3.30 ROTARY TABLE TRANSMISSION (Figure 3-37)

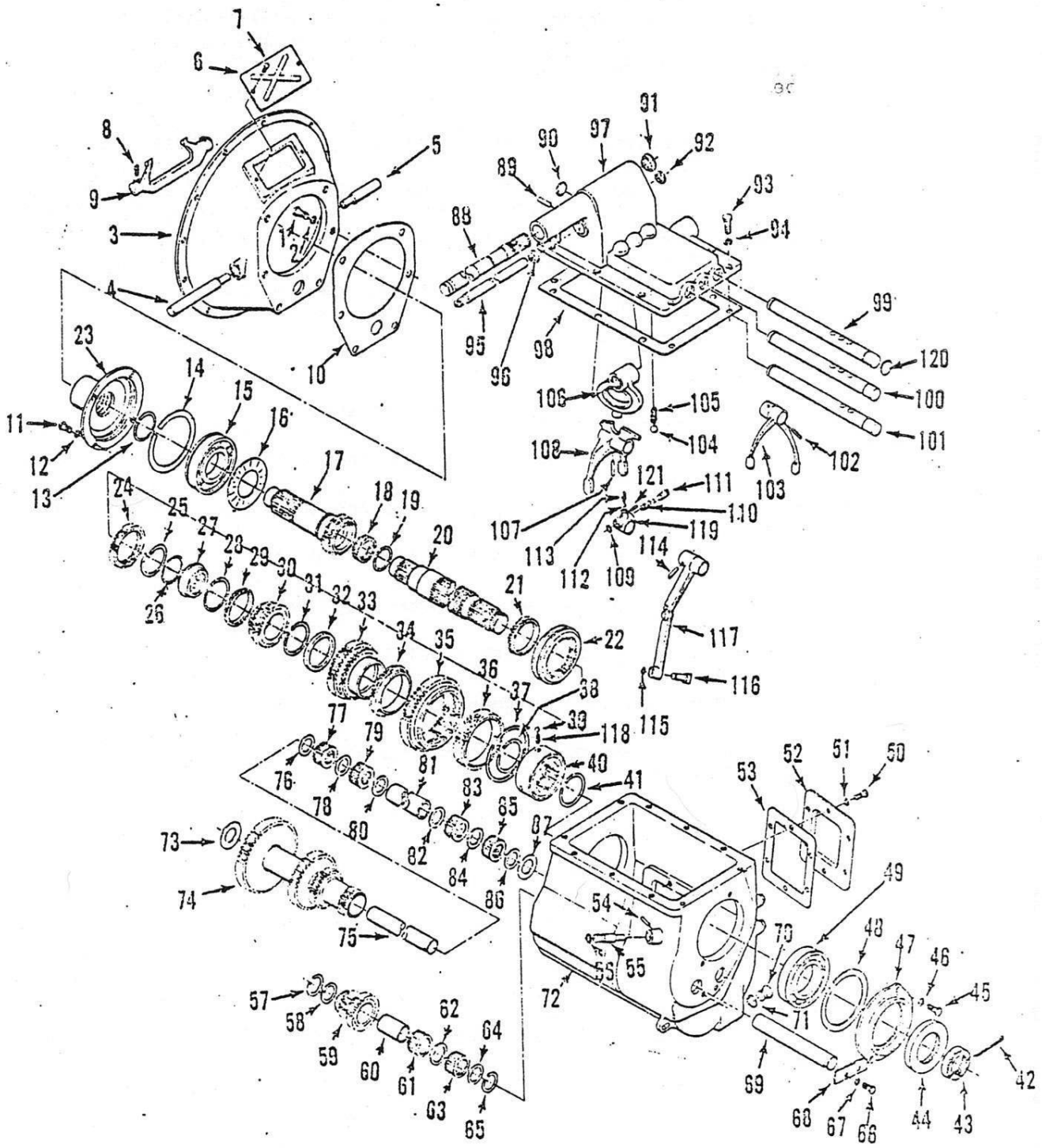


Figure 3-37. Rotary Table Transmission

1. SCREW
2. LOCKWASHER
3. HOUSING
4. SHAFT
5. SHAFT
6. SCREW
7. COVER
8. SCREW
9. YOKE
10. GASKET
11. BOLT
12. LOCKWASHER
13. RING
14. SPACER
15. BEARING
16. BAFFLE
17. GEAR
18. BEARING
19. SPACER
20. SHAFT
21. RING
22. SLEEVE
23. RETAINER
24. HUB
25. RING
26. SPRING
27. PLATE
28. SPRING
29. WASHER
30. GEAR
31. SPRING
32. WASHER
33. GEAR
34. RING
35. GEAR
36. PLATE
37. RING
38. RING
39. BALL
40. HUB
41. RING
42. PIN
43. NUT
44. SEAL
45. BOLT
46. WASHER
47. SUPPORT
48. SPACER
49. BEARING
50. SCREW
51. WASHER
52. COVER
53. GASKET
54. PIN
55. PIVOT
56. SEAL
57. RING
58. WASHER
59. GEAR
60. SLEEVE
61. SPACER
62. WASHER
63. SPACER
64. WASHER
65. RING
66. SCREW
67. LOCKWASHER
68. PLATE
69. SHAFT
70. PLUG
71. LOCKWASHER
72. CASE
73. WASHER
74. GEAR
75. SHAFT
76. WASHER
77. SPACER
78. WASHER
79. SPACER
80. WASHER
81. SPACER
82. WASHER
83. SPACER
84. WASHER
85. SPACER
86. WASHER
87. WASHER
88. SHAFT
89. PIN
90. RING
91. PLUG
92. RING
93. BOLT
94. WASHER
95. SHAFT
96. RING
97. HOUSING
98. GASKET
99. RAIL
100. RAIL
101. RAIL
102. PIN
103. FORK
104. BALL
105. SPRING
106. LEVER
107. PIN
108. FORK
109. RING
110. SPRING
111. PIN
112. BALL
113. SPRING
114. PIN
115. WASHER
116. SHOE
117. ARM
118. SPRING
119. END
120. RING
121. PIN

Legend for Figure 3-37. Rotary Table Transmission

To disassemble the transmission, take off the transmission cover and shifter assembly. Engage the gears to prevent the main shaft from turning and unscrew the nut holding the flange. Pull the flange off the shaft.

