide the Third-to-Fourth synchro forward (don't overextend it), and set the Reverse gear to the

### TORQUE SPECS

Back-up light switch	15 lb-ft
Drive pinion retainer	30 lb-ft
Extension housing	50 lb-ft
Side cover	15 lb-ft
Reverse detent retainer	50 lb-ft
Reverse detent plug	24 lb-ft
Shift lever nuts	18 lb-ft



center position on the shaft. Coat the new gasket with grease, and install the extension. The extension should seat fully without forcing, unless something (like a roller bearing or stop ring) has fallen out of position. Bolt up the tailshaft housing and flip both synchros back to Neutral.



**28** The side cover linkage is reassembled with new O-rings and grease on the shift-lever shafts. This pre-'71 trans uses a ball detent-type lockout system, while later units use a more complex and less reliable scissor (double-lever detent) mechanism. The Third-to-Fourth shift fork can go on, but not the First-to-Second.



**29** Before bolting up the side cover, spin the trans by the input shaft and squirt some gear oil over each gear. The side cover gasket gets a coat of grease, as do the business ends of the shift forks, and then the cover is installed. The First-to-Second shift fork has to be hooked into the synchro and the cover lined up. Except for the two long bolts on each side of the reverse lever, the bolts are shouldered to align with the cover. One has an extra-long shoulder, which acts as a dowel (arrow). Bolt down the side cover, fill with 8½ pints of 80W-90 gear oil, and your four-gear is ready for abuse! ●

### SOURCE

**BREWER'S PERFORMANCE  
MOTOR PARTS**  
Dept. PPC-SIP  
2560 S. State Rt. 48  
Ludlow Falls, OH 45339  
937/698-4259

Hot Rod Mopar Resto Guide 73