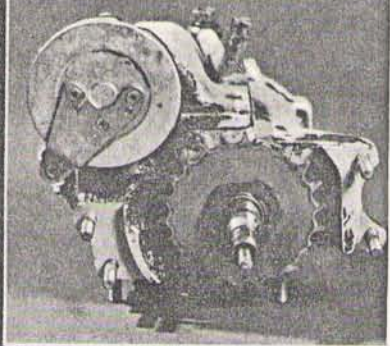


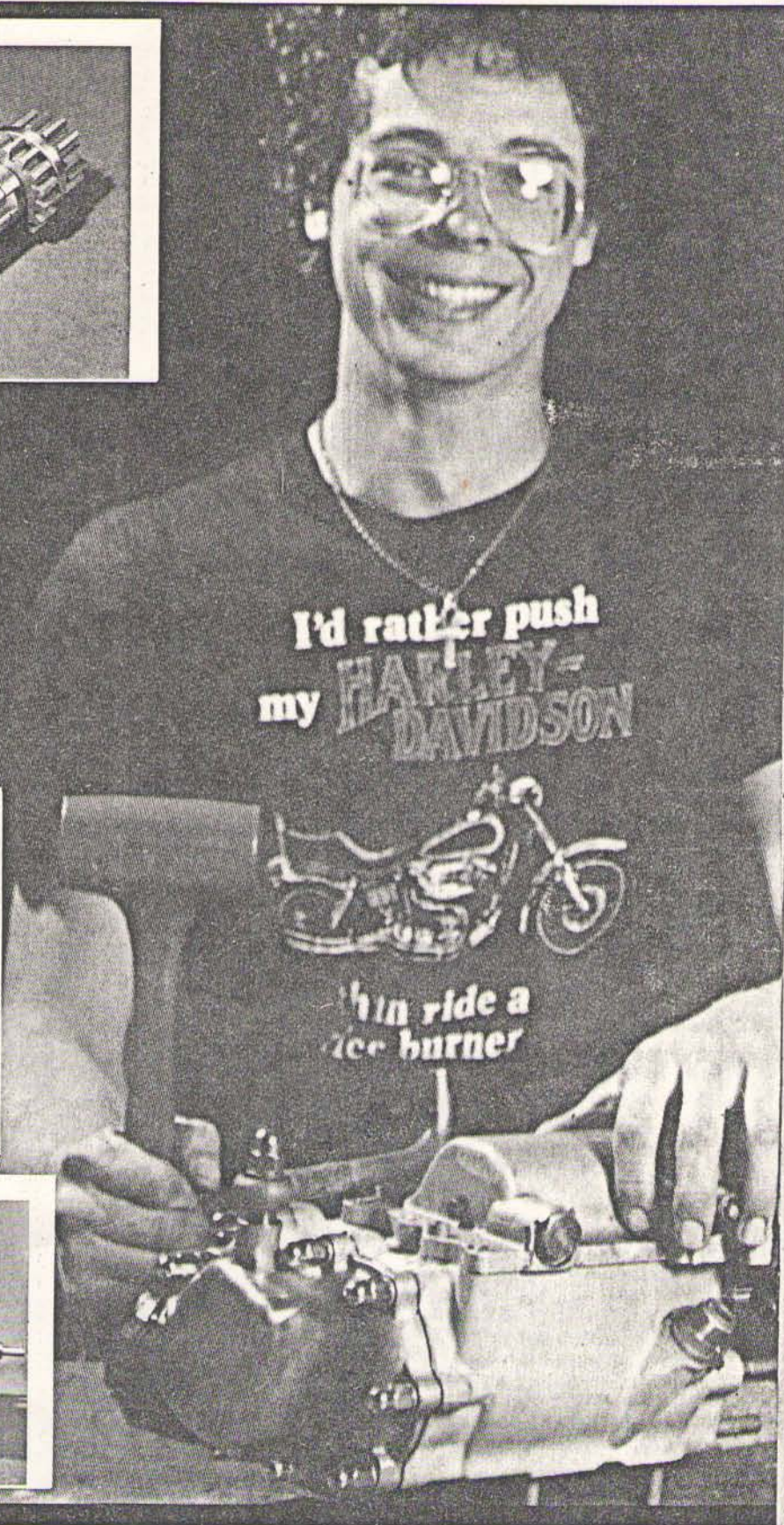
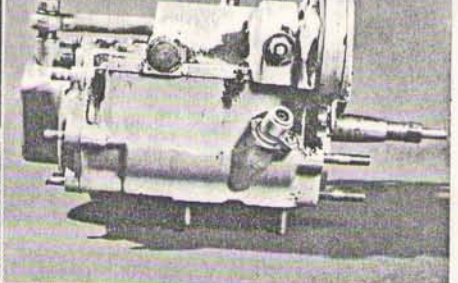
Andrews transmission gears are without doubt the finest designed and made gears available for the Harley-Davidson 74 tranny. Just eye inspection indicates they are better machined than the stock, and are, in fact, a slightly harder alloy treat for superb wear and fit. The standard Andrews set is "close ratio," which means the stock gear set large ratio gap between first and second has been eliminated by raising the low gear ratio and lowering the second gear ratio. Gear ratio in the Andrews is more nearly uniform increase increments throughout the shifting range. With the Andrews gear set you can make it across the intersection without shifting, and you don't get that "overdrive" lunge when you make second.

Just so we're all talking about the same thing from now on, here are the faces of the 74 tranny as we will refer to them in the Instructions.

LEFT SIDE



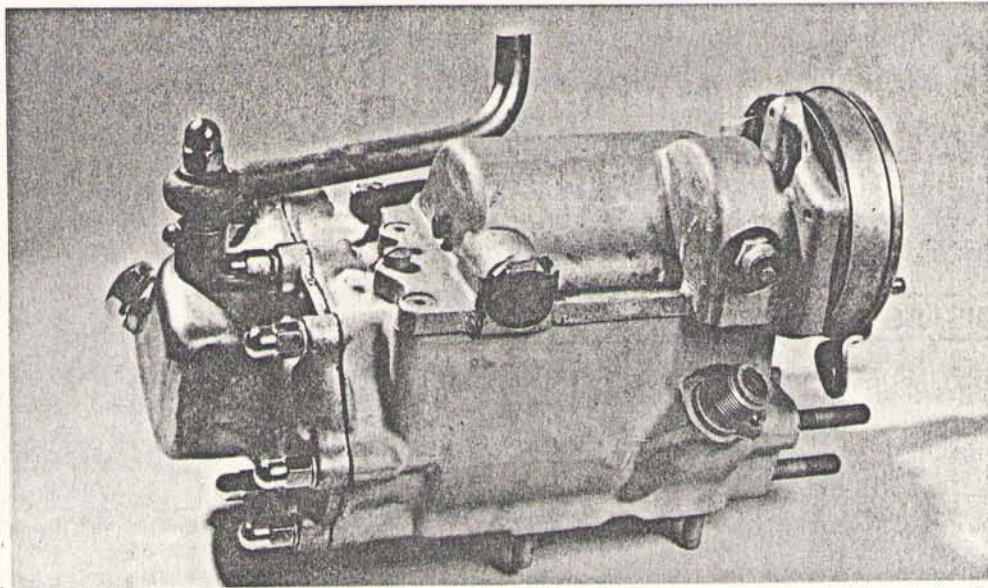
FRONT



Smilin' Bob Taylor, Harley Wrench Extraordinaire, holding his favorite Harley tool (just Jokin', Willy G.) and an overhauled 74 tranny. The outside, except for the boss Colony hardware looks pretty so-so. But inside are silk smooth Andrews gears fine tuned to slick shift, all done by the flick of Bob's wrist and the following processes.

# HOW TO WRENCH YOUR 74 TRANNY

*A Flix Fix Repair Procedure*



Follow the flix and anybody, even you, can repair a tranny.

With 125 photo's to go by, who could fuck up?

**W**e don't mean to take anything away from the motorcycle mechanic. A good one is just as talented and has gone through just as long a training period as a good doctor, but let's face facts in proper perspective: much of mechanic work is (a) the proper procedure, (b) knowing the tricks of the trade and how to apply them.

Up till now all the published material on motorcycle repair procedure has been mostly words with a few key photos or drawings illustrating complicated or key points. Such material is sufficient for the experienced mechanic, but hardly an adequate guide for the weekend warrior, those of us who get kicks out of doing some of our own wrench work, but are not experts.

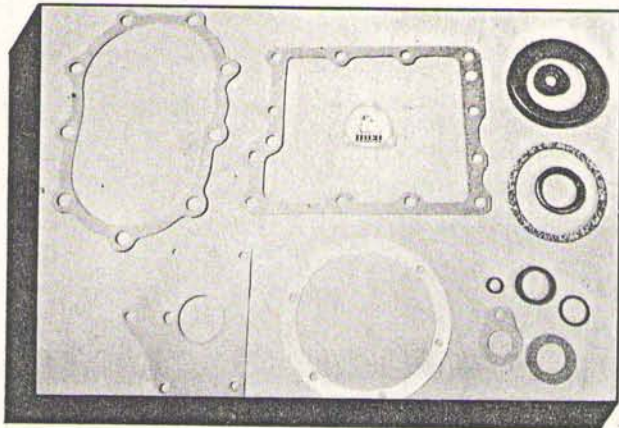
So here, we think for the first time at this scope, is a repair procedure designed for the beginner, the home mechanic, in which we use photos to tell the story. These are backed up by a minimum of

words in the form of captions. They say a photo is worth a thousand words, and in the case of mechanical repair work, we believe it.

We have selected for our first Flix Fix procedure the operation of disassembling, inspection and repair, and then reassembling a Harley 74 tranny. We chose it because many dedicated riders are wanting to replace stock gears with the better made and better ratio Andrews close-ratio set, and most trannies are just flat out of shifting adjustment and need some touch up work. You can bet the farm that anybody with hard shift problems, anyone who speed shifts, and anyone who tromps the shifter hard, is harboring some chipped gears and shifter dogs, and is in need of this procedure.

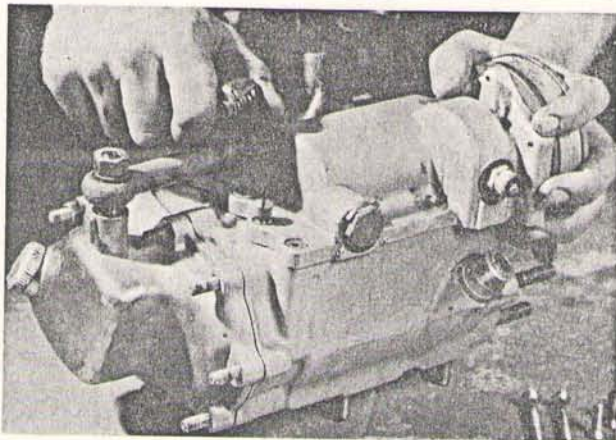
The procedure shown here was done for *Supercycle* by baby faced Bob Taylor, but don't let his sweet sixteen appearance fool you. He is a seasoned Harley mechanic employed by H-D of Westminster and

knows his' stuff. We guarantee that if you can look at pictures, read a few minimal captions, and follow Bob's hands with your own you'll end up with a first class tranny, every bit as good as any pro could make it. Happy wrenching.

