CONTENTS

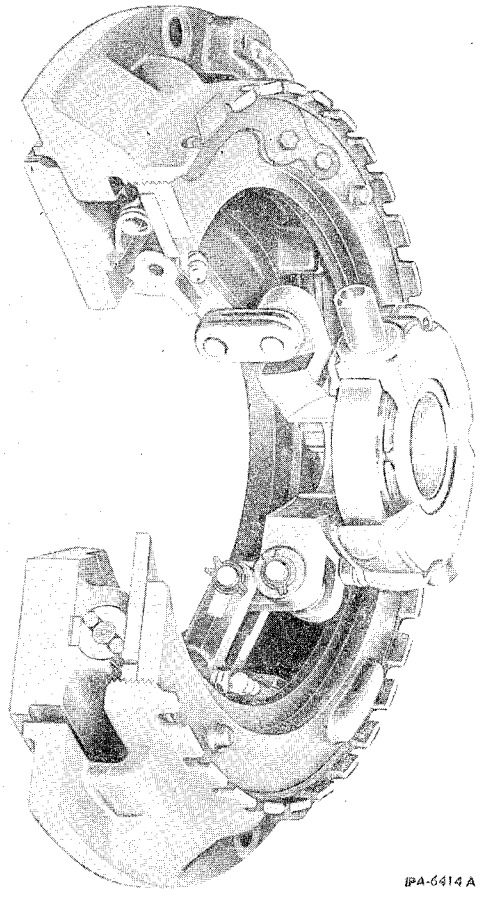
Paragraph		Page
1.	Description	1
2.	Specifications	1,2
3.	Checking Mechanical Problems	2
4.	Removal	5
5.	Disassembly	5,6
6.	Inspection and Repair	7,8
	Removing "Bonded On" Engine Clutch Facings	7,8
7.	Reassembly	8,9
8.	Installation	9
9.	Adjustments	9,10
10.	Clutch Alignment	10-15
11.	Checking Friction Surfaces	15,16

1. DESCRIPTION

The clutch cover, or back plate, is fastened to the engine flywheel. The driving unit of the clutch, consisting of the pressure plate, cams or toggles, release bearing, carrier, etc., is attached to the back plate and turns with it.

The driven unit, which consists of the clutch shaft and driven member, is supported on the pilot and transmission bearings (or clutch shaft outer bearing). This independent assembly revolves as a unit with the driving unit only when the clutch is engaged.

This is a hand-operated, singleplate, over-center clutch with ball-bearing release. The clutch has two rollers in each release cam to prevent wear and binding. The release mechanism has an automatic clutch brake which facilitates the shifting of transmission gears. No adjustment of the clutch brake is necessary.



Illust. 1 - Cutaway View of Clutch Driving Unit (Rockford) (9(91) Series Shown).

2. SPECIFICATIONS

	6, 6 (61) and 6 (62) Series	9, 9 (91) and 9 (92) Series
Make	Rockford	Rockford
Type	Over-center	Over-center
Size, inches	12	13
Plates used (driven member)	1	1
Facings used: Bendix ceremetallic, each side	6	6
Bi-metallic (sintered bronze)	2	2
Semi-metallic (bonded asbestos and copper or bronze)	2	2
Sintered metal (iron and ceramic)	2	2
Allowable out-of-flat in pressure plate, inch	.006	.006
Release fork, bushings and bearing carrier:		
Fork slot width, inch	.810 - .814	.810 - .814
Bushings: O.D. at flats, inch	.804 - .808	.804 - .808
I.D. (fits on carrier trunnion) inch	.625 - .627	.625 - .627
Carrier trunnion diameter, inch	.620 - .623	.620 - .623
Release sleeve bushings (split type)	2	2
I.D. inch (when pressed into 1.625 - 1.626 sleeve bore).	1.500-1.502	-
I.D. inch (when pressed into 1.875 - 1.876 sleeve bore).	-	1.750-1.752
Clutch shaft (carrier assembly bearing surface) O.D. inch	1.495-1.497	1.745-1.747

Continued on next page.

2. SPECIFICATIONS - Continued

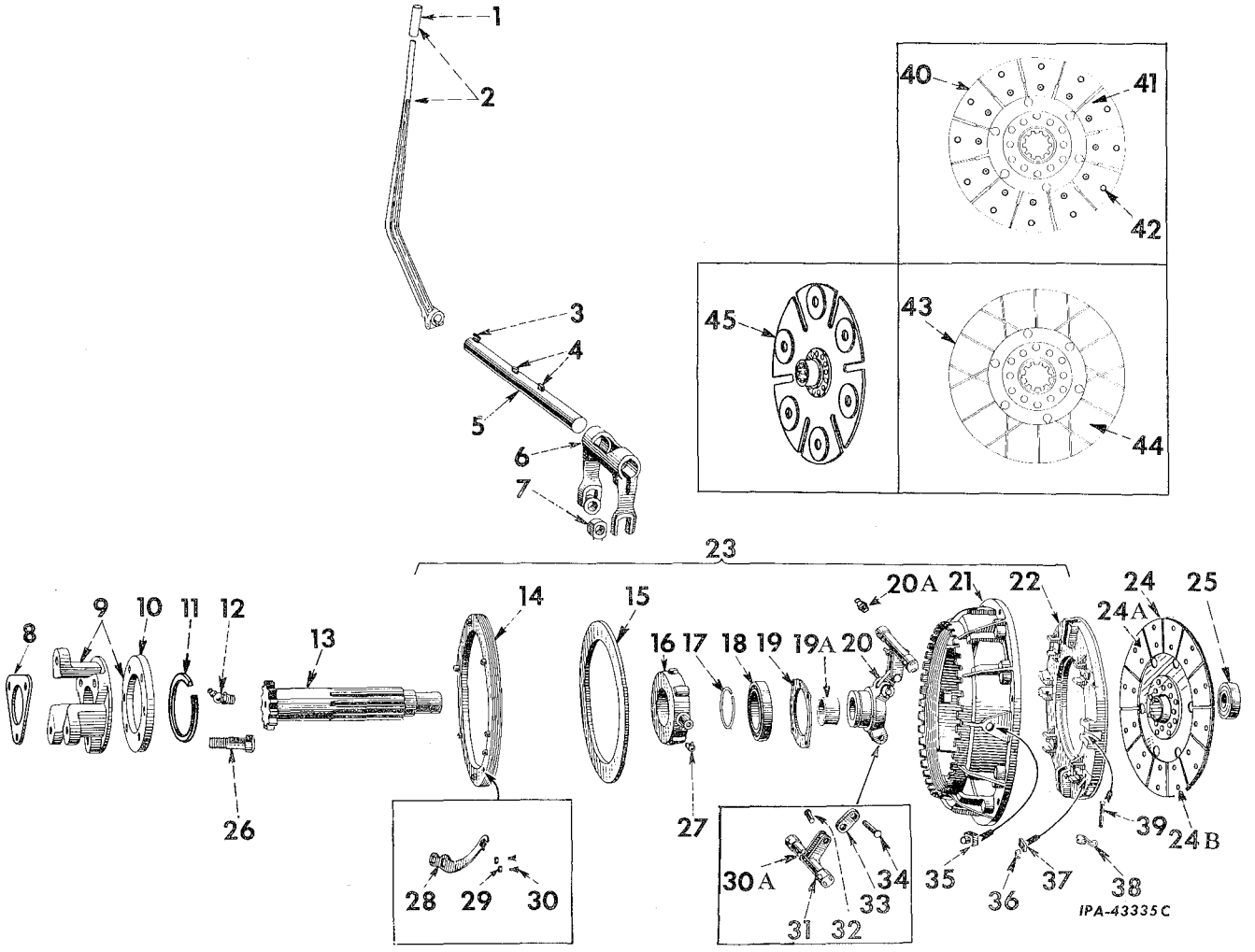
	6, 6 (61) and 6 (62) Series	9, 9 (91) and 9 (92) Series
Drive lugs and drive slots:		
Drive lug width, inch	.612 - .615	.994 - .997 (91) 1.495-1.500 (92)
Drive slot width, inch	.625 - .628	1.000-1.003 (91) 1.505-1.510 (92)
Release cams, cam saddles and cam blocks:		
Cam diameter, inch	.870 - .872	.870 - .872
Saddle width, inch	.875 - .877	.875 - .877
Clearance, inch	.003 - .007	.003 - .007
Maximum allowable total wear of cams and saddles, inch	1/16	1/32
Return springs (helical)	-	6 (92)
Free length, inch	-	2-5/32
Test length, inch	-	1-5/8
Test load, pounds	-	48 ± 3 (91) 75 ± 4 (92)

3. CHECKING MECHANICAL PROBLEMS

PROBABLE CAUSE	REMEDY
CLUTCH DRAGS	
1. Improper adjustment	Adjust clutch lever free travel.
2. Excessive dirt in clutch assembly	Remove clutch and clean. Replace worn parts.
3. Warped or cracked driven member or pressure plate	Install new driven member and/or pressure plate.
4. Weak return springs	Replace return springs.
CLUTCH SLIPS	
1. Improper adjustment of clutch	Adjust clutch.
*2. DIRT OR OIL ON CLUTCH Driven member	*Install new facings.
*3. Clutch driven member glazed or worn	*Inspect driven member. Replace if necessary.
*4. Torn clutch facing	*Install new facings.
5. Lack of lubricant in clutch	Lubricate clutch. Refer to "Lubrication Chart" in the operator's manual.
6. Worn cam shafts or blocks	Replace cam shafts and blocks.
***CLUTCH GRABBING**	
1. Oil on facings	Install new facings.
CLUTCH NOISY	
1. Excessive clearance at driving lugs	Install new pressure plate.
2. Loose engine mountings	Tighten engine mountings.
3. Cracked driven member hub plate	Install new driven member and check alignment.
4. Worn splines in hub or clutch shaft	Replace the driven member and clutch shaft.
5. Defective pilot or throwout bearing	Inspect and replace if not serviceable. Check for lack of lubrication.

