M.I. 9587
*Rev. A

ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT

# MAINTENANCE INSTRUCTION

## MODERNIZATION RECOMMENDATION

## ENGINE IDLER GEAR STUBSHAFT ASSEMBLY

PURPOSE: To upgrade the idler gear stubshaft assembly and gears to current design for improved strength and dependability.

APPLICATION: Turbocharged Engines – All 645 and 567.
Blower-Type Engines – All 645 and 567 except 567A and earlier.

DISCUSSION: Replacement idler gear stubshaft assembly 8470154, Fig. 1, for turbocharged engines, and assembly 8484128, Fig. 2, for blower-type engines are now available for upgrading the engines to current design standards. The new design incorporates the following improvements.

Turbocharged Engines - An oil flow that supplies filtered turbocharger oil to the lower (No. 1) idler gear stubshaft. This change includes replacement of the 2 GPM soakback pump and 1/4 HP motor with a 3 GPM pump and 3/4 HP motor to provide the increased oil flow required by the improved stubshaft bracket.

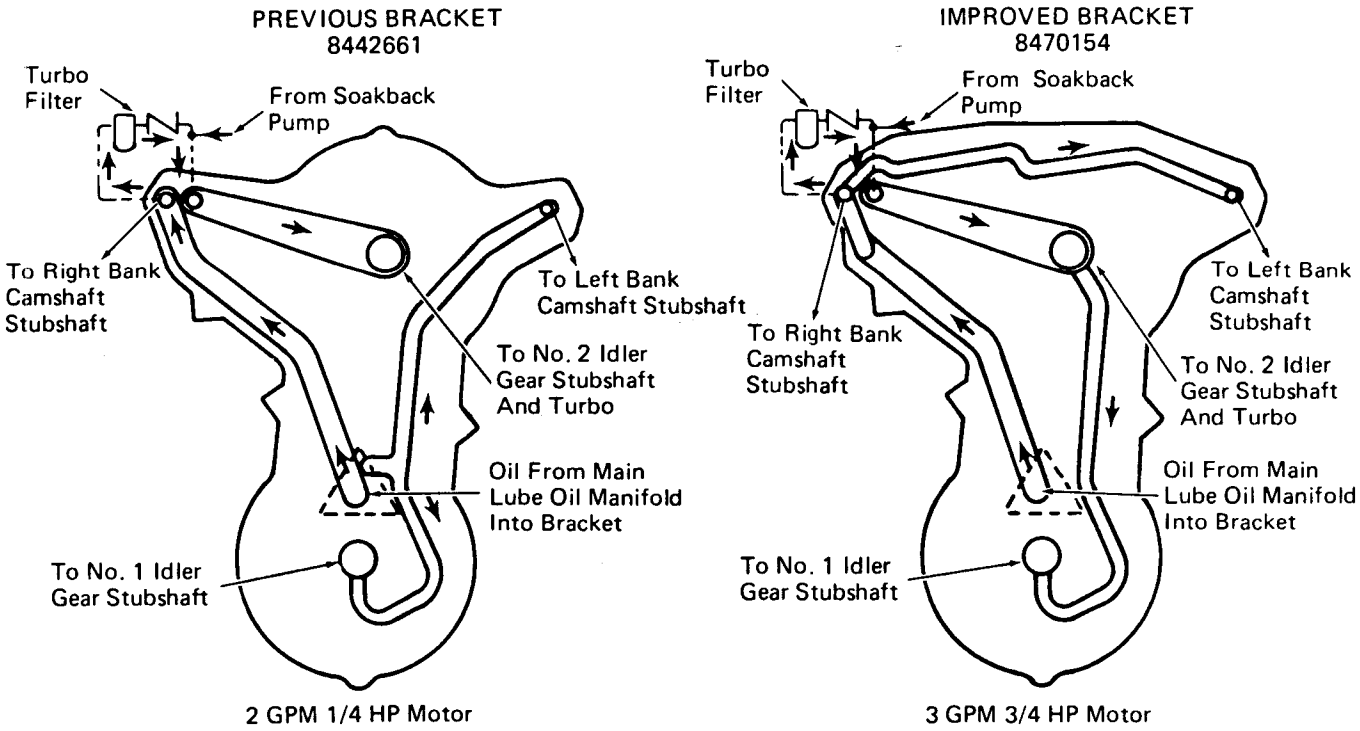


Fig. 1 – Idler Stubshaft Bracket Oiling, Turbocharged Engines

*This bulletin is revised and supersedes previous issues of this number.

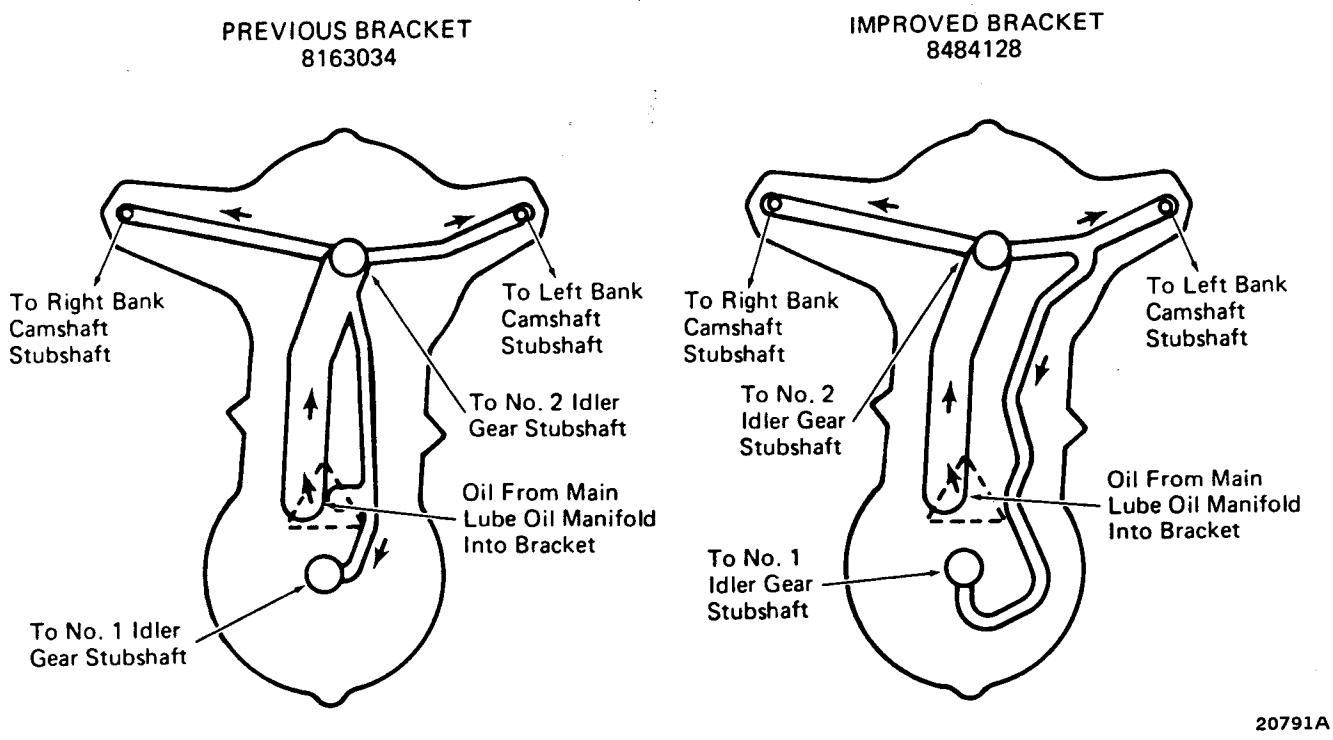


Fig. 2 – Idler Stubshaft Bracket Oiling, Blower-Type Engines

Blower-Type Engines – A new stubshaft with through-bolting (similar to current stubshaft design for turbocharged engines), shrunk-on bearings, and oil passages enlarged and rerouted to increase oil flow and minimize entry of oil-borne debris. The new stubshaft assembly for the 567B case only will have all of the above except through-bolting.