Remove capscrews from amin drive gear bearing retainer. Pull retainer from transmission. Remove main drive gear snap ring from in front of bearing. Pull main drive gear and bearing forward to permit using a bearing puller and pull bearing from main drive gear. Remove capscrews from main studs and nuts in this location. Remove speedometer drive gear from main shaft.

Pull main shaft bearing from shaft and case. Separate main drive gear from main shaft and lift main shaft assembly out through top of case. Remove main drive gear, bearing spacer and rollers from case. Remove clutch hub snap ring and slide the synchronizer unit and third speed gear forward from main shaft.

Remove the snap ring from behind the low and second speed clutch hub; then slide the second speed synchronizer assembly from main shaft. Remove the snap ring from behind the second speed gear and slide gear from main shaft. Remove the second speed thrust washer and snap ring from main shaft.

Drive the taper pin from transmission case; then remove shifting arm pivot and shifting arm. Remove idler and countershaft lock plate. Drive idler shaft and countershaft rearward to insure that the press fit on rear of bearing rollers may drop down and be damaged. Pull shafts from transmission and remove both gears, being careful to prevent loose parts from falling from countershaft gear. Remove one of the two snap rings from idler gear; then permit sleeve, bearing rollers and spacer to slide from gear.

Preferably, the low and second gear splines and clutch hub splines should be replaced in their original relationship; therefore, it is suggested that these parts be marked prior to disassembly to insure correct reassembly. Support clutch hub on a block, wrap a cloth around the assembly to catch balls and springs as they are released and press the low and second speed gear from hub. Remove shift plate retaining ring from hub groove.