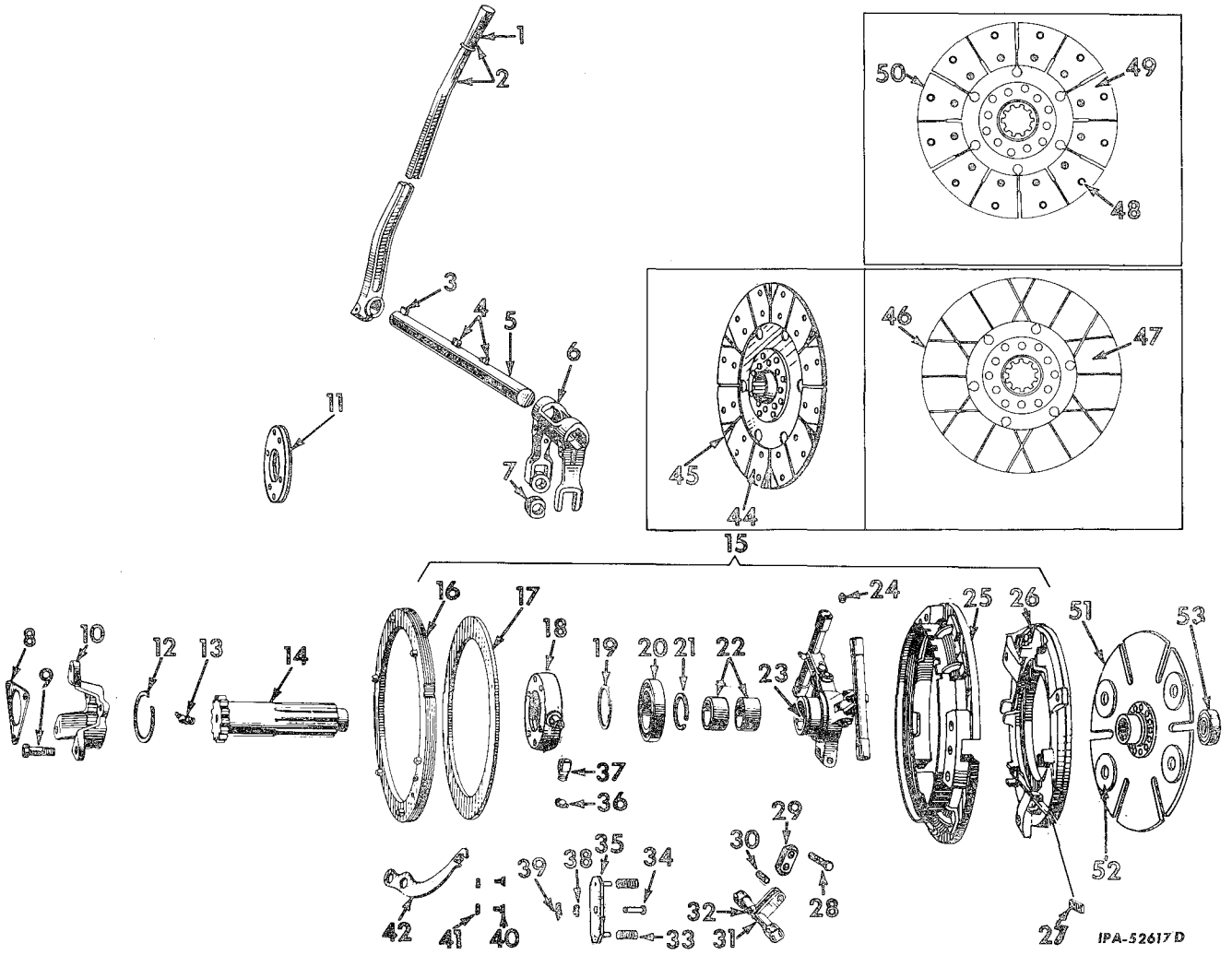
* Does not apply to cerametallic clutch facings.

PRINTED IN UNITED STATES OF AMERICA



Illust. 2 - Exploded View of Over-Center Engine Clutch (6(62) Series) (Rockford) (6(61) Series Similar).

1. Hand lever handle.
2. Hand lever.
3. Key.
4. Key.
5. Release shaft.
6. Release fork.
7. Release pin bushing.
8. Shaft end plate.
9. Clutch coupling.
10. Brake facing.
11. Snap ring.
12. Lubrication fitting.
13. Clutch shaft.
14. Adjusting ring.
15. Adjusting ring plate.
16. Release bearing carrier.
17. Snap ring.
18. Release bearing.
19. Bearing plate.
19A. Bushing.
20. Sleeve.
20A. Lubrication fitting.
21. Back plate.
22. Pressure plate.
23. Clutch cover, assembly.
24. Driven member.
24A. Sintered metal facing.
24B. Tubular rivet.
25. Pilot bearing.
26. Coupling dowel bolt.
27. Lubrication fitting.
28. Adjusting ring lock.
29. Hex nut.
30. Lock screw.
30A. Lubrication fitting.
31. Camshaft.
32. Link pin, short.
33. Connecting link.
34. Link pin, long.
35. Drive stud.
36. Washer.
37. Camblock.
38. Return spring.
39. Spring pin.
40. Driven member w/bi-metallic facing (riveted) (special).
41. Package, field service clutch facing (bi-metallic). (Consists of 2 clutch facings and 26 rivets.)
42. Rivet, clutch facing.
43. Member, driven clutch w/semi-metallic facing (bonded) (special).
44. Package, field service clutch facing (semi-metallic). (Consits of 2 clutch facings and 26 rivets.)
45. Driven member (cerametallic facing).



Illust. 3 - Exploded View of Over-Center Clutch, 13", Hand Operated (Rockford) (9(92) Series Shown) (9(91) Series Similar).

1. Handle.
2. Hand lever.
3. Key.
4. Key.
5. Release shaft.
6. Release fork.
7. Release pin bushing.
8. End plate.
9. Dowel bolt.
10. Coupling.
11. Facing.
12. Snap ring.
13. Lubrication fitting.
14. Clutch shaft.
15. Clutch assembly.
16. Adjusting ring.
17. Adjusting plate.
18. Bearing carrier.
19. Snap ring.
20. Throw-out bearing.
21. Snap ring.
22. Sleeve bushing.
23. Sleeve.
24. Lubrication fitting.
25. Back plate.
26. Pressure plate.
27. Camblock.
28. Link pin, long.
29. Connecting link.
30. Link pin, short.
31. Camshaft.
32. Lubrication fitting.
33. Return spring.
34. Retaining pin.
35. Return spring stop.
36. Lubrication fitting.
37. Fitting adaptor.
38. Pin washer.
39. "X" washer.
40. Ring lock screw.
41. Nut.
42. Adjusting ring lock.
43. Tubular rivet.
44. Clutch facing.
45. Driven member.
46. Member, driven clutch w/semi-metallic facing (special).
47. Package, field service, clutch facing (semi-metallic) (consists of 2 clutch facings and 26 rivets).
48. Clutch facing rivets.
49. Package, field service, clutch facing (bi-metallic) (consists of 2 clutch facings and 26 rivets).
50. Member, driven (clutch w/bi-metallic facing) (special).
51. Member, driven clutch w/ cerametallic facing.

PRINTED IN UNITED STATES OF AMERICA

4. REMOVAL (See Illust. 3.)

1. Lock the steering brake pedals forward and tie back the steering clutch levers to give working space. Remove the floor plates and supports.

2. Remove the clutch compartment cover.

3. Engage the clutch and remove the three nuts and bolts from the end plate (8) and the three clutch coupling dowel bolts (9). Release the clutch and rotate to remove the lower dowel bolts. Remove the lubrication fitting (13) to avoid knocking it off when lifting the clutch out. Re-engage the clutch.