EMD recommends that engines requiring service replacement of gears and/or double idler stubshaft be upgraded with the latest material. Part numbers and rework procedures are as follows.

## GEARS

MATERIAL REQUIRED:

| PART NO. | DESCRIPTION | PRICE EA. | ENGINE MODEL |
|---|---|---|---|
| 8483944 | Lower Idler | $241.88 | All Blower-Type And Turbocharged Engines |
| 8483945 | Upper Idler | 264.66 | All Blower-Type Engines |
| 8483947 | Blower Drive-29T | 138.00 | 8 & 16-645 Blower-Type |
| 8483942 | Blower Drive-30T | 130.57 | 8 & 16-567 Blower-Type |
| 8483946 | Blower Drive-39T | 166.00 | 12-645 Blower-Type |
| 8483943 | Blower Drive-41T | 138.00 | 6 & 12-567 Blower-Type |

The new gears incorporate induction hardened bores at the upper idler, lower idler, and blower drive gears, for increased resistance to dirt cutting.

## IDLER STUBSHAFT – TURBOCHARGED ENGINES

MATERIAL REQUIRED (Cont'd):

| NO. REQ'D. | PART NO. | PRICE EA. | DESCRIPTION |
|---|---|---|---|
| 1 | 8470154 | $467.00 | Stubshaft Assembly - includes lower bearing |
| 1 | 8492180 | 470.00 | Soakback motor/pump assembly |
| 1 | 8418364 | 10.36 | Thrust plate - lower idler |
| 4 | 8418363 | .85 | Bolt, 5/8"-18 x 6-1/2" |
| 4 | 8282178 | .11 | Washer, 5/8", hardened & ground |
| 18 | 8028302 | .16 | Bolt, 1/2"-20 x 1-1/2" |
| 18 | 8260114 | .06 | Washer, 1/2", hardened |
| 2 | 8306807 | .33 | Dowel, 1/2" x 1-3/16", hardened |
| 2 | 8028327 | .08 | Bolt, 5/16"-24 x 1-1/2" |
| A/R | 8049116 | 3.93 | Lockwire, .047" diameters (500 ft.) |
| 2 | 8366345 | .04 | Gasket, Soakback pump |
| 1 | 8458724 | 11.23 | Circuit Breaker 30 Amp. |

The new style stubshaft, Fig. 3, for turbocharged engines can be applied to all 567 and 645 engines except 567 models with external turbocharger lube oil piping. Pre-1972 engines require drilling and tapping of four 5/8"-18 holes in the crankcase for the lower idler gear stubshaft 6-1/2" bolts plus three 1/2"-20 holes in the crankcase for the stubshaft bracket. 1972 to 1974 crankcases only require the drilling and tapping of the three 1/2"-20 holes.

NOTE: For locomotive application the new 3 GPM - 3/4 HP soakback pump and motor assembly, along with a 30 ampere circuit breaker must be installed in conjunction with the new turbo stubshaft bracket. Locomotives built in the period from 1970 through May 1975 were equipped with a 15 ampere circuit breaker in the soakback pump motor circuit. Locomotives built before 1970 and after October of 1974 were equipped with a 30 ampere circuit breaker.