Mark hub and sleeve to permit splines and faces of these parts to be assembled as they were originally. Remove the two springs. Slide sleeve from hub and shifting plates will fall from the assembly.

Wash and air dry all parts. Do not wipe parts with rags as lint from these rags will always remain on parts. Shifting fork grooves and splines of gears, hubs and shafts should be smooth and should not show wear. Excessive backlash between hub and sleeve splines indicates wear. Springs should not be bent or mutilated. Gears should not be broken, cracked, chipped or pitted. Thrust washers should be smooth and not worn. Bearing rollers and annular bearings should not be pitted or show damage of any kind and should roll free and smooth.

ASSEMBLY OF TRANSMISSION: Assemble sleeve to hub with splines and faces positioned in their original relationship. A one thirty-second inch wide groove around hub outside diameter is approximately one-third of the distance from the other end of hub and two-thirds of the distance from the other end of hub. Two identification grooves on sleeve chamfered face should be assembled to the end of hub which is approximately two-thirds of the distance from the one thirty-second inch groove. Move sleeve to a position on hub to permit assembling the three shifting plates into the slots in hub; then move sleeve

to fully engage hub splines. Hook one spring over one of the shifting plates and wrap around inside of hub over all three plates. Hook the other spring over the opposite end and opposite side of the same shifting plate and wrap in the opposite direction around inside of hub over the three plates.

Assemble shift plate retaining ring into hub groove. Support clutch hub on end nearest to retaining ring. A block, 3-1/2" in diameter and 1-3/16" thick, will position the hub to permit easy assembly to the remaining components. A poppet spring and ball is sometimes assembled in a drilled hole in clutch hub; and when used, should be held in position in clutch hub as gear is assembled over hub splines and positioned at rest on bench. Use marks to relocate splines. Should binding occur, try mating another set of splines to obtain a free fit.

Assemble a shifting plate, a spring and ball into one of the three hub slots. Compress ball and spring and press shifting plate down until poppet ball is held in position by the sleeve. Repeat this operation until the three shifting plates, poppet springs and balls are started into the sleeve. Press down on hub and lift on sleeve to complete the assembly.

Assemble the sleeve into reverse idler gear. Place the spacer over the sleeve and assemble a row of thirty-seven bearing rollers into each end of idler gear. Assemble a thrust washer and snap ring into each end of gear. The sleeve should be free when rotated. Lower reverse idler gear into case and hand assemble idler shaft from rear of case and through gear. Align slot in shaft to permit lock plate to be assembled; then drive shaft into case. The lock plate slot should remain fully exposed.

ASSEMBLY OF TRANSMISSION (CONT'D)

A pilot shaft 9.730 inches long and 1.134 inches in diameter should be made to retain bearing rollers during assembly procedure. Assemble the long spacer into countershaft gear bore. Slide the pilot shaft through spacer in gear bore. Assemble a spacer washer, a row of twenty-two bearing rollers, a second spacer washer, a second row of bearing rollers and a third spacer at each end of the long spacer inside of gear.

Coat face of thrust washer with low melting point grease and align washer tangs with gear slots as washer is positioned over shaft and against face of gear and the other end of shaft should be flush with gear face. Enter small end of countershaft from rear of case and place the rear thrust washer over shaft and against case. The end countershaft should be made flush with front face of thrust washer. Use a light coating of low melting point grease to help hold thrust washer in position. Coat countershaft thrust washer with low melting point grease and align washer tang with the cast "V" slot as washer is assembled to case fron thrust face.

Carefully lower countershaft gear assembly into position in case between the two thrust washers. Align gear bore with countershaft and hand assemble countershaft into gear as pilot shaft is pushed out through front of case. Align lock plate slot and drive countershaft into case, leaving slot fully exposed. Assemble lock plate, lockwasher and bolt to retain idler shaft and countershaft.