4. Remove the release shaft (5), release fork (6) and bushing (7).

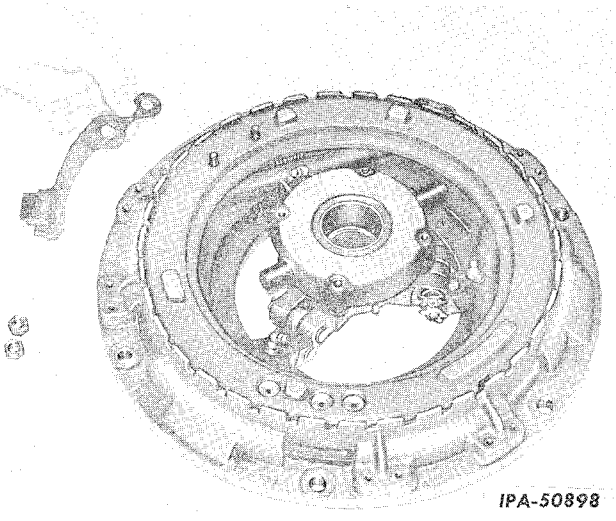
5. Remove the six clutch mounting bolts.

6. Slide the clutch shaft (14) back and out of the pilot bearing and lift the clutch out.

5. DISASSEMBLY (Refer to Illust. 3.)

1. Slide the driven member (45) from the clutch shaft (14). Pull out the clutch shaft.

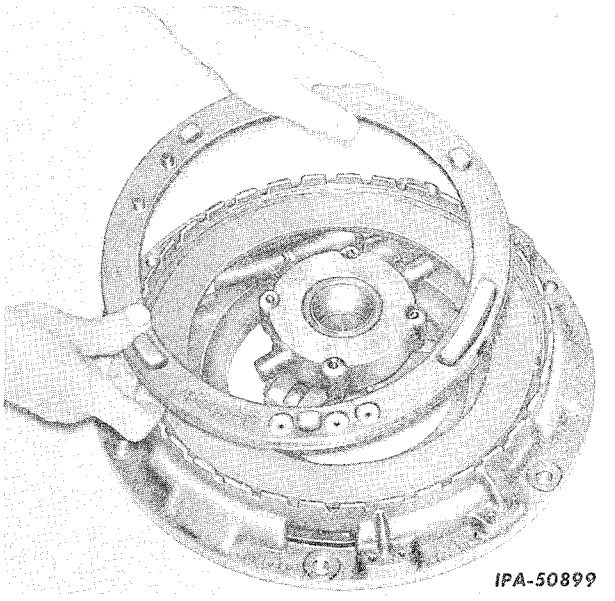
2. Remove the adjusting ring lock (42). See Illust. 4. Turn out the adjusting ring (16) and remove the adjusting ring plate (14). See Illust. 5.


IPA-50898

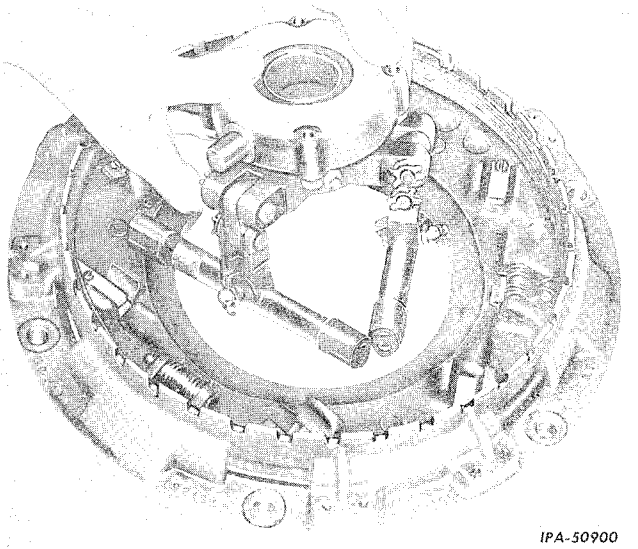
Illust. 4 - Removing the Adjusting Ring Lock.

3. Lift out the sleeve assembly (23). See Illust. 6 and 7.

4. Drive out the connecting link pins, short (33) and long (28) from the connecting link (29) and camshaft (31). See Illust. 12.


IPA-50899

Illust. 5 - Removing the Adjusting Ring Plate.

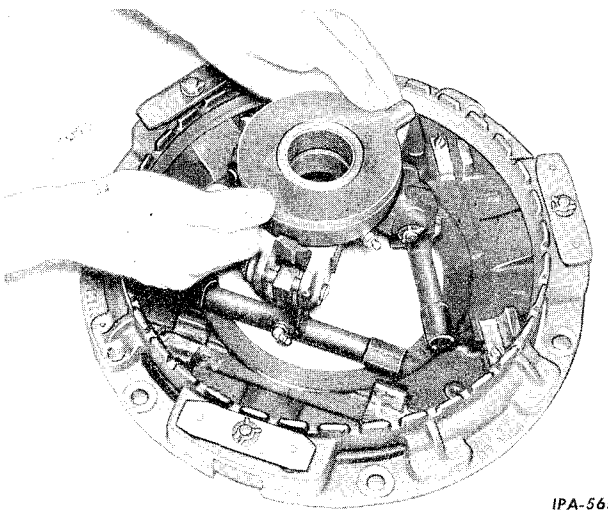

IPA-50900

Illust. 6 - Removing the Cams and Sleeve from the Pressure Plate (Not 9(92) Series).

5. 6, 6 (61), 6 (62), 9, 9 (91) SERIES BELOW SERIAL 67 462: Remove the bearing carrier (18). See Illust. 8. By close inspection it can be determined whether or not the bearing (20) or the bushings (22) will need replacement. A snap ring (19) retains the bearing on the sleeve (23). See Illust. 13.

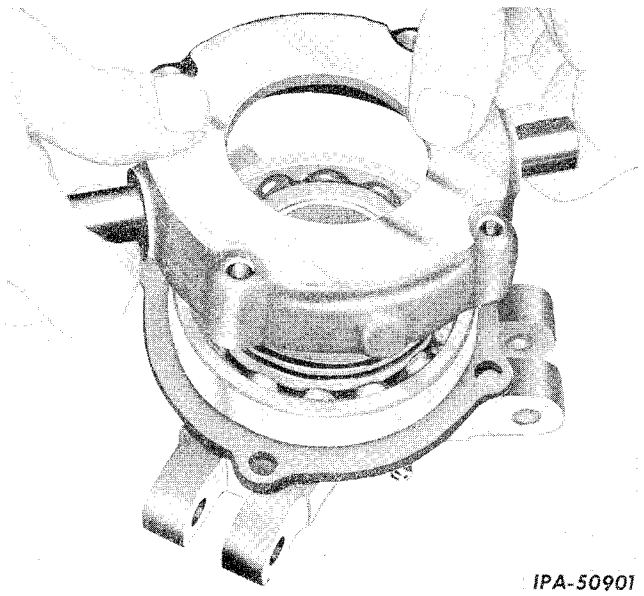
Continued on next page

5. DISASSEMBLY - Continued



IPA-56597

Illust. 7 - Removing 9(92) Series Cams and Sleeve Assembly.



IPA-50901

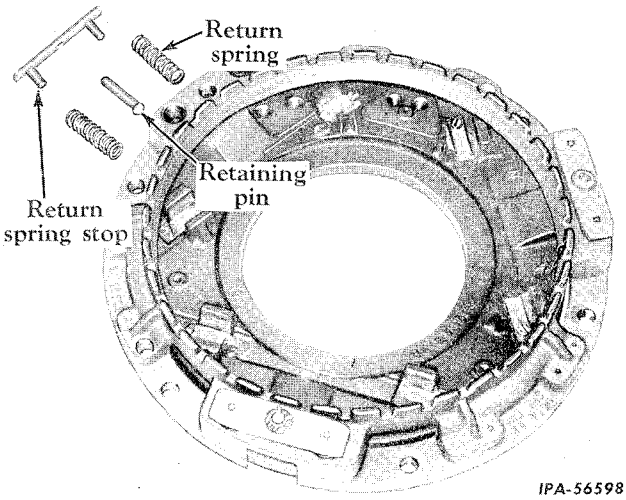
Illust. 8 - Removing the Bearing Carrier (91 series shown - others similar).

9 (91 SERIES), SERIAL 67462 AND UP, AND 9 (92 SERIES): To remove the bearing carrier from the sleeve, remove the snap ring (21). Access to the snap ring can be made through the cut-outs in the carrier. The bearing snap ring can now be removed for inspecting the throw-out bearing.

6. T-6, TD-6 (61), 6 (62) SERIES AND T-9, TD-9 (91) SERIES BELOW SERIAL 67462: Remove the three return springs. Pull the cotter pin and drive the spring pin out. See Illust. 10 and 11. Lift the back plate (25) from the pressure plate (26).