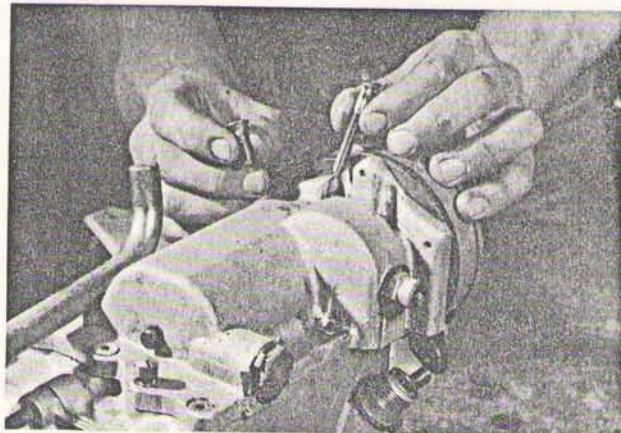


We used IBCO gaskets (No. IB-351-HDT) all around except for the mainshaft oil seal gasket. We regard IBCO as the finest quality gaskets available. IBCO is one of only a few makers who carefully select gasket stock material on an individual performance spec application, rather than just punching all the gaskets out of a single piece of semi-suitable material.

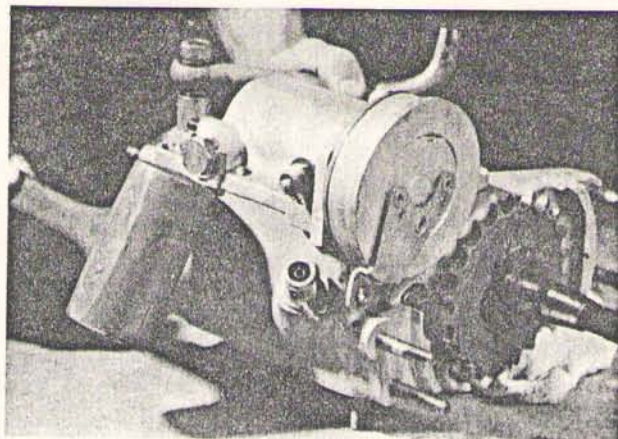
## DISASSEMBLY



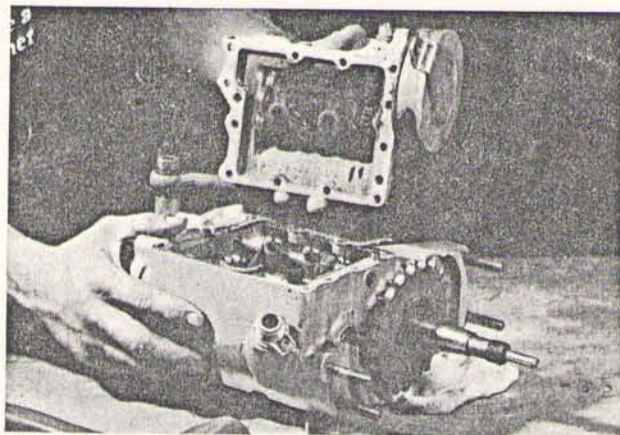
1. Remove 12 *shifter cover* screws. Make sure allen wrench is fully seated in screw slot before twisting. If screw cannot be removed, drill about 1/8 inch deep in wrench hole with 1/8" drill to relieve pressure on screwhead taper.



2. Notice shifter cover screws are of two types and lengths. Hands hold examples of two lengths, both flathead screws. Partially extracted fillerhead screw in foreground is tranny case breather and must be installed at this location. We'll tell you where they go during assembly.



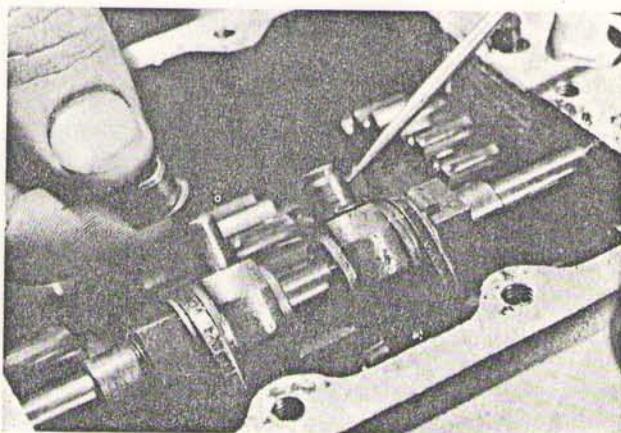
3. Drive off *shifter cover* with soft metal or shot-filled hammer. Strike (softly) cam follower retainer, never shifter pawl case.



4. With shifter cover removed, take time to examine gear clusters and locations of various parts.

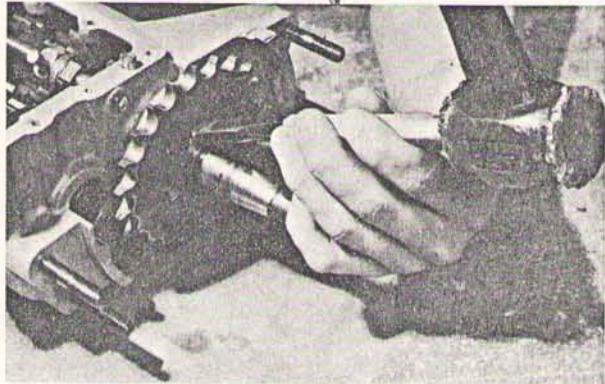
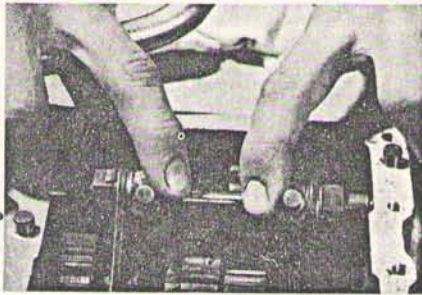


5. Remove gasket from tranny and shifter cover faces.



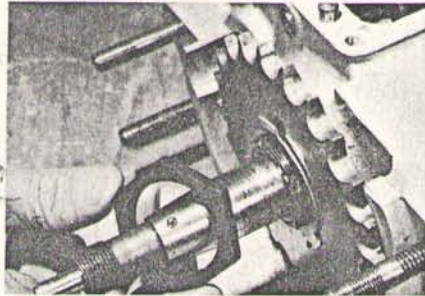
6. Remove *shifter finger rollers* from shifter fingers and drain oil from tranny case by inverting it.

7. Shift tranny into any two gears so mainshaft doesn't rotate. Do this by pushing shifter forks apart or together.

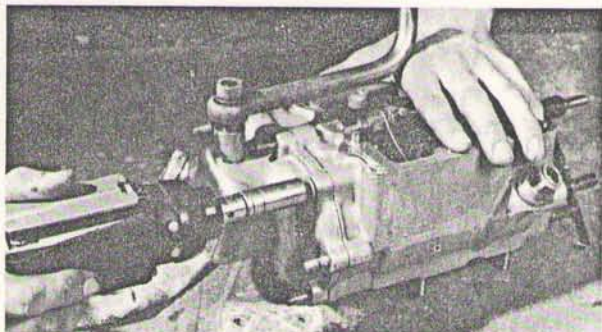
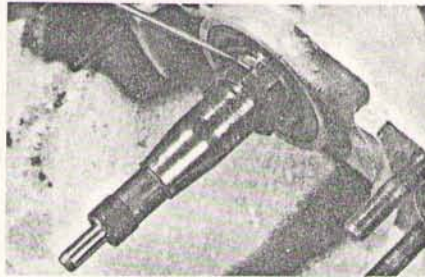


8. With mallet and cold chisel bend back ear on mainshaft sprocket lock nut.

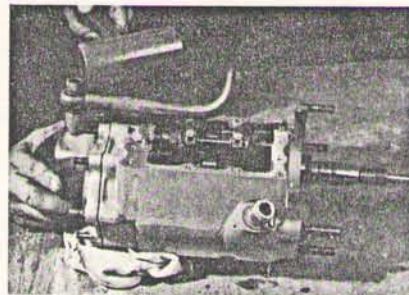
9. Remove sprocket lock nut and lock washer. Nut has lefthand threads.



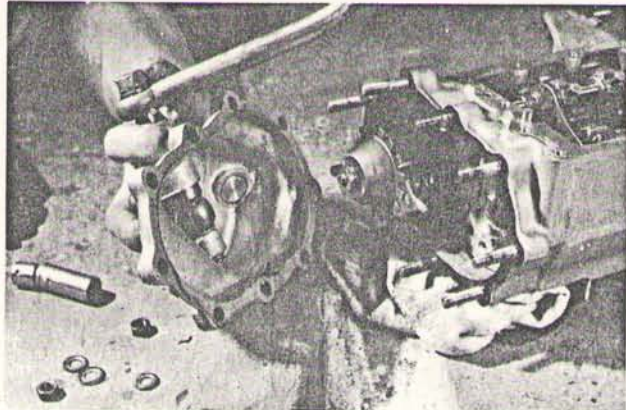
10. Remove sprocket and small main drive gear spacer key from slot or keyway in main drive gear.



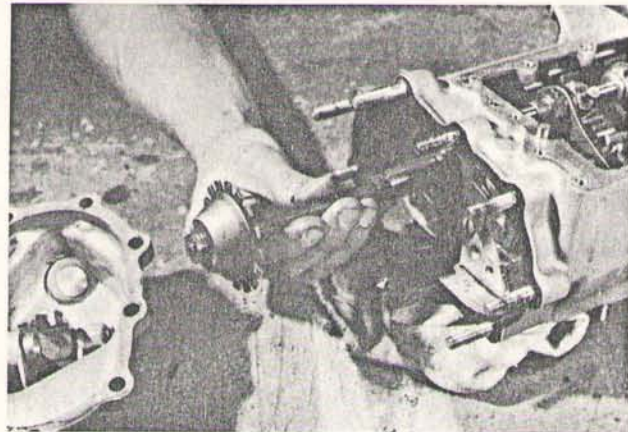
11. Remove nuts and washers from sidecover studs. Loosen oil filler plug.



12. Tap clutch release lever shaft lightly to break gasket seal.



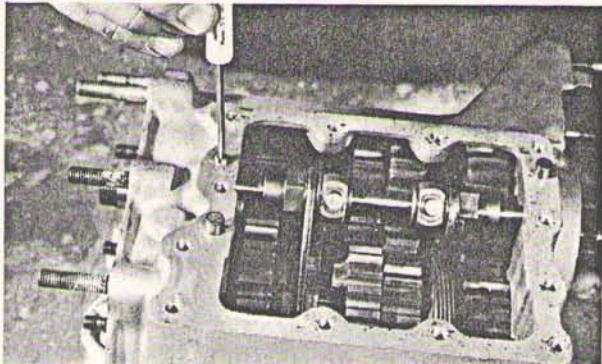
13. Remove sidecover.



14. Remove clutch release bearing and pushrod assembly.

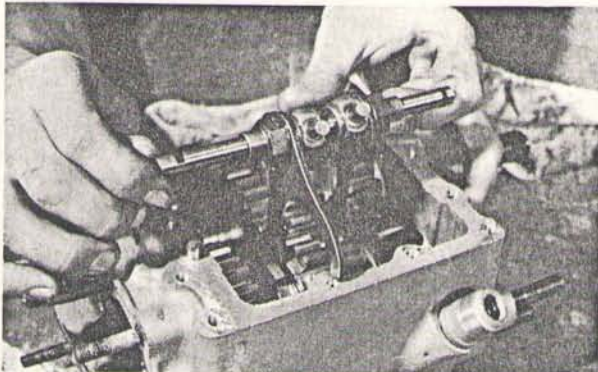


15. Remove gasket from tranny and sidecover faces. Note hole in tranny face which may be used to drift the shifter fork shaft from the case.