Coat main drive gear bore with low melting point grease and assemble twenty-two bearing rollers in gear bore. Assemble main drive gear into case front bore and assemble the fourth speed blocking ring over main drive gear cone.

Place main shaft, with threaded end up, in a vise which has been fitted with

soft jaws. Assemble a main shaft snap ring in the third groove from threaded end of shaft. Assemble the recessed side of second speed gear thrust washer over snap ring. Assemble main shaft second speed gear against washer. Assemble a main shaft snap ring in groove behind gear. Place a xynchronizer blocking ring over the second speed gear cone.

Assemble the second speed synchronizer assembly over splines of main shaft, aligning the three blocking ring cutouts with shifting plates. The low and second gear shift fork groove should be located to rear of transmission. Assemble a main shaft snap ring in main shaft groove behind clutch hub. Invert main shaft and assemble main shaft third speed gear against main shaft shoulder. Assemble a blocking ring on cone of third speed gear.

Assemble third and direct synchronizer unit over main shaft splines. Align the three blocking ring slots with shifting plates and position the end of the hub which has the long chamfer to front of transmission. Assemble the clutch hub snap ring in main shaft groove in front of synchronizer unit. Assemble the bearing spacer over main shaft and against shoulders. Lower main shaft assembly into position in transmission and rest on countershaft gear. Use careful manipulation and not force to assemble main drive gear over main shaft. The blocking ring slots should be aligned with shifting plates.

A tool which bridges over the third and fourth synchronizer assembly should be used to prevent blocking ring damage while the bearings are being pressed or driven into position. Assemble bearing snap ring in main shaft bearing snap ring groove. Press main shaft bearing into position in rear bore of case. Assemble speedometer gear over main shaft. Press a new oil seal into

bearing retainer. Assemble bearing retainer gasket and bearing retainer and torque bolts to 35-45 pounds feet.

Assemble the oil baffle over main drive gear. Oil baffle should offset away from bearing. Assemble bearing snap ring into main drive gear bearing groove. Press bearing onto shaft and into case bore. Select the thickest main drive gear snap ring which will fit and assemble into main drive gear groove in front of bearing. Assemble gasket, bearing retainer, lockwashers and bolts to retain main drive gear bearing. Retainer and gasket should have oil return holes aligned with case oil return hole. Bolt torque 5/16" retainer bolts should be 17-20 pounds feet.

Assemble reverse shifting shoe into reverse shifting arm and snap shifting shoe "C" washer into groove of shifting shoe. Assemble the oil seal into shifting arm pivot groove. Engage shifting shoe into reverse idler gear and slide shifting arm pivot into case and into shifting arm. Align groove around pivot with hole in case and drive the taper pin into case.

Slide the low and second shift rail into control housing and through first and second shift rail end and low and second shift fork. Poppet spring and poppet ball should be assembled into control housing spring pocket. Use a punch to hold ball and spring down to permit shift rail to be moved into position over ball and spring. Replace spring pins to retain fork and rail end to rail. Move rail to neutral position. Slide one interlock plunger into housing drilled passage and into contact with the low and second shift rail.

Place interlock pin in drilled hole through third and direct shift rail. Slide rail into housing and through third and direct shift fork. Hold

poppet ball and spring down to permit assembling rail over these parts. Handle parts in a manner to prevent interlock pin and interlock plunger from sliding out of position. Replace spring pin; then move shift rail to neutral position. Slide a second interlock plunger into housing passage and into contact with third and direct shift rail.

Assemble reverse plunger spring and reverse plunger into reverse shift rail end and replace "C" washer in plunger groove. Replace steel ball, poppet spring and cotter pin in shift rail end. Assemble reverse shift rail, reverse shift rail end, poppet spring, poppet ball and spring pin into control housing. Replace all expansion plugs.