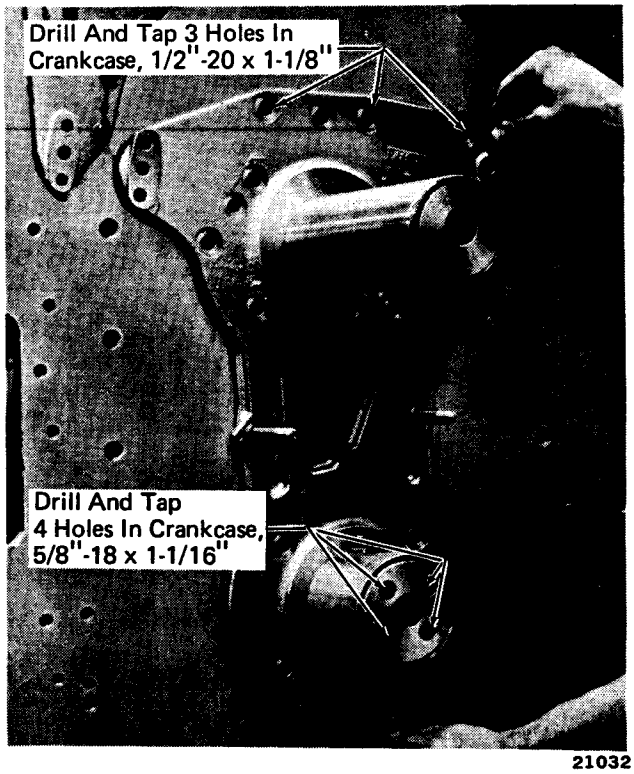


Fig. 3 – Using Bracket To Locate New Holes In Crankcase

## IDLER STUBSHAFT - BLOWER-TYPE ENGINES

MATERIAL REQUIRED (Cont'd):

| NO. REQ'D. | PART NO. | PRICE EA. | DESCRIPTION |
|---|---|---|---|
| 1 | 8484128 | $470.00 | Stubshaft Assembly - Includes shrunk-on bearings |
| 1 | 8418364 | 10.36 | Thrust Plate - Lower Idler |
| 4 | 8418363 | .85 | Bolt 5/8"-18 x 6-1/2" |
| 4 | 8282178 | .11 | Washer, 5/8", hardened and ground |
| 15 | 8028302 | .16 | Bolt, 1/2"-20 x 1-1/2" |
| 15 | 8260114 | .06 | Washer, 1/2", hardened |
| 2 | 8071443 | .33 | Dowel, 1/2" x 1-3/16" |
| 2 | 8028327 | .08 | Bolt, 5/16"-24 x 1/2" |
| A/R | 8049116 | 3.93 | Lockwire .047" diameter (500 ft) |

## IDLER STUBSHAFT - 567B

| NO. REQ'D. | PART NO. | PRICE EA. | DESCRIPTION |
|---|---|---|---|
| 1 | 9098013 | $473.00 | Stubshaft Assembly - Includes bearings |
| 1 | 8081394 | 7.19 | Thrust Plate - Lower Idler |
| 4 | 8048764 | .40 | Bolt 1/2"-13 x 1-1/4" Plate Mounting |
| 15 | 8028302 | .16 | Bolt 1/2"-20 x 1-1/2" |
| 15 | 8260114 | .06 | Washer, 1/2", hardened |
| 2 | 8071443 | .33 | Dowel, 1/2" x 1-3/16" |
| 2 | 8028327 | .08 | Bolt 5/16"-24 x 1/2" |
| A/R | 8049116 | 3.93 | Lockwire .047" diameter (500 ft) |

The new stubshaft with through-bolting can be applied to all model 567C through 645 blower-type engines by drilling and tapping four 5/8"-18 holes in the crankcase rear end plate. For an engine built with a 567B case, EMD recommends that to avoid oil leaks into the air box the stubshaft with through bolting should not be used. Instead, use stubshaft 9098013, which is similar to 8484128 except the lower idler is not modified with through-bolt holes. It maintains the four 1/2"-13 tapped holes.