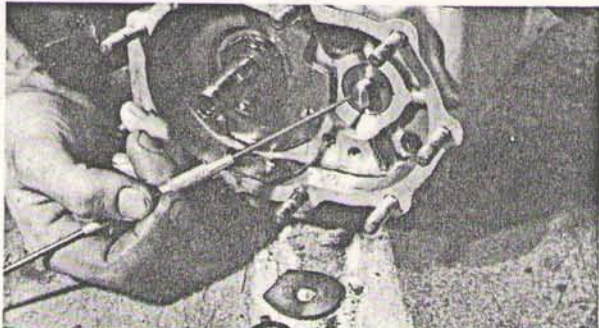


16. Remove the *lock screw* from right end of tranny case shifter cover face. This shouldered screw locks the shifter fork shaft in place.

17. Drive *shifter fork shaft* out left side of tranny, sliding shifter fork assemblies along it as it is extracted. Use blunted nail as drift.

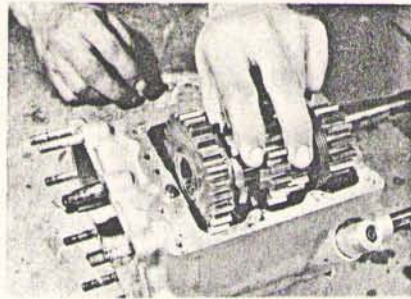
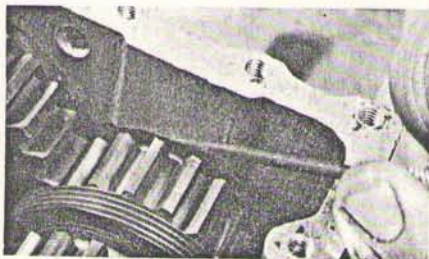


18. Lift *shifter fork assemblies* from tranny case and immediately install them on the shifter fork shaft in their correct positions.



19. Remove the *countershaft* by lightly driving it from right to left after removing *countershaft nut, lock washer, and lock plate* from keyed shaft end.

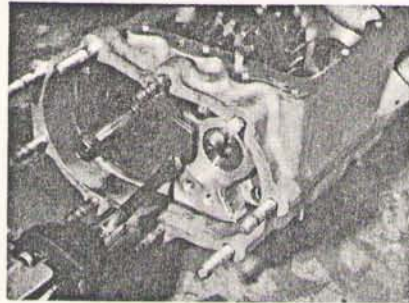
20. The *countershaft gear cluster* cannot be lifted out because the fourth gear extends under case recess lip, as shown by pointer.



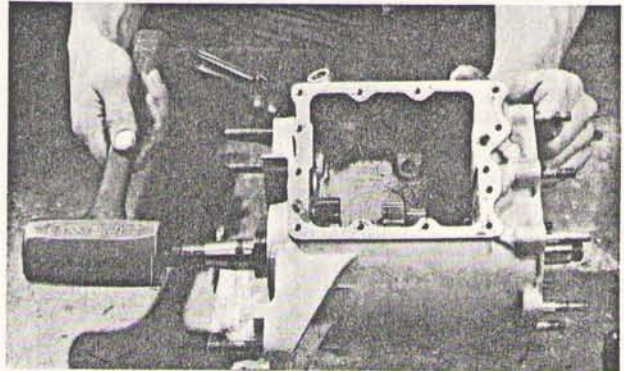
21. Invert tranny case, making sure you hold *countershaft gear cluster* in place, and shake out *countershaft end washer*. Remove *countershaft gear cluster* by lifting it out top of tranny case.



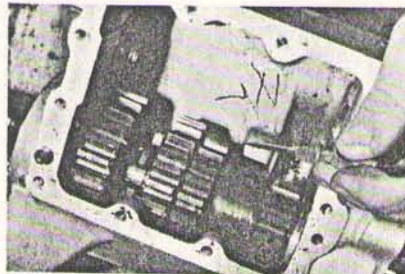
22. Shafts prior to 1976 serial number U8959 will likely have loose roller bearings in both ends. Later trannies have caged rollers. If yours is the former kind, remove the loose rollers and bag them in individual envelopes which are marked properly. You cannot interchange bearing rollers.



23. Remove the four *bearing plate screws, bearing plate, ball bearing nut, and lock washer* from right end of mainshaft.

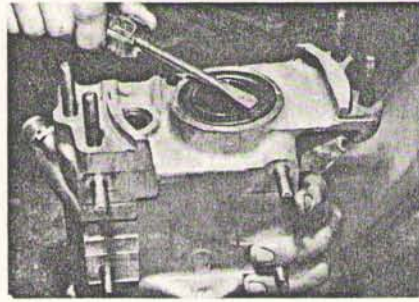
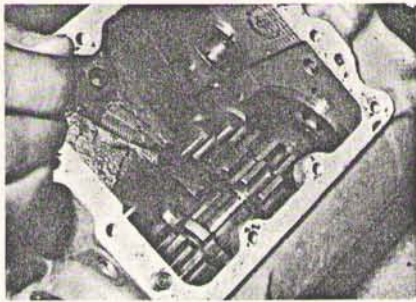


24. Gently tap mainshaft from left to right approximately  $\frac{1}{2}$  inch, or until the mainshaft bearing clears the case opening.

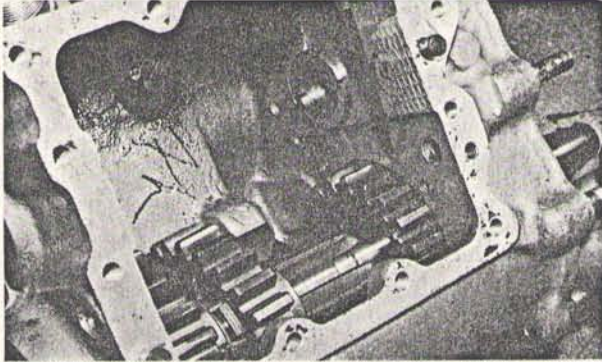


25. Mainshaft cannot be driven completely out because second gear will strike cast boss in tranny case at location shown.

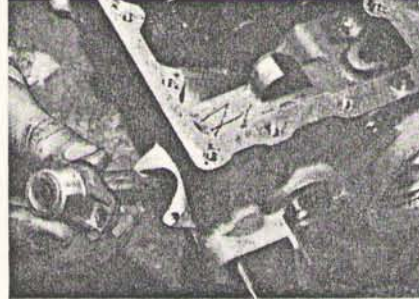
26. With scriber or hooked awl, pry lock ring out of its groove in mainshaft and move it onto splines.



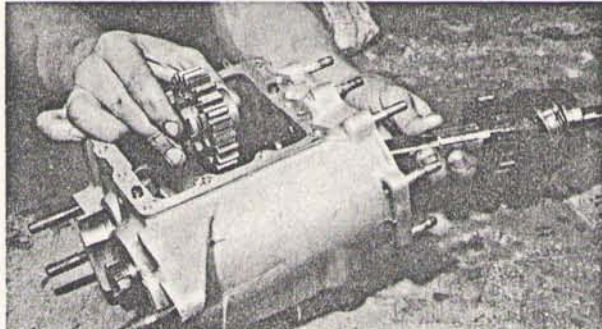
31. Pry main drive oil seal from left case opening with screwdriver. Remove main drive gear spacer and cork oil seal washer.



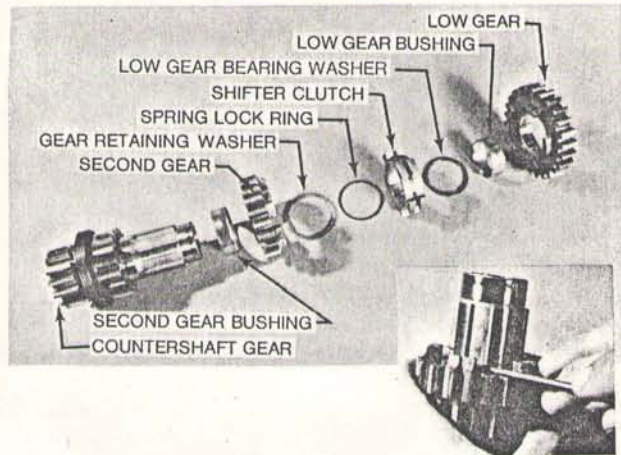
27. Continue driving mainshaft toward right side of case until large end of second and low gear approaches case hole. Guide gear into case opening and tap mainshaft assembly out.



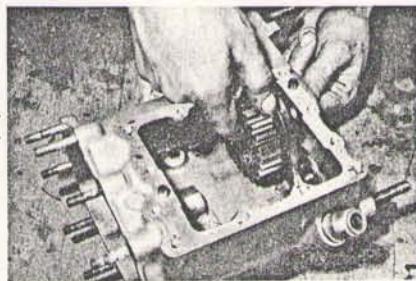
32. Remove speedometer drive unit.



28. Remove mainshaft, mainshaft bearing, bearing housing, and second gear from right case side. Slip third gear, retaining washer, lock ring, and shifter clutch off shaft and out top of tranny.

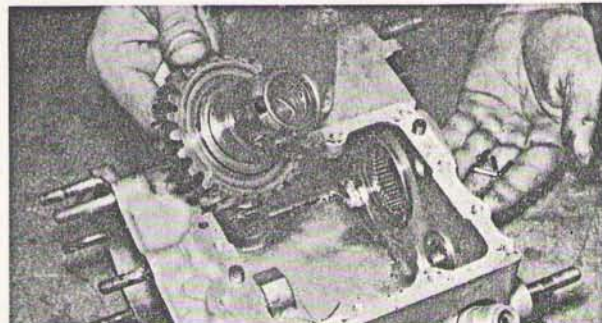


29. Push fourth gear into case and remove.

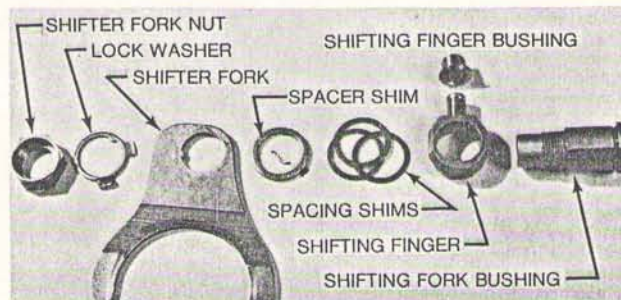


33. To disassemble countershaft gear cluster, slip low gear, low gear bushing, bearing washer, and shifter clutch off right end of countershaft. Remove spiral lock ring from its groove and slip it off countershaft gear splines. Remove gear retaining washer, second gear, and gear bushing. Speedometer gear must be pressed from countershaft gear if required.