Move all gears and synchronizers to neutral position and place the gasket on case face. Move shift forks to neutral position and lower control housing into position, aligning shift forks with mating fork grooves and reverse shifting arm. Replace control housing to case bolts and lockwasher. Bolt torque should be 17-20 pounds feet.

Assemble shift lever, control housing pin, spring, spring washer and cap. Shift control lever to each position and check that each gear ratio is engaged and that gears turn free.

SPICER 2631 TRANSMISSION

To remove the transmission assembly, first disconnect the universal joint from the driving flange. Disconnect the shifter rod at the front universal joints. Now, remove the capscrews holding the clutch housing to the case. The transmission and clutch housing will then slip back and may be removed.

DISASSEMBLY OF SPICER 2631 TRANSMISSION: To disassemble the transmission, take off the transmission cover and shifter assembly. This cover is held in place by six capscrews. Engage the gears to prevent the main shaft from turning and unscrew the nut holding the flange. Pull the flange off the shaft. Remove the main shaft rear bearing retainer. Then, remove the capscrews holding the clutch housing to the transmission case. Withdraw the main drive gear and bearing through the front of the case. Slip the sliding gear from the front of the main shaft and push the main shaft to the rear far enough to permit the rear bearing to be removed. Tilt the front end of the main shaft upward and lift the assembly out through the top.

Remove the counter shaft rear bearing cap and release the snap ring holding the inner bearing. Then, tilt the front end of the counter shaft and lift out of the case. The third and fourth speed gears can be pressed, one at a time, off the counter shaft after removing the snap ring. Then, remove the capscrew and lock plate from the reverse gear shaft and pull shaft. Remove reverse idler gear and bearing. Note the two thrust washers in each side of gear.

To remove the gears from the main shaft, slip the sliding gear from the shaft, release the snap ring from the front of the third speed gear; rotate the thrust washer until the teeth register with the splines on the main shaft. The washer and third speed gear will slip off.

INSPECTION: After the transmission cover has been removed, wash out the case and parts with cleaning solvent and examine parts for wear. If the shafts can be shaken, the bearings are worn and should be replaced. It might not be necessary to completely disassemble the entire transmission to replace the parts needed. However, if the transmission is completely disassembled, examine all parts closely and replace the worn ones. Usually bearings are all that need replacing.

ASSEMBLY: Assemble in reverse order of disassembly.

ADJUSTMENTS & LUBRICATION: There are no adjustments and all parts run in oil. Case should be filled to level plug after assembly. See Lubrication Chart for grade of lubrication and capacity.

DISASSEMBLY OF SHIFTER MECHANISM: To disassemble the shifter mechanism, drive out the expansion plugs at the front of the cover.

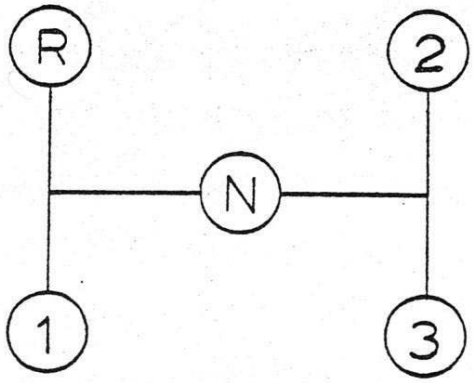
With the shifter rods in neutral, remove the set screws from the shift forks and push the rods out toward the front, holding a hand over the ball holes to prevent the balls and springs from flying out. As each rod is removed, it should be marked to assure correct assembly.

INSPECTION: It is hardly probable that the shifter will ever be disassembled; but, if it is, examine the rods and shifter forks for wear.

ASSEMBLY: Assemble in reverse of disassembly. Be sure the rods are in the correct position and that the lock balls and springs are in place. Replace and tighten set screws and lock with a lock wire.

ADJUSTMENTS AND LUBRICATION: There are no adjustments. Lubrication is by splash from the transmission.

Shifting Pattern for Spicer 2631 Transmission



Shifting Pattern for Warner T18 Transmission