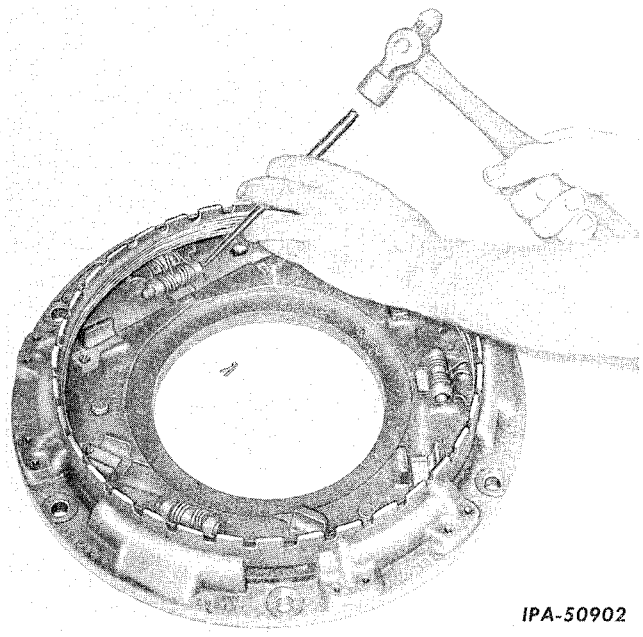
TD-9 (91) SERIES, SERIAL 67462 AND UP, AND 9 (92) SERIES: Remove the six helical coil return springs (33). Remove the "X" washers (39) from the retaining pin (34) and the return pin stop (35) will be released. (Refer to Illust. 9.)

CAUTION: Take precautions when removing the "X" washer. The springs are compressed and will fly up when the washer is removed.



IPA-56598

Illust. 9 - Components of the Return Spring Assembly.

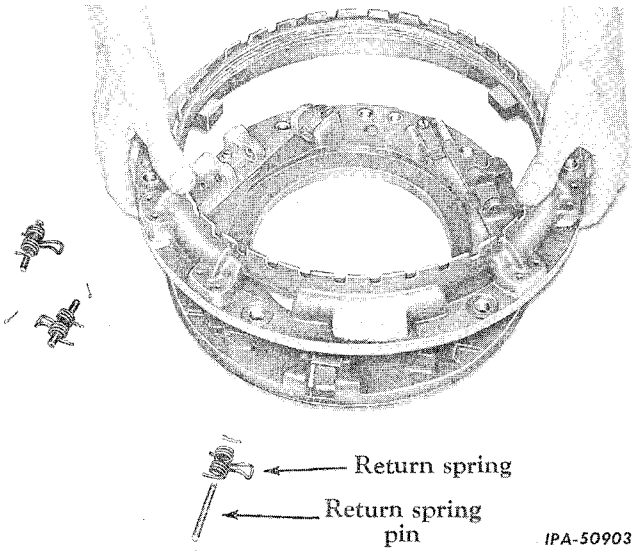


IPA-50902

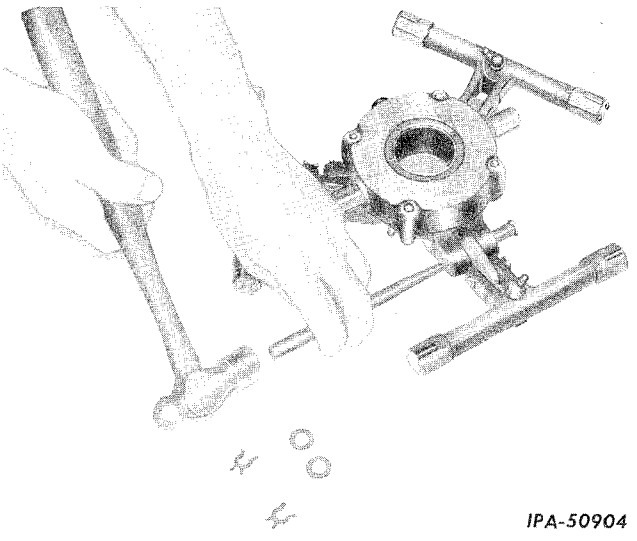
Illust. 10 - Driving Out the Return Spring Pins (91 Series Shown).

Lift the back plate (25) from the pressure plate (26).

PRINTED IN UNITED STATES OF AMERICA



Illust. 11 - Removing the Back Plate from the Pressure Plate (91 Series shown - Others similar).



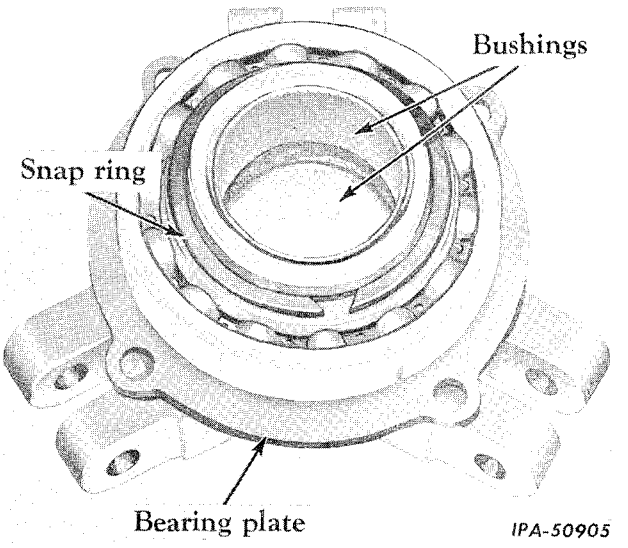
Illust. 12 - Removing the Connecting Link Pins.

6. INSPECTION AND REPAIR

1. Clean all parts thoroughly when disassembled.

2. Check the splines on the clutch shaft and driven member for burrs or nicks and remove with a stone.

3. Check the condition of the clutch disc facings. If worn to the rivet heads, replace with new, and be certain the rivets are correctly countersunk. (To remove "bonded-on" facings, refer to instructions which follow, under a separate heading).



Illust. 13 - Clutch Cam Sleeve with Bearing.

4. Check the condition of the clutch cams. Lack of proper lubrication may cause excessive wear at the cam rollers and they will drop out when the cam is lifted away from the pressure plate. Replace the cams when necessary. Check the lubrication fittings. Improper adjustment may cause the cams to be too tight and prevent over-center action and cause unnecessary wear.

5. Check the pressure plate for warping. See Illust. 29. Refer to Par. 2 "SPECIFICATIONS."

6. Check the hub of the driven member for excessive wear or cracks. Wear at this point indicates a possible clutch misalignment. Replace if necessary.

Removal of "Bonded-on" Clutch Facings

1. Use a solution of Turco No. 1662, or equivalent, mixed according to directions. Heat to 150° to 200° F. Turco No. 1662 is available through Turco Products, Inc., 75 E. Wacker Dr., Chicago, Ill.

2. Keep complete driven member submerged in the above solution for 12 to 15 hours.

3. After driven member is submerged for 12 to 15 hours, clutch facings can be removed from driven member very easily.

4. Wipe off solution and brush the clutch plate clean with a wire brush after it has dried, to assure that none of the solution is left on.

5. Inspect hub rivets to be sure they are tight, and also check for cracks in plate just outside of flange.

Continued on next page

6. INSPECTION AND REPAIR - Continued

6. Install new facings on plate. Be sure all rivets are properly countersunk.

7. Check driven member for warpage the same as described for the pressure plate in par. 11.

Cerametallic Clutch

The cerametallic clutch driven member, because of its aggressiveness and ability to transmit the same torque at lower plate loads, has a tendency to produce "phonographic" type grooving on mating plates. This can occur in a very few hours, depending on clutch operation. Upon inspection of the clutch, if grooves are present, this does not mean that clutch parts should be replaced. Cerametallic material was developed for use in rugged clutch application. It thrives on heat. One indication that the clutch is not performing satisfactorily is the clutch facing not having a blue-black color. This glaze must develope otherwise premature wear of mating surfaces will occur.

The cerametallic clutch has the following characteristics when performing its job:

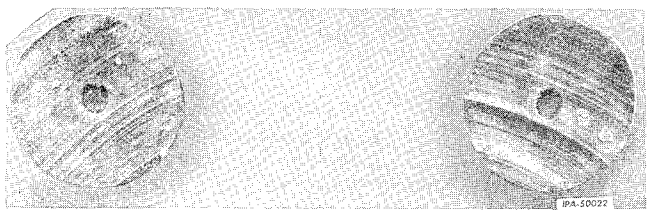
(a) Concentric grooving of the mating surfaces is normal.

(b) Facing glazes to a deep blue-black color which can carry over to mating surfaces.

(c) Deepest grooves occuring at O.D. and I.D. of driven member sweep.

(d) Buttons may become egg shaped.

(e) More aggressive than previous materials.



Illust. 14 - Close-Up View of Cerametallic Buttons on Driven Member.

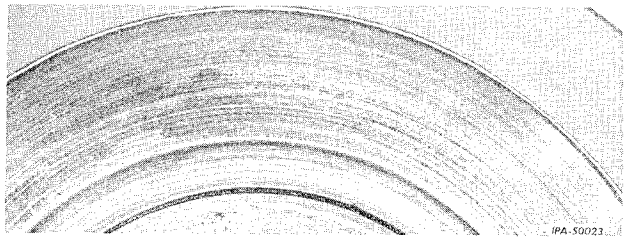
The ceramic buttons, Illust. 14, show a typical normal wear pattern. When the buttons have worn down to the grid, the driven member will then have to be replaced, and the mating surfaces checked to determine their serviceability.