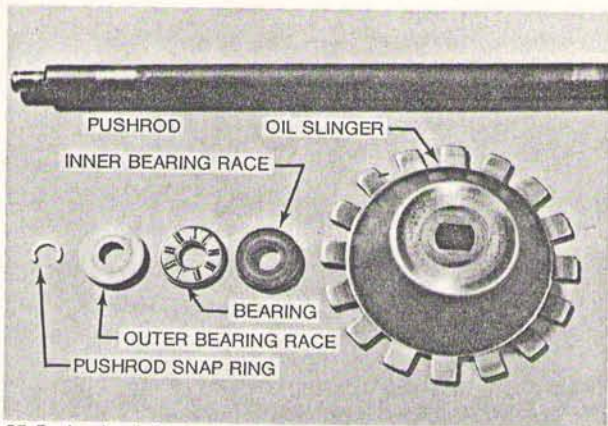
## INSPECTION AND CHECK FITTING



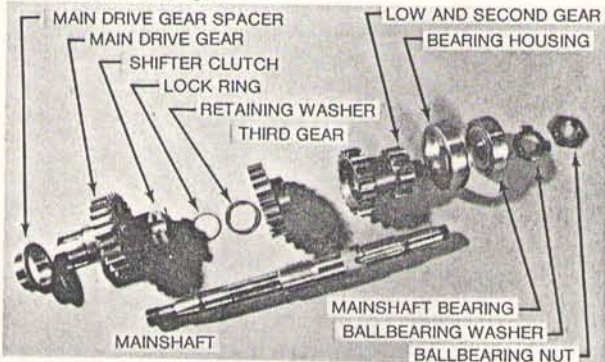
30. Remove 44 fourth gear bearings and bag them in a labeled container.



34. Shifter fork assemblies must be taken apart to determine if shifter fork is flat. However, don't disassemble them unless you suspect this is the case. Inspect shifter fork for wear. Check shifter fork bushing fit on shifter fork shaft. It should be a free-spinning fit without play. If bushing is loose it must be replaced.

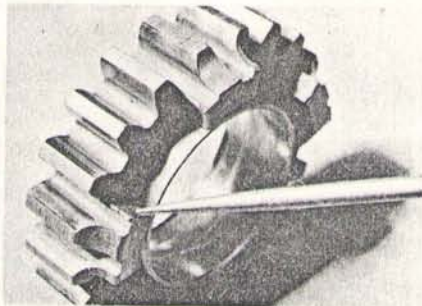


35. Pushrod and clutch release bearing assembly must be disassembled to determine if bearing race faces are in serviceable condition. Remove *snap ring* from groove in end of pushrod and remove *outer race, bearing, inner race, and oil slinger*.

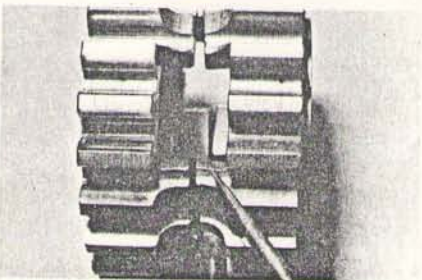


36. Mainshaft gear cluster parts in relative positions, showing order in which parts are assembled.

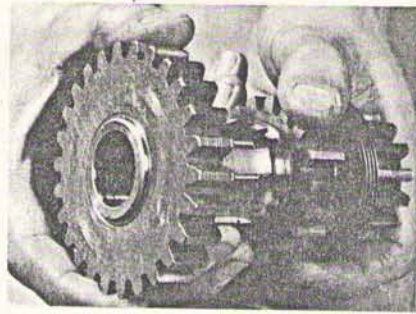
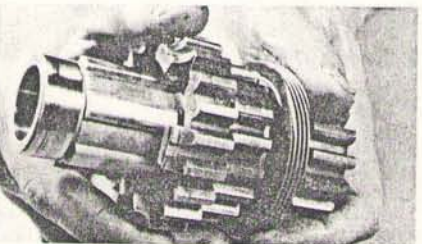
37. Inspect countershaft second gear for worn gear tooth faces and worn clutch dog faces. If dog face has a mushroomed and ragged appearance as at pointer it is no longer serviceable. If it is chipped as on the dog face above it is also rendered un-serviceable.



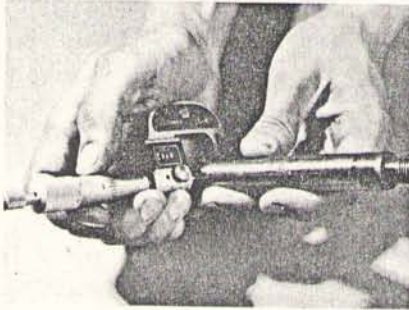
38. Comparison of worn (left) and new Andrews second gear shows the difference. Note that Andrews gear dog faces are properly undercut to facilitate pulling a partially engaged shifter clutch into full engagement. When a clutch dog face is worn flat as on the left it is no longer serviceable.



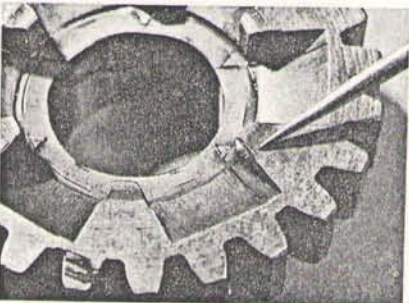
39. Check countershaft second gear fit on countershaft gear. It should spin freely but have no more than just barely palpable play.



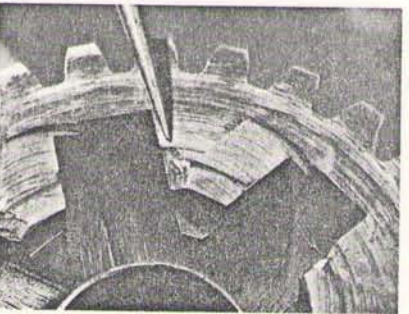
40. Check low gear play on shaft. The same fit tolerance applies to it.



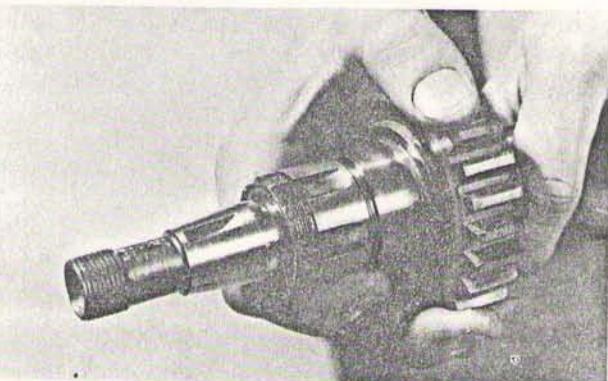
41. Inspect countershaft for pitting and wear. Measure its diameter at positions in which gear bushings run as opposed to those in other areas. If wear is evident, replace shaft.



42. Inspect mainshaft third gear clutch dog faces for chipping and wear. Any rounding of corners will cause shifter clutch to jump out of mesh. Inspect gear teeth for wear and chipped corners. Check gear for play on mainshaft. Be sure gear is in running position when checking.

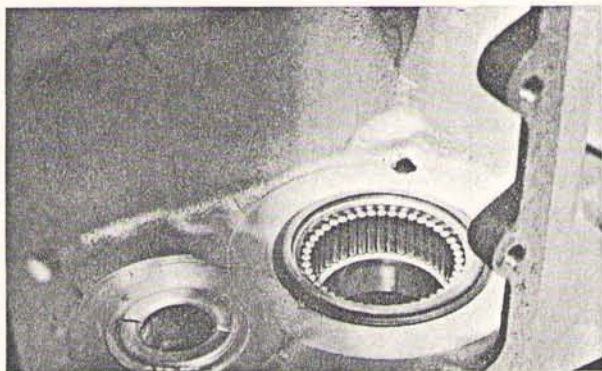


43. Inspect fourth gear (main drive) for worn teeth and chipped or worn clutch dog faces. Damage such as shown here results from speed shifting or shifting with clutch only partially disengaged.

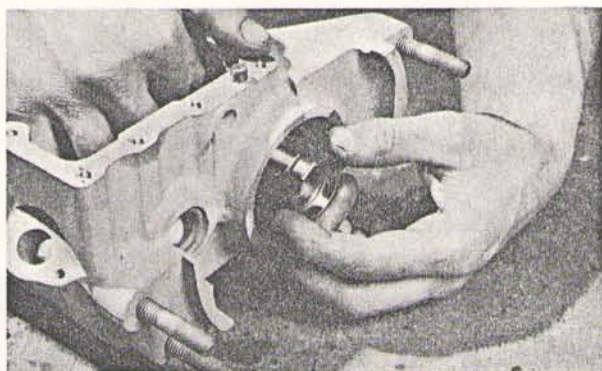


44. Check tolerance of main drive gear on shaft. If play exceeds a just-noticeable shake, bearing must be replaced. If you don't have tools, take gear to H-D service where they will press out old and insert new bearing, and hone it to proper fit on shaft.

45. Check shifter clutch dog faces for wear and chipping. This shifter clutch should be replaced.

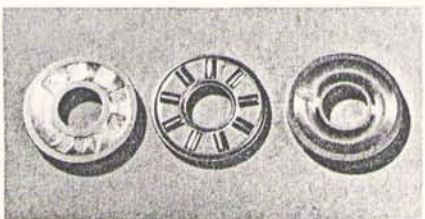


46. Check fit of main drive gear in case. Coat the 44 bearing rollers with grease and position them in case race.

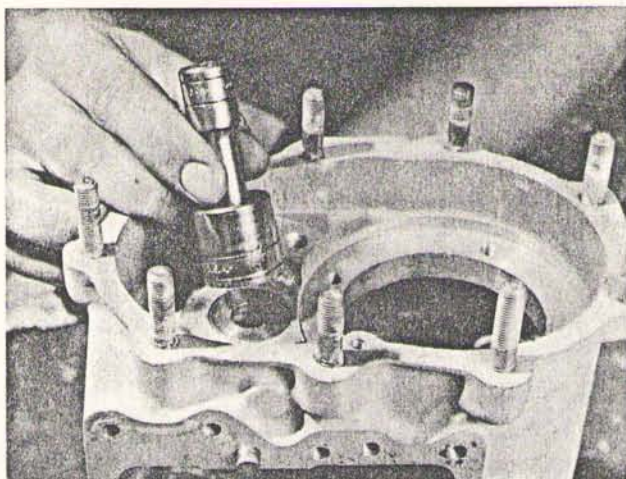
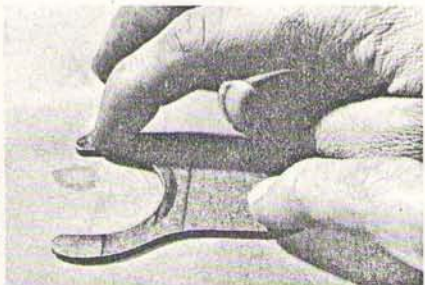


47. Insert main drive gear and check play. It should be just barely palpable. All fits should be checked with instruments, but "feel" checking is satisfactory if done right. If unsure, take all gears, bearings, and shafts to a mechanic and have them instrument checked.

48. Check clutch pushrod and release bearing for wear. Note galling on bearing race surfaces. This race pair is no longer serviceable.



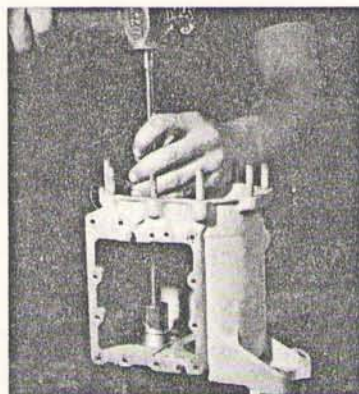
49. Shifting forks are checked for flatness on a steel plate or other totally flat surface. If fork rocks it must be straightened or replaced. Straightening excessively may weaken fork and make it unserviceable.



50. If you are upgrading your tranny to post-1976 configuration using a countershaft gear with caged roller bearings, you will have to press out the old countershaft mounting collars and install new ones. The pre-1976 shaft measures 0.7545 inches in diameter, the new 0.7495 inches. Use a 13/16 inch socket on a 3/8 inch drive as knockout tool.

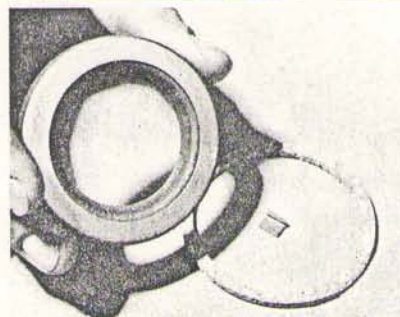


51. Apply anti-seize compound to case surface and to outside of new collar.



52. You can knock out old collars in any order, but new collars must be installed right side first (the collar with largest hole).

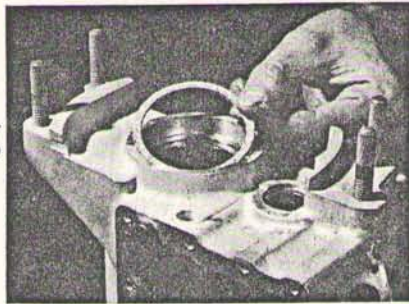
## ASSEMBLY PROCEDURES



53. Install main drive gear oil seal and cork washer in case. Use only a new part of good quality. We recommend either the Colony part 7805-2 kit (shown here) or the IBCO part 350-HDT (1941-1964) or 351-HDT (1965-1978).



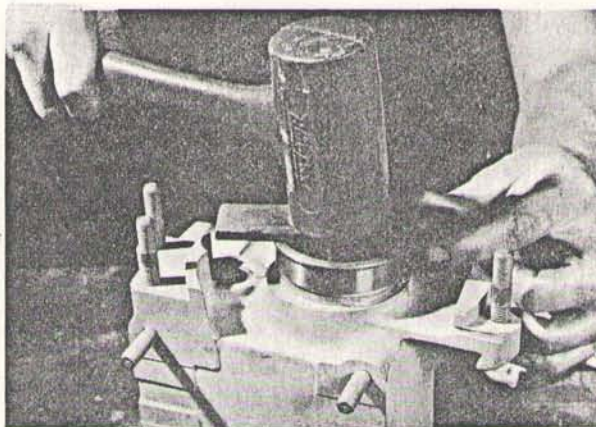
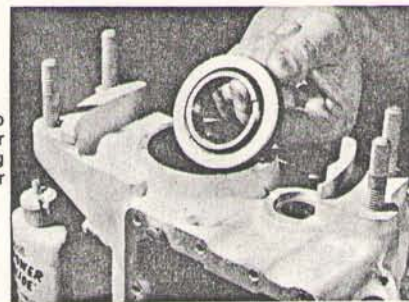
54. Install dry washer in mainshaft main drive gear hole in case.



55. Apply lubricant to oil seal lip.

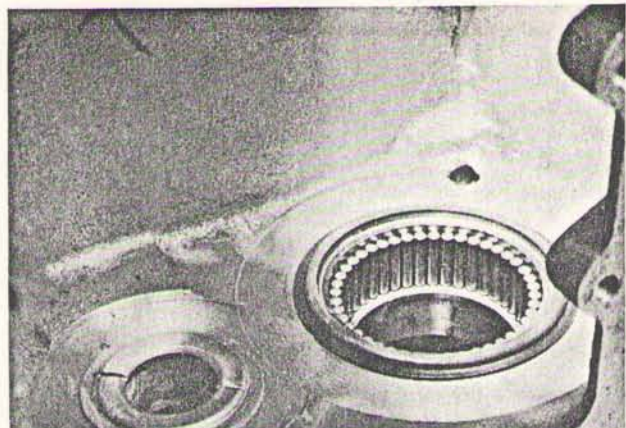


56. Work oil seal onto main drive gear spacer with seal lip pointing inward toward spacer collar.

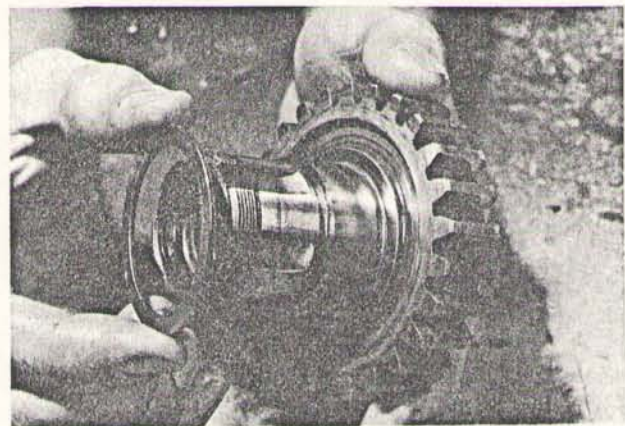


57. Install oilseal/spacer assembly into case. You may use H-D Main Drive Gear Oil Seal Tool for this, or an arbor press, or drive it in with a mallet as shown using a discarded bearing race or piece of tubing as a driver anvil.

58. Install a new oil seal in the main drive gear. This can usually be done by hand with just thumb pressure. Notice the oil seal need be pressed in only until it is securely in the bore, not necessarily up against bushing shoulder.



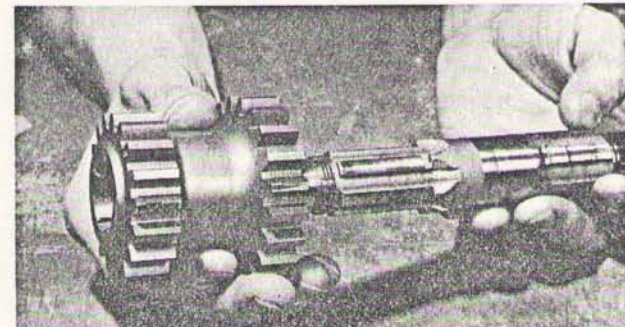
59. Install 44 main drive gear bearing rollers in case bearing race. Use a light coat of grease to hold them in place.



60. Place thrust washer on main drive gear.

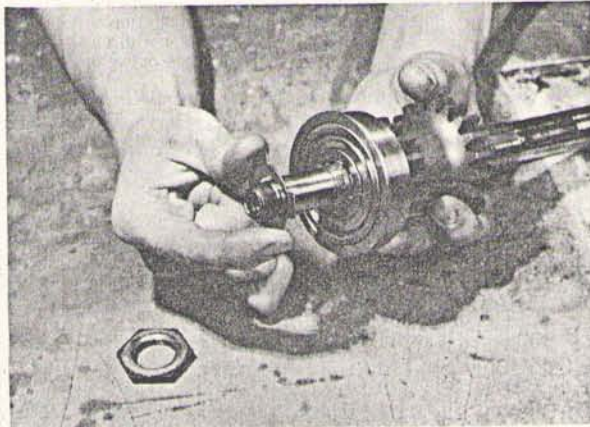


61. Install mainshaft bearing in bearing housing and lightly tap it in place.

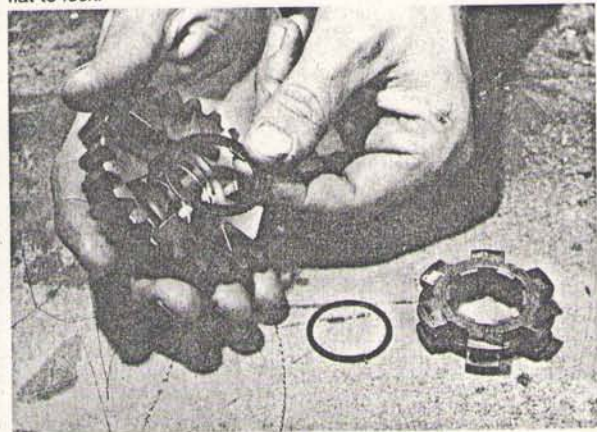


62. Install low/second gear on mainshaft.

63. Press mainshaft into mainshaft bearing and housing. Support bearing assembly on two blocks of wood, position another block of wood over end of mainshaft, and drive shaft into bearing.



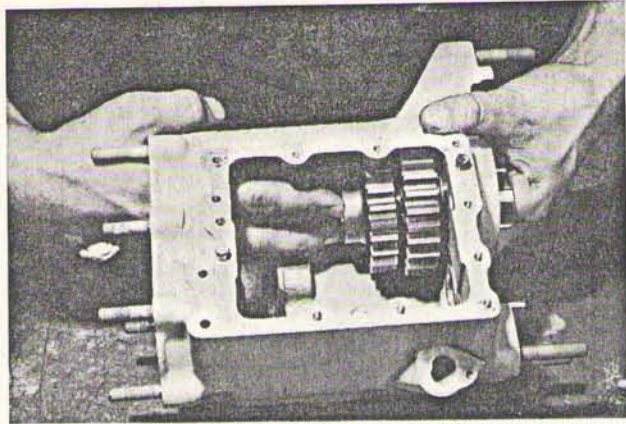
64. Install ball bearing washer and nut. Bend ear of washer against nut flat to lock.



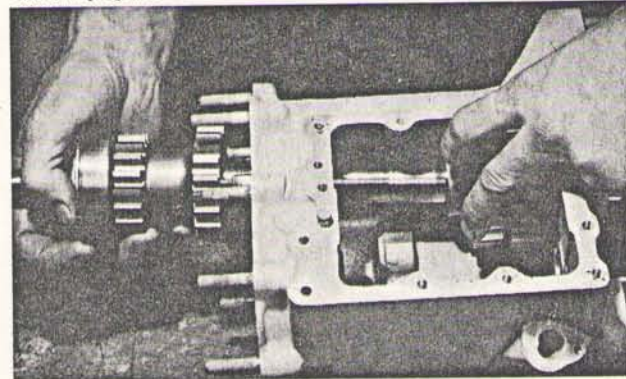
65. Lay retaining washer, lock ring, and shifter clutch, in that order, into recess in mainshaft third gear.



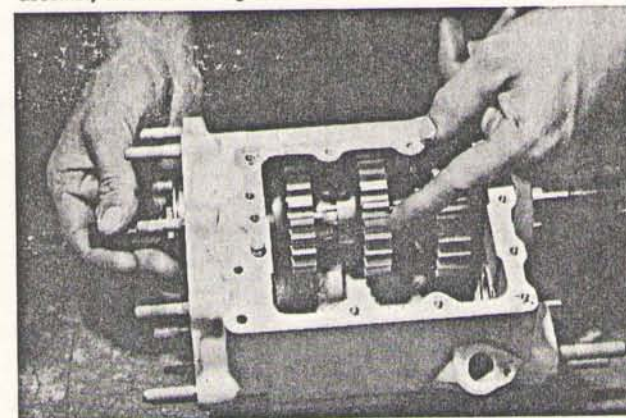
66. Notice that side of shifter clutch with word "HIGH" is positioned upward in previous assembly. It must face high gear in final assembly.