7. REASSEMBLY (Refer to Illust. 3.)

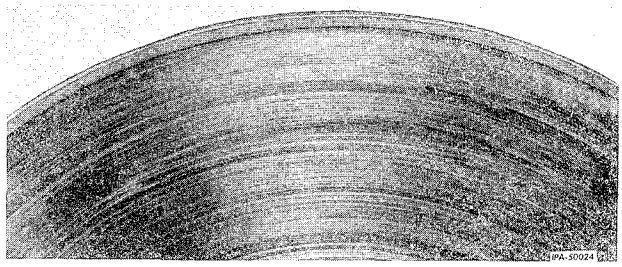
1. Locate the back plate (25) on the pressure plate (26).

2. T-6, TD-6 (61) AND 6 (62) SERIES, T-9, TD-9 (91) SERIES BELOW SERIAL 67462: Install the three return springs and drive the spring pins in place. The head of the pin should face in the direction of rotation. (See Illust. 12).

TD-9 (91) SERIES, SERIAL 67462 AND UP, AND 9 (92) SERIES: Install the six helical coil return springs (33). Secure the spring stop (35) with the retaining pin (34), washer (38) and "X" washer (39).



Illust. 15 - Flywheel Grooving Showing Typical "Phonographic" Type Pattern.



Illust. 16 - Pressure Plate Normal Wear Pattern.

3. Install the bearing plate (if so equipped) and bearing (20) on the sleeve (23) if it has been replaced and press a new bushing or bushings (22) in the sleeve also, if they were removed. The snap ring (19) should be installed to retain the bearing (20).

4. Install the bearing carrier (18). On the 91 series after serial 67462, and the 92 series, a snap ring (21) secures the carrier. With the snap ring loosely in place on the inner side of the bearing, position the carrier on the bearing, press down and install the snap ring. Three cut-outs in the carrier provide access points for removing or installing the snap ring.

PRINTED IN UNITED STATES OF AMERICA

7. REASSEMBLY

5. 6, 6 (61), 6 (62), 9, 9 (91) SERIES BELOW SERIAL 67462: Assemble the connecting links (29) to the camshaft (31), being sure the connecting link pins (30) and (28) face in the direction of clutch rotation (see Illust. 12.) Connect the links to the sleeve, and lock all pins with "X" washers.

9 (91) SERIES ABOVE SERIAL 67462, AND 9 (92) SERIES: Assemble the connecting links (29) to the camshafts (31) using the short pin (30). The headed pin (28) connects the link to the sleeve (23) and the head of the pin should face in the direction of rotation and secured with an "X" washer.

6. Position the sleeve assembly (23) with camshafts on the pressure plate (26). Be sure the cam rollers ride properly in the saddles and on the camblocks, and that the connecting links are vertical, before continuing with the next step.

7. Install the adjusting ring plate (17) and adjusting ring (16). Block up the sleeve assembly with a wood cube (4" x 4"). Turn the adjusting ring in until it picks up the weight of the sleeve and at this point the over-center action can be felt. Install the adjusting ring lock (42) and tighten the two hex nuts.

8. Install the clutch shaft (14) in the coupling (10) and install the snap ring (12) in the coupling ring groove. The driven member (45) can now be installed.

NOTE: The clutch must be in the engaged position when ready for installation.

8. INSTALLATION (Refer to Illust. 3)

1. Install a new pilot bearing in the flywheel face if the old one is no longer serviceable.

2. Lower the clutch into the clutch compartment using a chain hoist. Slide the clutch shaft into the pilot bearing. After aligning the holes of the backplate with those in the flywheel, install the six clutch mounting bolts.

3. Set the release fork (6) into position, so that the bushings (7) align with the pins of the carrier (18). The lubrication fitting should be at the top.

4. Slide the release shaft (5) through the side of the main frame and through the fork (6). The keys (3) and (4) should be inserted into the shaft prior to driving the shaft through the fork and then on into and through the main frame at the opposite side.

5. Assemble the clutch hand lever (2) to the end of the shaft (5). Install the locking cap screw in the handle and the two screws in the release fork (6). Be sure the fork is centered over the carrier (18).

6. Mesh the teeth of the clutch shaft with the grooves in the coupling. Then, rotate and align the dowel bolt holes. Secure with three dowel bolts (9). Be sure the grease fitting (13) can be reached and install the end plate (8) with three cap screws.

7. Adjust the clutch as outlined in Par. 9, "ADJUSTMENTS."

8. Install the clutch compartment cover. Install the floor plates and supports. Release the steering brake pedals and steering clutch levers.

9. 6 AND 9 SERIES: Install the air cleaner to the dash.

6, (61), 6 (62), 9 (91) AND 9 (92) SERIES: Install the air cleaner under the hood.

9. ADJUSTMENTS

1. Remove the clutch inspection cover.

2. With the clutch disengaged and the clutch brake engaged, slowly crank the engine until the adjusting ring lock appears.

3. Disengage the lock and rotate the adjusting ring until the hand lever pull at handle is 60 to 65 pounds for bi-metallic or semi-metallic clutch facings and 40 to 45 pounds for sintered metal or cermetallic type facings. Transmission shift lock mechanism, if used, should be disconnected from the clutch hand lever during adjustment.

4. Engage the adjusting ring lock and tighten the lock bolts.

Continued on next page.

9. ADJUSTMENTS - Continued

5. Start the engine and check to see that the driven member is free with the clutch disengaged.

6. Reassemble the transmission shift lock mechanism to the clutch hand lever.

7. Replace the clutch inspection cover.

NOTE: For satisfactory clutch operation, do not adjust the clutch so tightly that the over-center action is not easily obtained. If little or no pressure is required to engage the clutch by hand, further adjustment as outlined above is necessary. When correct adjustment has been obtained - when a considerable but not excessive pressure can be felt when the operating hand lever is pulled back - tighten the lock. Should adjustment as made above cause the cams to be tight and prevent over-center action, back off the adjusting ring one notch (counterclockwise).

10. CLUTCH ALIGNMENT

Necessity for Proper Alignment

The clutch shaft, between the pilot bearing and the transmission bearing, is in effect an extension of the crankshaft, and it should always be in perfect alignment with the crankshaft. In other words, an imaginary line extending through the axis of the crankshaft could be continued through the axis of the clutch shaft if the clutch is in proper alignment.

With all rotating clutch parts thus assembled around a common axis, it is obvious that to operate satisfactorily they must rotate concentrically and that anything which would cause parts to rotate eccentrically, such as wear on the pilot bearing and/or clutch bearing, would impair the efficiency of these parts and probably in time cause serious damage. Consequently, when adjusting or assembling the clutch, be alert to evidences of misalignment and do whatever is necessary to correct that condition before the efficiency of the clutch is impaired and expensive replacement of parts becomes necessary.

Evidences and Causes of Misalignment

The most common evidence of engine clutch misalignment is wear on the clutch shaft splines and corresponding wear in the clutch disc hubs. Other evidences are distorted or broken clutch discs, uneven wear on facings, and a "dragging" clutch.

The most common cause of such conditions is wear on the clutch pilot bearing and transmission bearing. Other causes, all attributable to carelessness in assembling, include a loosely bolted flywheel, a flywheel assembled at an improper angle to the crankshaft (because of burrs, dirt, etc.) causing it to run out of true, a loosely bolted flywheel housing, and a flywheel housing assembled at an improper angle to the crankcase (because of burrs, etc.). Still other causes, attributable to rough handling, accidents, etc., include distortion of the flywheel housing.

Service Procedure

Normally the replacement of a worn clutch pilot bearing and transmission bearing will restore clutch alignment. In case of chronic clutch difficulty however, a thorough check should be made of all factors affecting the alignment of the clutch. The principal factors to be checked are as follows:

(a) Concentricity of the pilot bearing bore and the crankshaft.

(b) Flywheel perpendicularity to the crankshaft.

(c) Alignment of the engine with the transmission:
1. Along parallel planes.
2. Horizontally and vertically.

NOTE: These checks must always be made in the order given. The detailed procedure for each is as follows:

Concentricity of the Pilot Bearing Bore and the Crankshaft (Illust. 17).

CAUTION: Before starting this check, make sure the flywheel housing is securely bolted to the engine, and the flywheel is securely attached (bolted) or fitted (press fit) to the crankshaft.