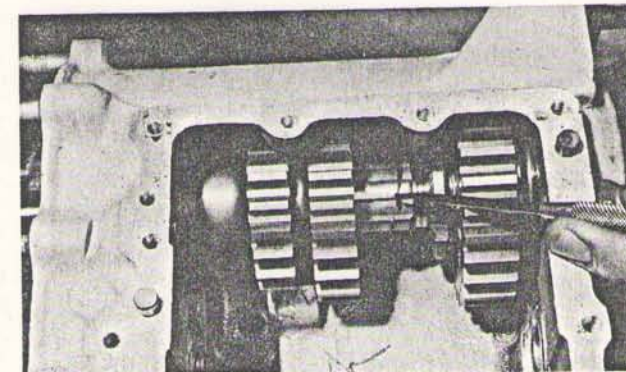
67. Install main drive gear (fourth) into case from inside. Position third gear assembly against it.



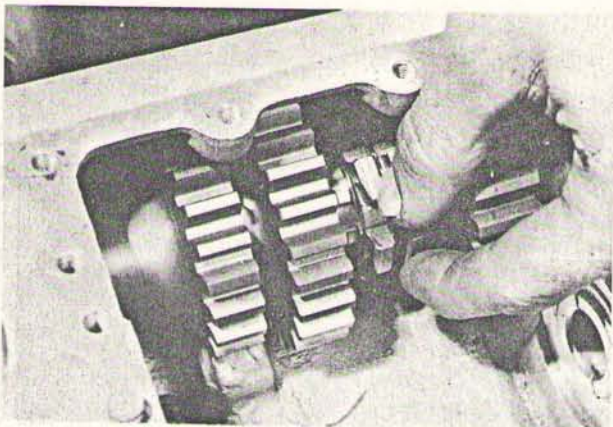
68. Install mainshaft assembly from right side of case, through third gear assembly and main drive gear.



69. While holding shaft securely, slide third gear along shaft spline to separate it from main gear.

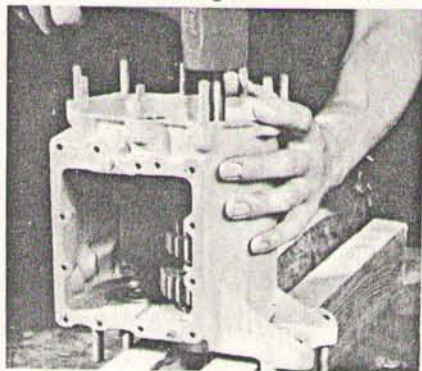


70. With scribe or awl, work lock ring onto splined shaft section.

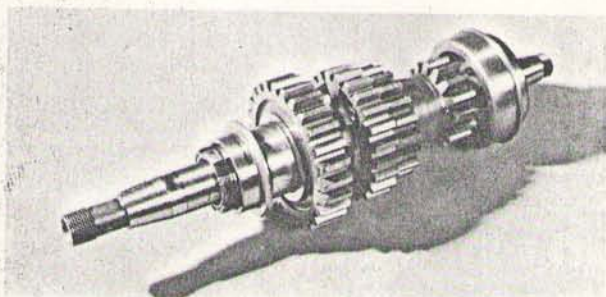


71. Move shifter clutch along shaft spline, pushing the lock ring along it, until you hear the lock ring snap into its shaft groove.

72. Drive mainshaft assembly into case until collar on mainshaft bearing housing seats against case.

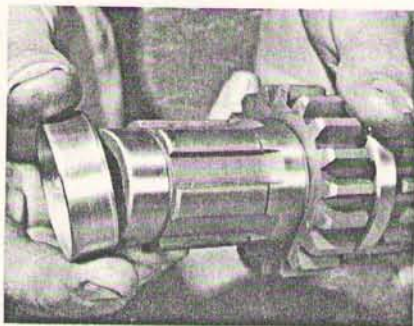
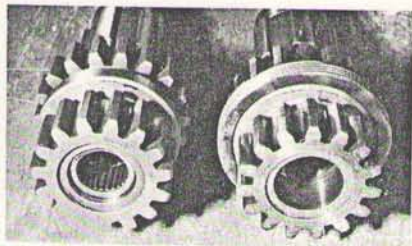


73. Attach retaining plate in position shown with four screws. Plate screw holes are chamfered on one side for screwheads.

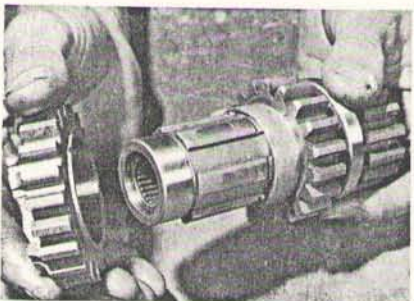


74. The mainshaft gear cluster is not fully assembled and then installed as is the countershaft. However, fully assembled as it appears in the case it should look like this.

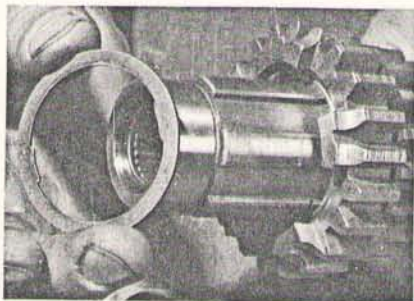
75. Comparison of Andrews and H-D stock countershaft gear. Andrews is for late model transmissions from about mid-1976. Note caged bearing. Andrews is superior steel and superior gear hobbing.



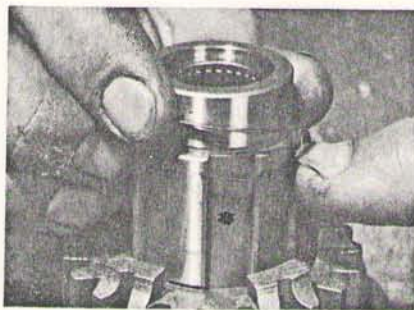
76. Lubricate countershaft second gear bushing ID and install on countershaft.



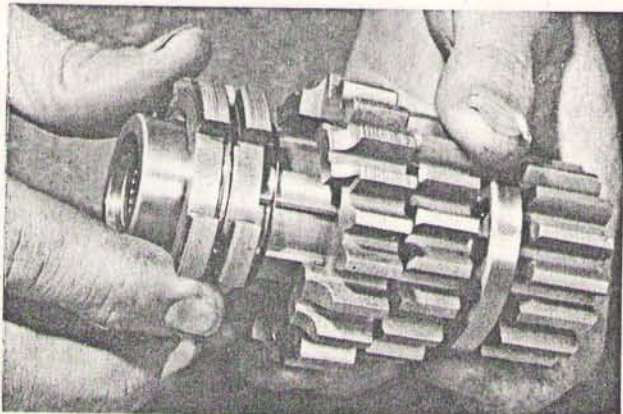
77. Lubricate bushing OD and install second gear with clutch dog face outward.



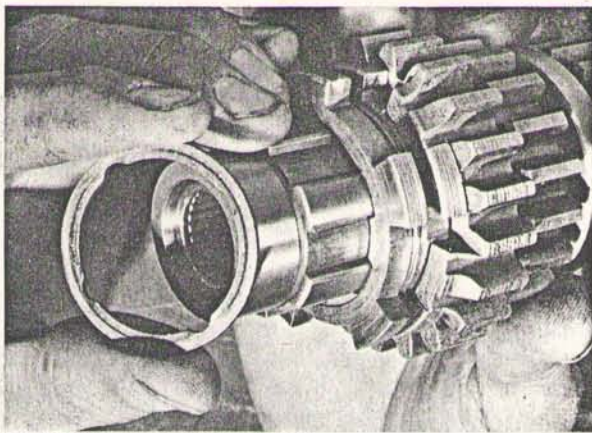
78. Install second gear retaining washer.



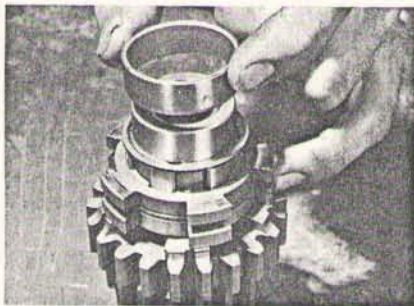
79. Install spring lock ring. Work spiral of lock ring onto countershaft gear splines.



80. Install shifter clutch (either side out) onto splines and push spiral lock ring along splines until it snaps into recess. The shifter clutch must slide in splines with no binding. Try various location combinations until the most free is determined.



81. Install low gear bearing washer.



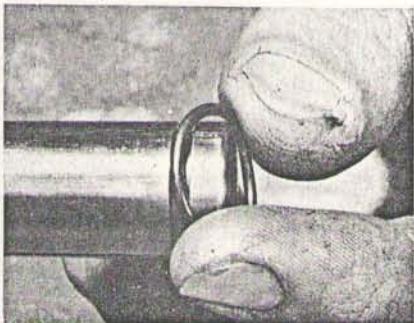
82. Lubricate ID and install low gear bushing.



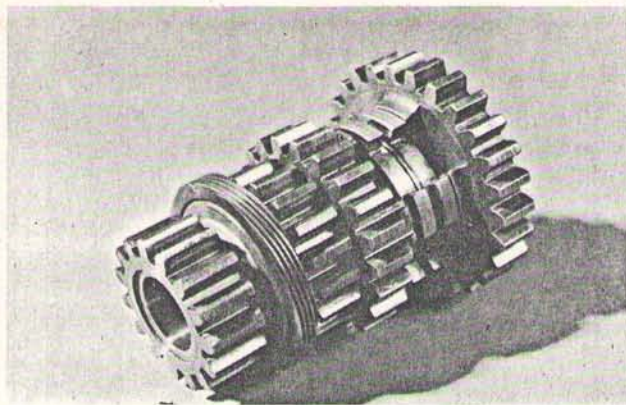
83. Lubricate bushing OD and install low gear with shift dog face inward.



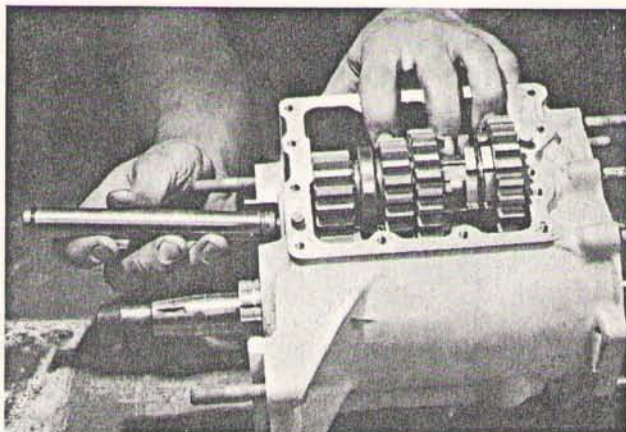
84. Install countershaft gear roller thrust washer in recess on high gear end of countershaft.



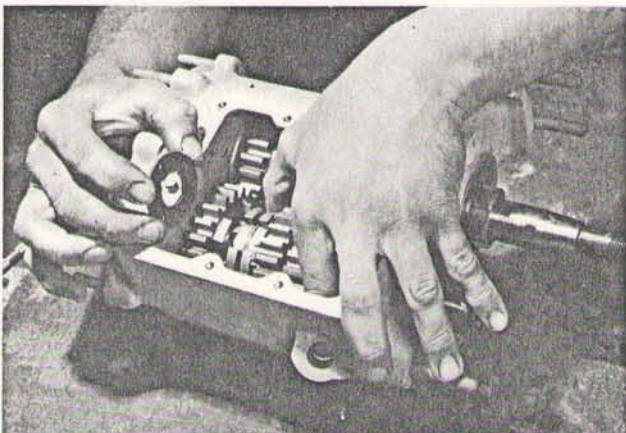
85. Install O-ring seal on end of countershaft.



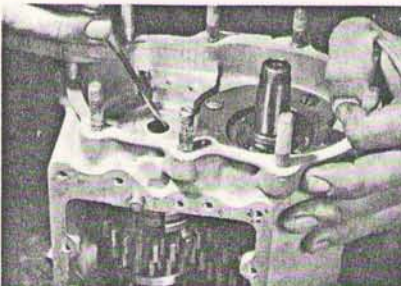
86. With exception of roller thrust washer in end, the countershaft cluster should appear as shown here.



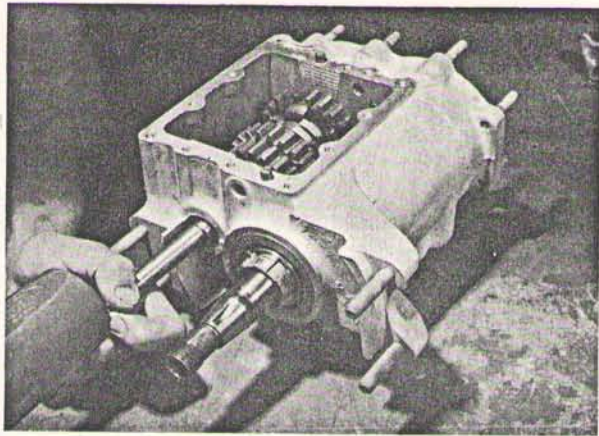
87. Position countershaft gear cluster in case as shown and insert countershaft from left side of case until it is just short of entering right case side.



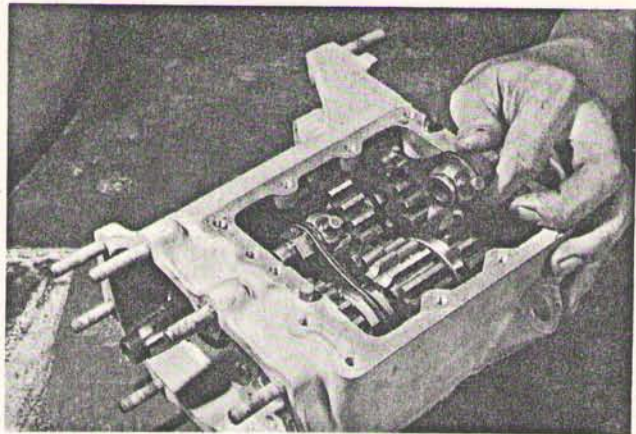
88. Insert a washer of correct thickness to limit cluster endplay to .007 to .012 inches. End washers are available from .074 to .100 inches thick in increments of .003 to .005 inches. It may be necessary to install any one washer, measure end play, then disassemble and install correct washer.



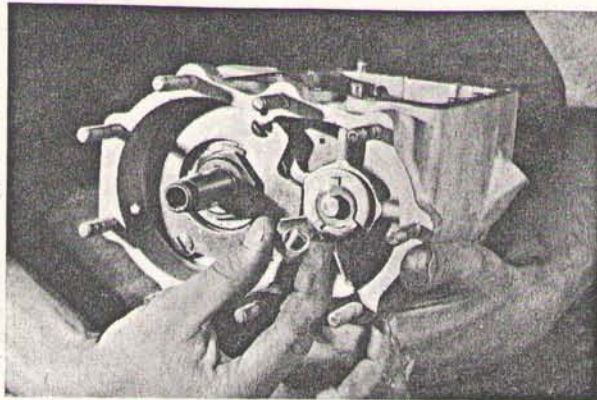
89. With washer inserted, up end case and probe washer to alignment with case hole.



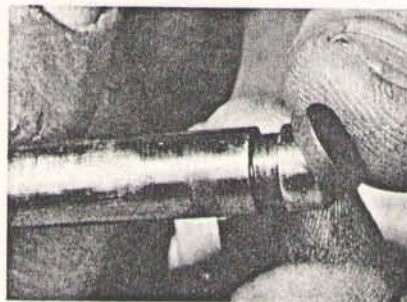
90. Carefully drift countershaft into place with very light blows.



94. Larger fork is assembled to countershaft shifter clutch groove. You cannot install both shifter forks incorrectly, but you can install them flopped. Note both shifter fingers should point toward front of case.

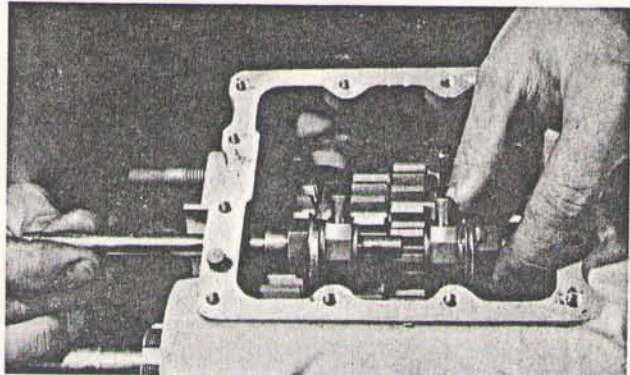
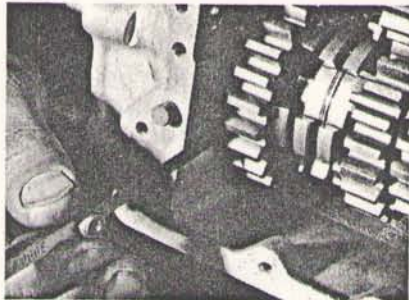


91. Install lock washer and nut. Completely tighten nut.

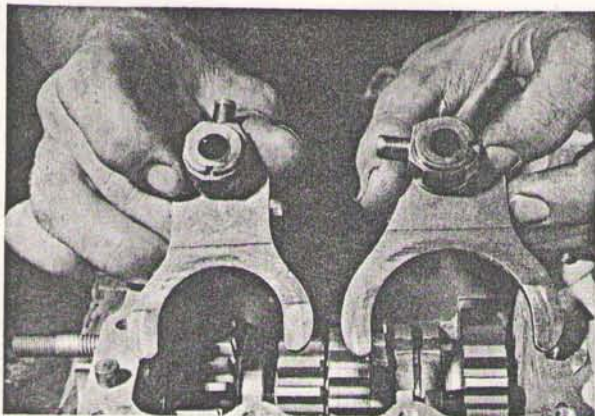


95. Install O-ring oil seal in groove on end of shifter fork shaft.

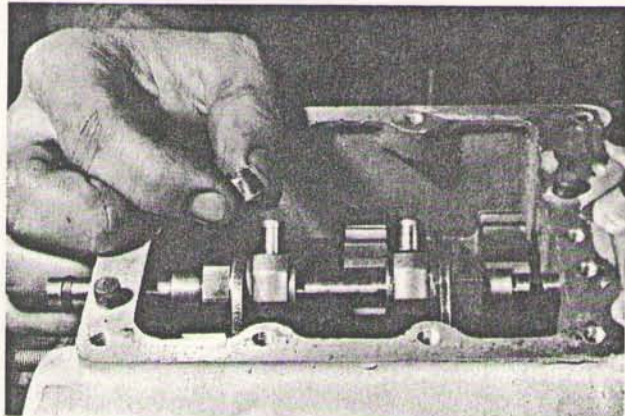
92. Measure cluster endplay with leaf gauge. If not within tolerance, disassemble and install washer of appropriate thickness. Final check freeness of all moving parts. Mainshaft should turn freely, without binds, gears and shifter clutches should slide easily in splines.



96. Insert shifter shaft through left case hole, through shifter fork assemblies, until it just enters right case hole.

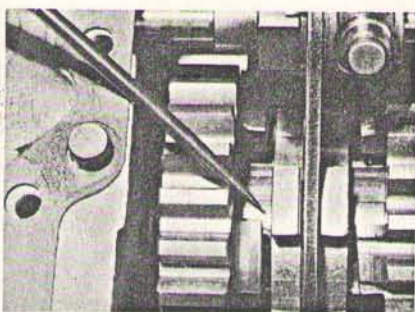


93. Assembled correctly, shifter forks appear as shown here. Notice one fork spread is larger than the other.

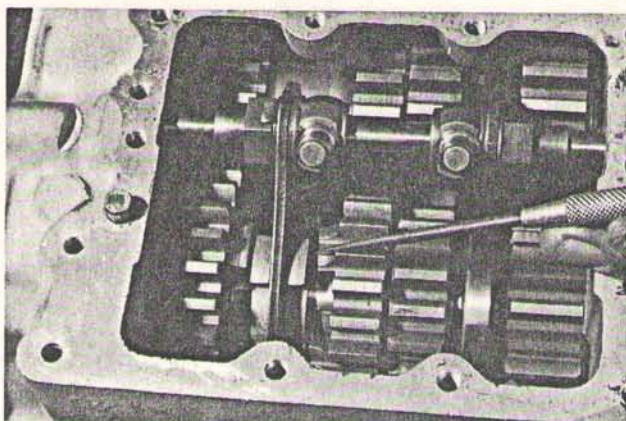


97. Install shifter finger rollers on shifter fingers.

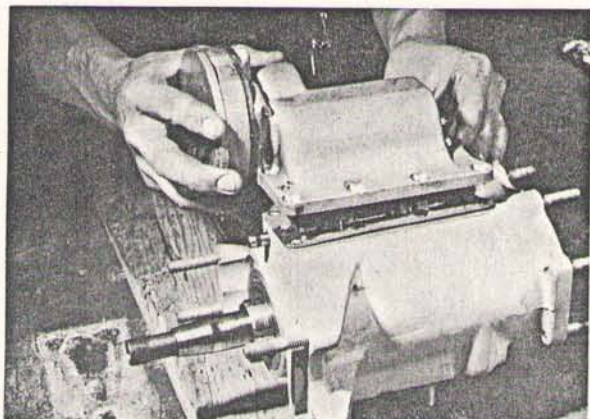
98. Next you must align shifter forks so that when shifter cover is in neutral the space between the gear clutch dog and shifter clutch faces is the same on both sides of the shifter clutch. The shifter clutch must be centered between the two gears it serves. Do this adjusting as follows.



99. Position shifter mechanism so it is in neutral. Pointer indicates shifter cam indent representing neutral. Rotate shifter cam until this indent is aligned with spring loaded cam follower (shown here just below notch).



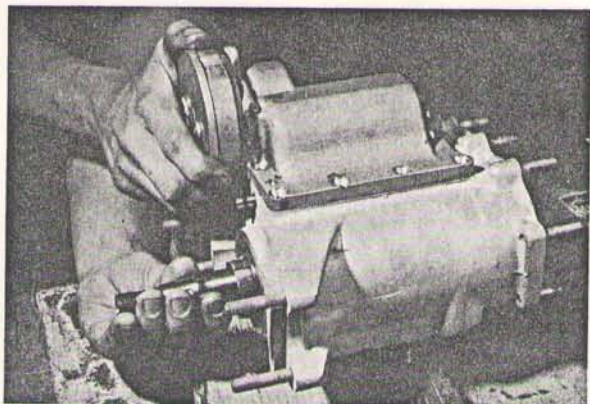
102. Carefully work shifter cover free of locating case dowelpins and lift straight up. The object is to avoid any sideways movement of the shifter clutches. If you goof, put the lid back in place and shift through the gears again. Unequal shifter clutch spacing as shown here is unacceptable. Spacer washers between shifter fork and shifter finger will have to be removed.