To check the concentricity of the pilot bearing bore and crankshaft, remove the bearing and attach a dial indicator to the flywheel housing

10. ALIGNMENT

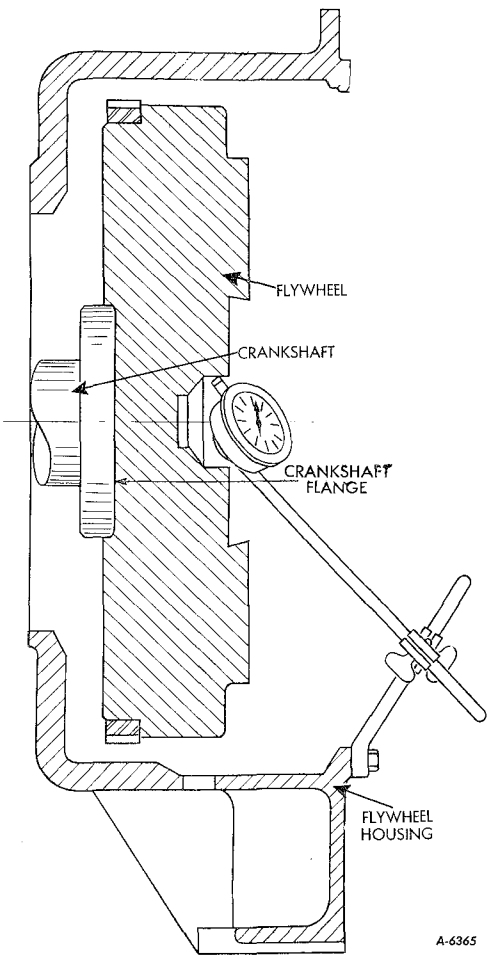
or tractor frame, placing the point of the indicator against the pilot bearing bore as indicated in the illustration. Revolve the flywheel and note any variation. Permissible variation is 0.006 inch. Variation in excess of 0.006 inch (which condition is extremely rare) indicates need for rebushing the bore or replacing the part in which the bore is located.

Flywheel Perpendicularity to Crankshaft (Illust. 18).

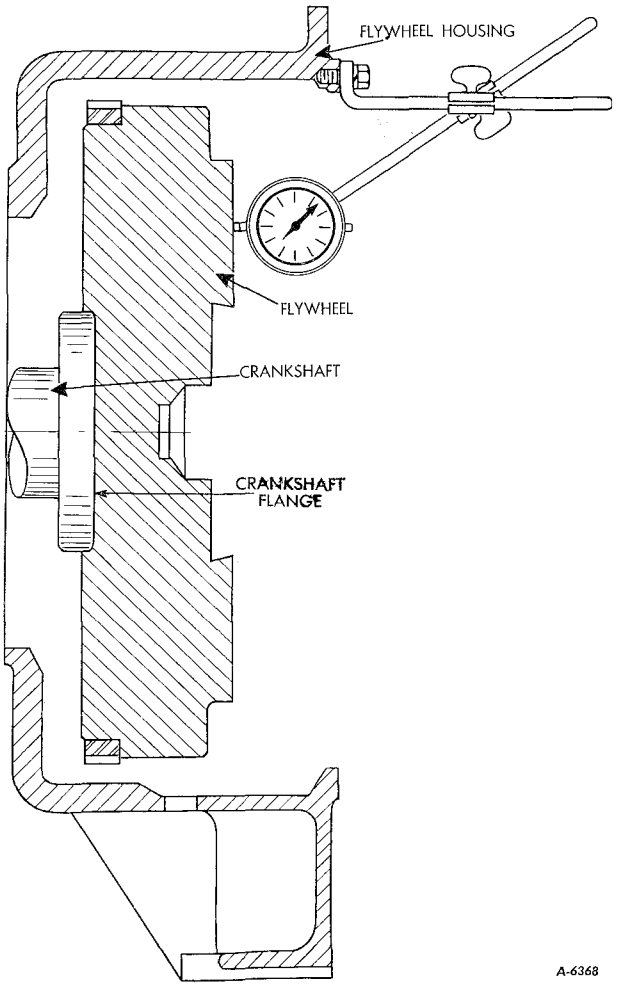
To check the perpendicularity of the flywheel to the crankshaft, attach a dial indicator to the flywheel housing, placing the point against the friction surface of the flywheel as indicated in the illustration. Revolve the engine flywheel one revolution and note the variation on the dial. Variation should not exceed 0.006 inch.

If excessive variation is noted, remove the flywheel and clean well between the flywheel and the crankshaft flange. Reassemble the flywheel to the crankshaft, drawing the attaching cap screws up evenly and tightly, and recheck. If the surfaces have been thoroughly cleaned, the test should be satisfactory.

continued on next page



Illust. 17 - Showing position of dial indicator when checking concentricity of pilot bearing bore and crankshaft.



Illust. 18 - Showing position of dial indicator when checking perpendicularity of flywheel to crankshaft.

10. CLUTCH ALIGNMENT - Continued

Alignment of the Engine with the Transmission

(a) Along parallel planes

(b) Horizontally and vertically

When checking the alignment of the engine to the transmission, a series of indicator readings must be taken on the face and also O.D. of the transmission driving flange coupling.

The flange side face readings, taken at 3, 6, 9 and 12 o'clock positions, serve to indicate the parallel condition of the crankshaft axis to the transmission drive shaft center line.

The flange O.D. readings, also taken at 3, 6, 9 and 12 o'clock positions, serve to indicate the horizontal and vertical relations of the crankshaft center line to the transmission shaft center line.

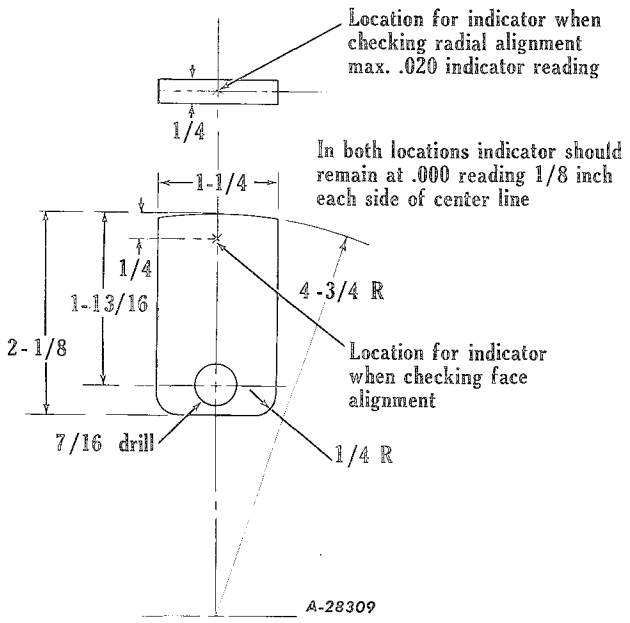
Maximum tolerances of these checks are as follows:

Side face readings - .001" per inch of the diameter of the circle in which the indicator rotates.

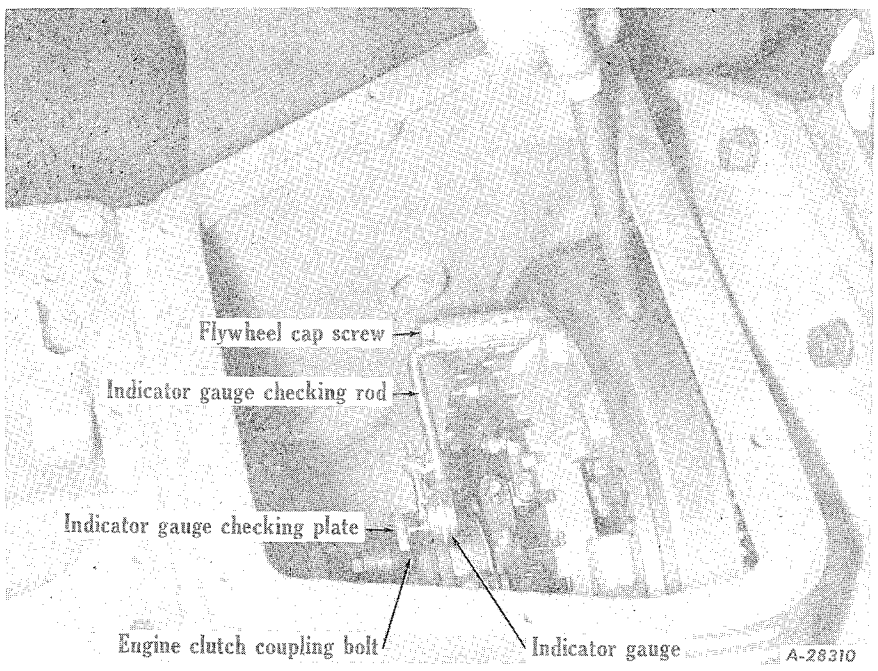
O.D. readings - .010" eccentricity of center lines, or .020" indicator reading.

Preparatory Steps for Taking Readings

NOTE: Before you make any checks, be sure to ground the magneto (if used) to prevent accidental starting.



Illust. 19 - Checking Plate Used on all 6 and 9 Series.



Illust. 20 - Prying Flywheel Back. Indicator Gauge stem set on Checking Plate in 12 o'clock Position.

PRINTED IN UNITED STATES OF AMERICA

It is suggested that specially designed rigid checking rods be made for each model, as shown in Illust. 24 and 25. (This is mandatory, as insufficiently supported rods will deflect when the flywheel is rotated and cause errors in indicator readings.)

It is also necessary that a gauge indicator plate (Illust. 19) be made to facilitate checks made on all 6 and 9 series crawler tractors.