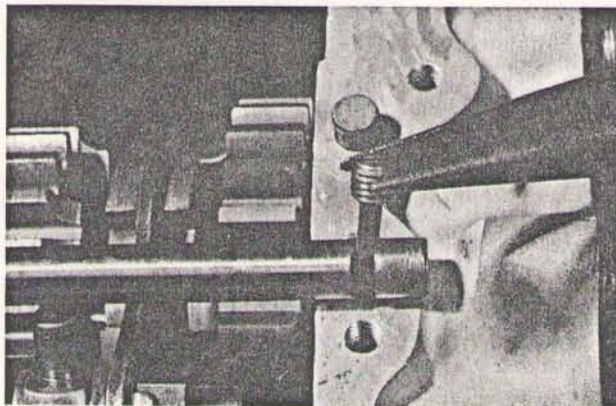
100. Install shifter cover on transmission with dry gasket in place.



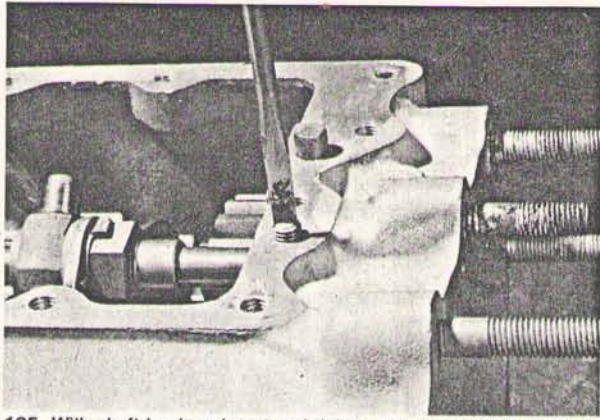
103. When shifter forks require adjustment, spacer shims, available in .007 and .014 inch thicknesses, must be added or subtracted to either widen or narrow the distance between the shifter fork and the shifting finger. Spare shims may be moved around the other side of the shifter fork and stored beneath the lock washer and nut.



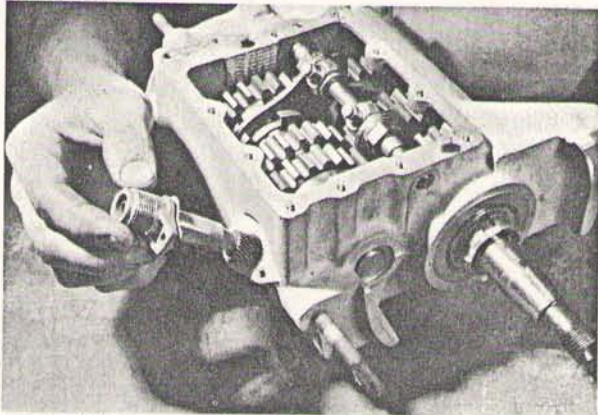
101. Shift transmission through gears, ending up back in neutral, while rotating the mainshaft.



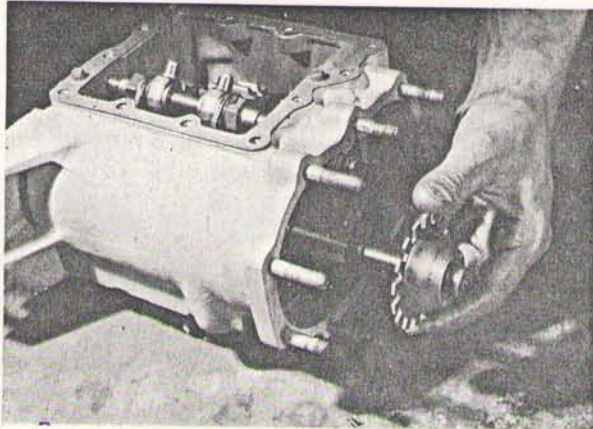
104. When fork adjustment is complete, bend over tab on lock nut as shown and install the shifter fork shaft. Notice a notch keyway in the right end of the shaft. This coincides with a shouldered screw hole in the case, and serves to lock the shaft in position in the case. The shaft must be installed with this keyway vertical.



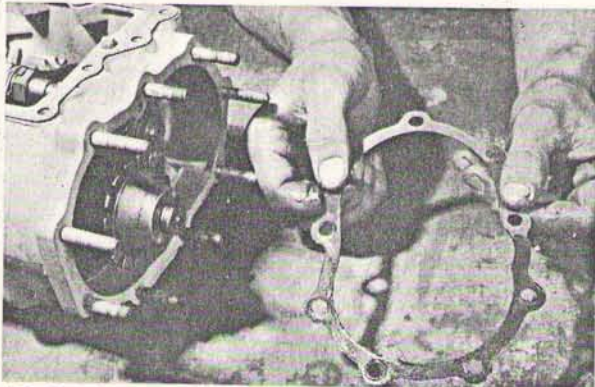
105. With shaft in place insert and tighten shouldered lock screw in correct hole.



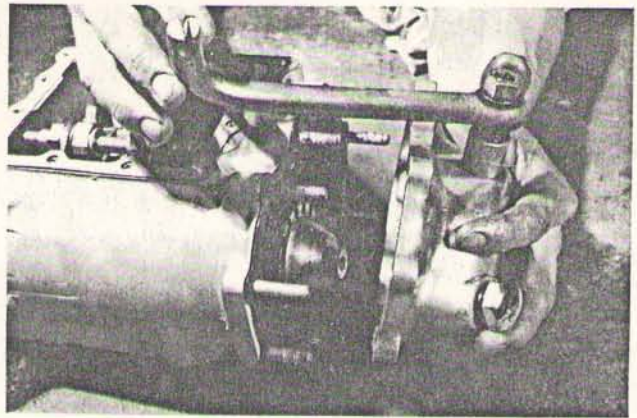
106. Install the speedometer drive unit if you are running a speedo.



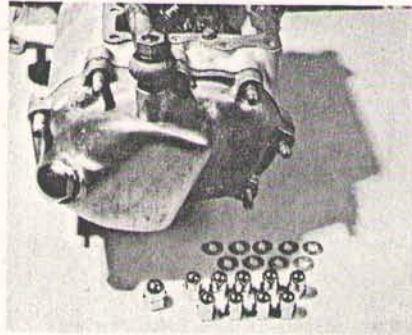
107. Install clutch pushrod assembly.



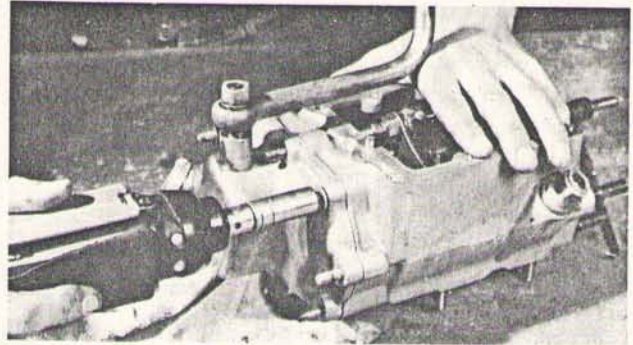
108. Coat side cover gasket with thin coat of grease.



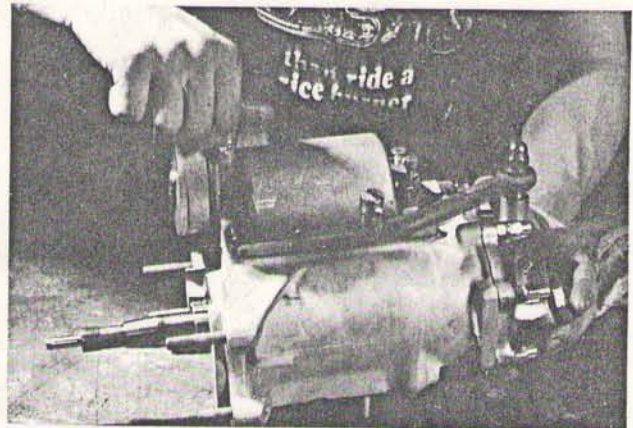
109. Install side cover gasket and cover.



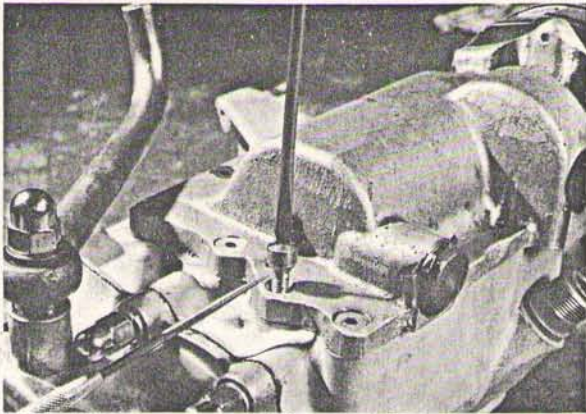
110. We used Colony Side Cover and Clutch Arm Acorn Nut Kit, No. 7112-19, and Transmission Filler Plug, No. 7616-1 to dress up the tranny and give it some class.



111. Install and tighten the nine side cover washers and nuts.



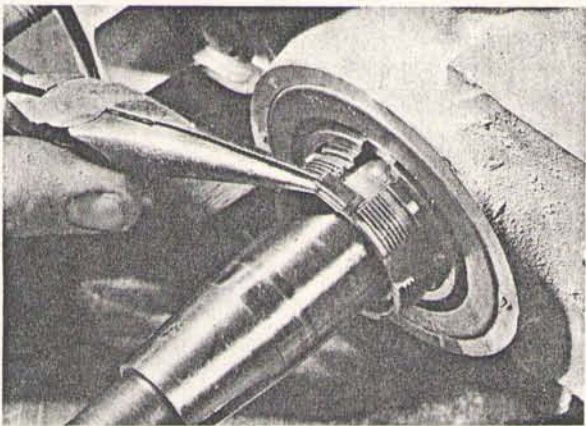
112. Apply thin grease coat to both sides of shifter cover gasket and install it and the shifter cover with twelve screws, two of which are longer than the remainder. The long screws are installed in the two holes behind the shifter pawl assembly (ratchet box).



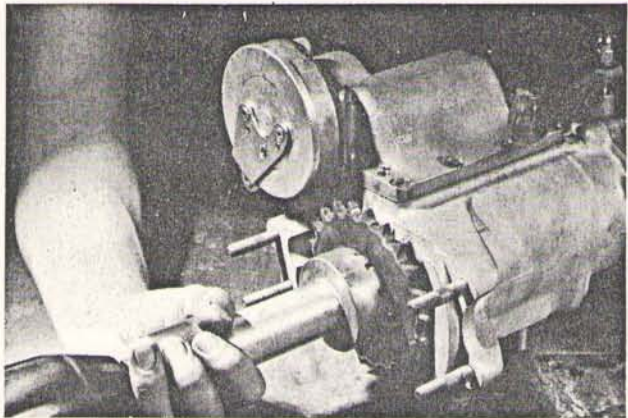
113. Install tranny vent screw in indicated hole. Tighten it only snug with hand-held screwdriver. Do not use Loctite or other thread-grip compound on this screw, but it is advisable to use it on the remaining screws.



116. Inspect sprocket lock nut carefully for any sign of thread wear. Threads should be sharp edged and well defined. Replace if not perfect.



114. Install main drive gear spacer key.



117. Install lock washer and sprocket lock nut. Tighten thoroughly, bend over washer tab against nut flat.

115. Install chain sprocket on main drive gear splines with the illustrated face inward.