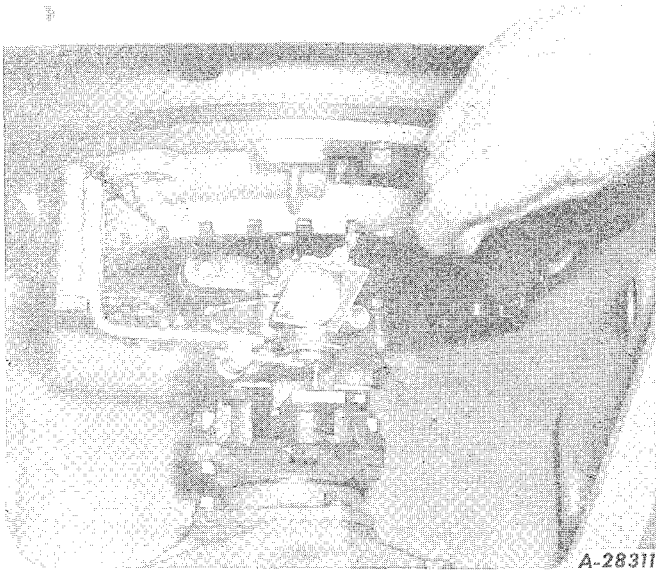
CHECKING FOR PARALLEL PLANE

1. Clamp the indicator checking rod to one of the flywheel clutch plate cap screw holes. Attach the gauge indicator plate to the engine clutch coupling (Illust. 20, 21 and 22). The first check is to indicate the transmission driving flange side face for parallel plane.

2. Mount the indicator to the rod which is bolted to the flywheel (Illust. 20).

3. Adjust the indicator so that the stem is perpendicular to the gauge plate as shown in Illust. 20 and 21.

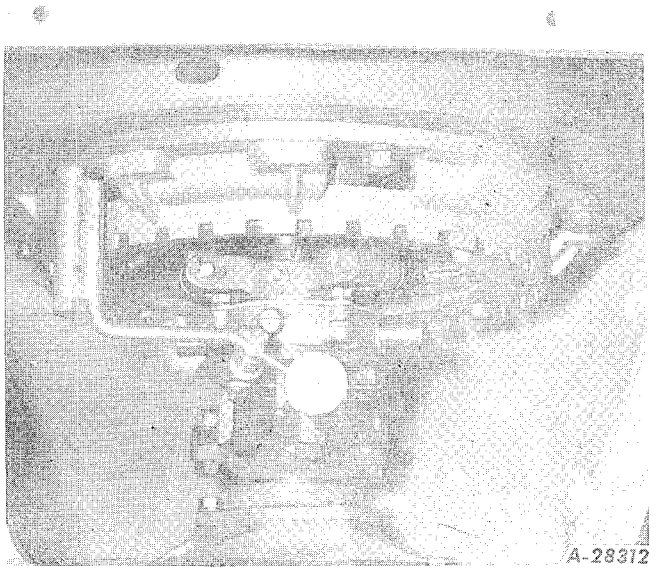
NOTE: The flywheel must be pried to the rear to eliminate end play error in the setting of the indicator.



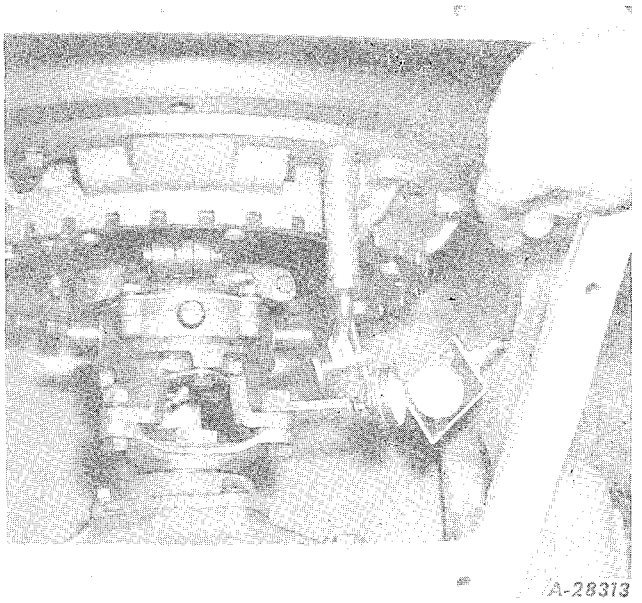
Illust. 21 - Indicator gauge stem set on face of checking plate in 12 o'clock position showing use of mirror in taking reading.

4. With the engine clutch engaged, the flywheel pried back, and the indicator set at zero reading in the 12 o'clock position (top) (Illust. 21 and 22), rotate the flywheel to position the indicator at 9 o'clock position, pry back the flywheel again for elimination of end play error and note the indicator reading. Following this procedure, position the indicator (by rotating the flywheel) to 6 o'clock, 3 o'clock, and back to 12 o'clock, prying back the flywheel each time, before noting the reading of the indicator.

Continued on next page.



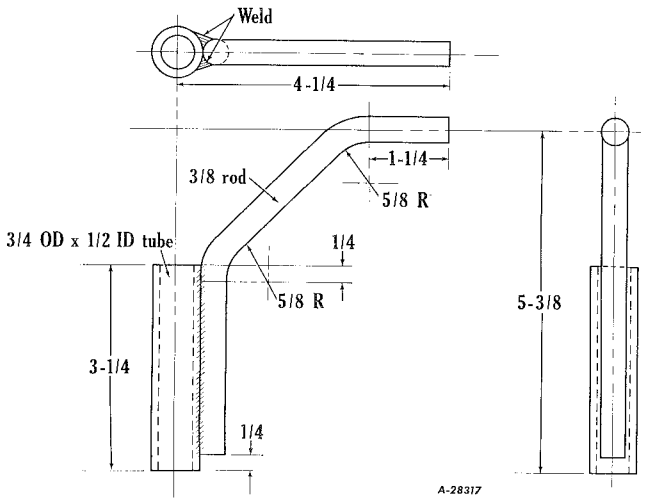
Illust. 22 - Indicator gauge stem set on flange O.D. of checking plate in 12 o'clock position



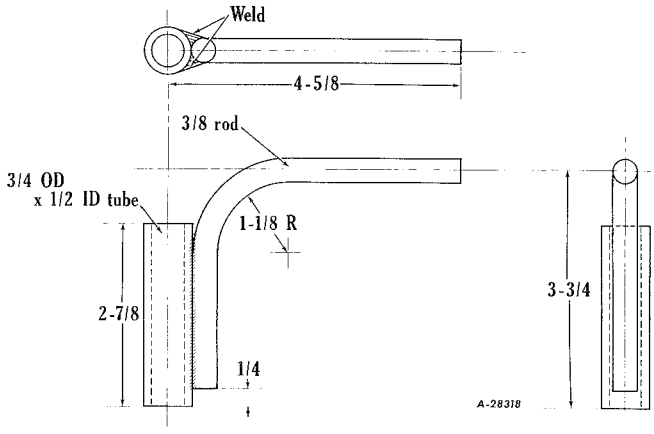
Illust. 23 - Indicator gauge stem set at flange O.D. of checking plate in 3 o'clock position.

10. CLUTCH ALIGNMENT - Continued

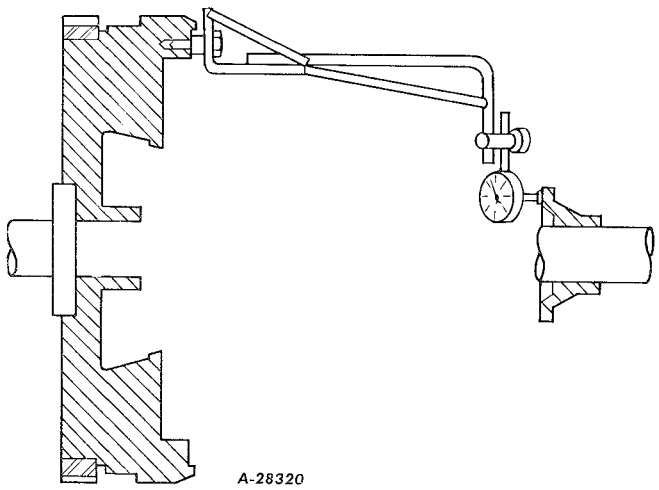
5. Tolerance of indicator reading should not exceed .001" per inch of the diameter of the circle in which the indicator rotates. For example, if the dimensional difference of location of the indicator from 12 o'clock or top position, to 6 o'clock or bottom position, is 6 inches, then the indicator reading should not exceed .006".



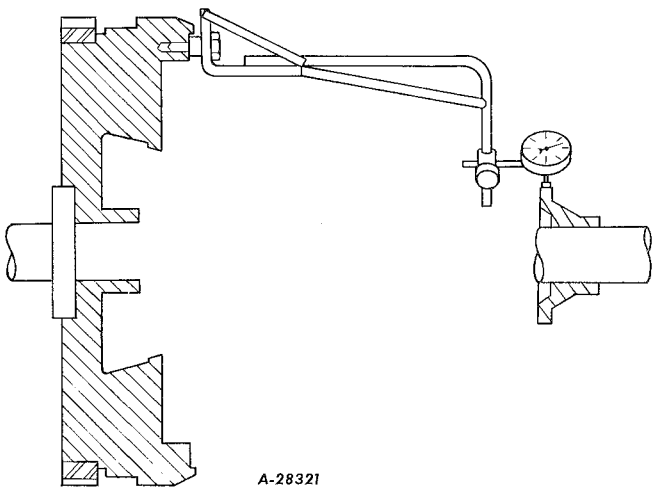
Illust. 24 - Type of Checking Rod Used for 6 Series Crawler Tractors.



Illust. 25 - Type of Checking Rod Used for 9 Series Crawler Tractors.



Illust. 26 - Showing position of the indicator gauge stem on the flange side face when checking the parallel condition of the crankshaft axis to the transmission drive shaft center line. This check can be made either with the engine clutch and clutch coupling assembled or without the engine clutch and clutch coupling, as shown here.



Illust. 27 - Showing the position of the indicator gauge stem on the flange O.D. when checking the horizontal and vertical relations of the crankshaft center line to the transmission drive shaft center line. This check can be made either with the engine clutch and engine clutch coupling assembled or without engine clutch and engine clutch coupling, as shown here.

PRINTED IN UNITED STATES OF AMERICA

CORRECTION FOR PARALLEL PLANE

1. Remove the cap screws from the front engine support. Add or remove an equal amount of shims from under both legs of the support, depending on the location of the high and low reading of the indicator to the vertical line.

2. Shift the front of the engine to either side, depending on the horizontal line reading.

3. Securely tighten the front engine support cap screws.

CHECKING FOR HORIZONTAL AND VERTICAL CENTER LINES

1. To check the horizontal and vertical relation of the crankshaft center line with the transmission shaft center line, the procedure is identical with that of the parallel check described above, except that the indicator is placed on the top of the gauge plate. (Illust. 22 and 23.)

2. The readings observed in the horizontal and vertical positions of the indicator when the flywheel is rotated through the 9 o'clock, 6 o'clock, 3 o'clock and 12 o'clock positions should not exceed .010" eccentricity, or .020" indicator reading.

CORRECTION FOR HORIZONTAL AND VERTICAL CENTER LINES

1. Remove the two rear engine dowel bolts and loosen all cap screws, which hold the rear engine support to the main frame, enough to allow the engine to be shifted.

2. Move the rear portion of the engine into correct alignment, by raising or lowering with a jack, or by shifting to either side with a bar.

3. Assuming that the face has been checked for parallel plane and is square, equal shims to the amount of the engine shift (up or down) must be added or removed from each side of the front engine support, depending on whether the engine is raised or lowered.

4. Tighten the cap screws of the rear engine support.

5. Recheck both the face and O.D. to assure correct alignment. Repeat correction adjustments if necessary until within tolerances of .020" on the O.D., and .001" per inch of diameter of the circle in which the indicator rotates.

6. Ream the dowel holes to secure a good drive fit and insert oversize dowels.

11. METHODS OF CHECKING FRICTION SURFACES

To be effective, contact between friction surfaces must be as nearly complete as possible. To assure maximum contact in the case of metal surfaces, they are usually finish-ground by the manufacturer rather than merely machined. To assure maximum contact in the case of faced surfaces, great care is exercised by manufacturers to avoid any unevenness which would reduce the total contact area. Likewise, when removing and inspecting a clutch, examine the contact surfaces carefully for ridges, scores, and grooves which would reduce the contact area, and be sure that such irregularities have been corrected before reassembling the clutch.

The friction surfaces which must be kept in good order include:

(a) Flywheel
(b) Pressure plate
(c) Driven member

Flywheel (Illust. 28)

It is good practice, whenever removing a single-plate clutch from a flywheel having a friction surface, to wash and clean the flywheel thoroughly before inspecting the friction surface for ridges, scores, grooves, heat cracks, and burned spots caused by overheating, projecting rivets, etc.

If the friction surface shows no noticeable damage, it can be assumed that it is in good condition.

If, however, any of the above mentioned evidences of damage are present, the friction surface should be checked with a straightedge in order to locate and mark the high spots. Place the straightedge across the flywheel and note whether it contacts the surface evenly and firmly all the way across. Make this test at different points and in different positions all around the flywheel friction surface and try to insert a 0.006 inch feeler gauge inside of any high spots noted. If the 0.006 inch feeler gauge can be inserted at any inside point, the flywheel should be removed and ground down, if grinding equipment is available. Otherwise, it should be mounted in a lathe, and dressed

continued on next page

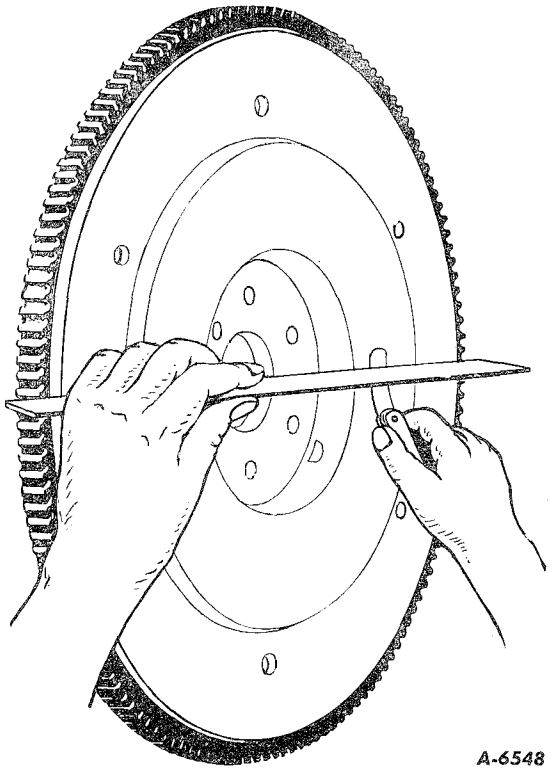
11. METHODS OF CHECKING FRICTION SURFACES -Continued

down over the friction surface with emery cloth. Start with a coarse cloth and finish with a fine cloth. If the surface is extremely rough, it should first be cut down with a lathe tool, then smoothed with the emery cloth.

Pressure Plate (Illust. 29)

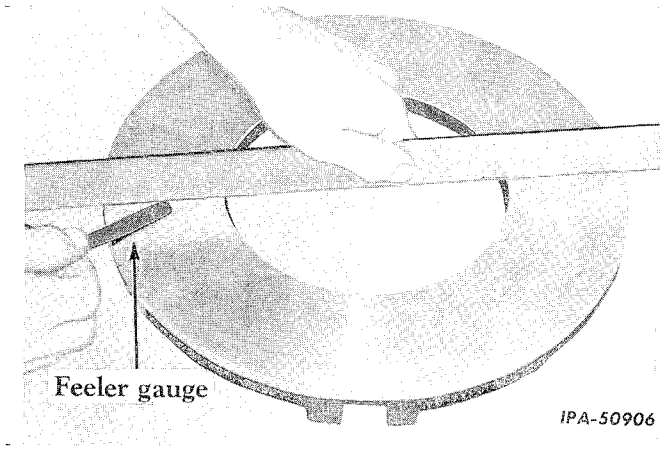
Every evidence of damage which may be present on a flywheel friction surface, as previously discussed, may also be present on a pressure plate, plus one additional -- warpage. The pressure plate, having less mass than the flywheel, will sometimes warp as the result of continued overheating.

Check the pressure plate for high spots and warpage in the manner prescribed for checking the flywheel friction surface, including the use of a 0.006 inch feeler gauge to measure the high spots and the degree of warpage. (Refer to Illust. 29.)



Illust. 28 - Using Straightedge to Check Flywheel for Surface Unevenness.

If the inside measurement of high spots or warpage exceeds the 0.006 inch tolerance, the pressure plate should be dressed down with emery cloth in the manner prescribed for the flywheel. If damage is severe, it is always advisable to replace the pressure plate.



Illust. 29 - Using Straightedge to Check Pressure Plate for Warpage.

Driven Member

The main considerations when checking a driven member of the faced type are: (a) whether the facing is free of grease, (b) whether the facing is smooth and even all around, (c) whether the facing is held tightly to the disc all around, with all rivets properly countersunk, and (d) whether the facing has been worn to the point where it should be replaced.

If (a) the facing is not free of grease, it should be replaced. Experience has demonstrated the futility of washing or burning saturated clutch facings in order to remove the grease.

Likewise, if the facing has buckled and (b) is no longer smooth and even all around, or if, because of loose rivets or torn rivet holes, the facing (c) is not held tightly to the disc, it should be replaced.

If neither of the two conditions is present but the facing is found to be (d) worn down and there is imminent danger of the rivets contacting and scoring the mating surface, the facing should be replaced.

CAUTION: Be sure all rivets in a new facing are properly countersunk.

PRINTED IN UNITED STATES OF AMERICA