## PROCEDURE

TURBOCHARGED ENGINES

1. After removing the cam drive housing and old stubshaft bracket, position the new stubshaft so that the dowel holes in the stubshaft line up with those in the crankcase. Install dowels and tighten several bolts.

NOTE: If dowel holes in crankcase are oversize or out of round, perform Step 3.

2. Place the new lower and upper idler gears on the stubshafts and check to see that backlash is .007"-.016" at the cam gear and crankshaft gear. If acceptable, proceed to Step 4. If not, perform Step 3.

3. Position stubshaft to obtain required backlash and drill and ream for oversize dowels as required to produce full circumference fit. Install dowels.

4. Locate the centers for the four new holes in the end plate by using the holes in the lower stub to pilot an 11/16" diameter drill. Drill only deep enough to provide centers.

5. Locate centers for the three 1/2"-20 holes by using the three new holes at the top of the new stubshaft to pilot a 9/16" diameter drill. Drill only deep enough to provide centers.

6. Remove stubshaft bracket and thoroughly clean.

7. On the four centers established, drill 37/64" diameter x 1-5/16" deep, countersink, and tap 5/8"-18 UNF 2B x 1-1/16" deep (use bottoming tap). Use care to avoid getting chips into engine or stubshaft.

8. On the three centers established, drill 29/64" diameter x 1-1/8" deep, countersink, and tap 1/2"-20 UNF 2B x 7/8" deep (use bottoming tap). Avoid getting chips into engine and stubshaft.

9. Thoroughly clean rear end of engine, removing all chips.

10. Apply stubshaft and dowels. Apply fifteen 1/2" bolts with hardened washers, torque to 90 ft-lbs, and lockwire. Apply the lower idler gear, thrust plate, and four 5/8" bolts with hardened washers; torque to 185 ft-lbs, and lockwire.

11. Proceed with engine assembly.

12. For locomotive application apply new soakback pump and gasket. On some engines it may be necessary to relocate the pump mounting bracket so piping to the new pump will fit. To accomplish this, remove mounting bracket, hook up soakback pump and appropriate pipes, and apply loose mounting bracket to soakback pump. This locates the proper position of the bracket. Weld the mounting bracket in place.

## PROCEDURE

BLOWER-TYPE ENGINES

1. After removing the cam drive housing and old stubshaft bracket, position the new stubshaft so that the dowel holes in the stubshaft line up with those in the crankcase. Install dowels and tighten several bolts.

NOTE: If dowel holes in crankcase are oversize or out of round, perform Step 3.

2. Place the new lower and upper idler gears on the stubshafts and check to see that backlash is .007"-.016" at the cam gear and crankshaft gear. If acceptable, proceed to Step 4. If not, perform Step 3.

3. Position stubshaft to obtain required backlash and drill and ream for oversize dowels as required to produce full circumference fit. Install dowels.

4. Disregard Steps 5, 6, 7, 8, and 9a if applying stubshaft 9098013 (567B engines). Disregard step 9b if applying stubshaft 8484128.

5. Locate the centers for the four new holes in the end plate by using the holes in the lower stub to pilot an 11/16" diameter drill. Drill only deep enough to provide centers.

6. Remove stubshaft and thoroughly clean.

7. On the four centers established, drill 37/64" diameter x 1-5/16" deep, countersink, and tap 5/8"-18 UNF 2B x 1-1/16" deep (use bottoming tap). Use care to avoid getting chips into engine or stubshaft.

8. Thoroughly clean rear end of engine, removing all chips.

9a. Apply stubshaft 8484128 and dowels. Apply fifteen 1/2" bolts with hardened washers, torque to 90 ft-lbs, and lockwire. Apply the lower idler, thrust plate, and four 5/8" bolts with hardened washers; torque to 185 ft-lbs, and lockwire.

9b. Apply stubshaft 9098013 and dowels. Apply fifteen 1/2" bolts with hardened washers, torque to 90 ft-lbs, and lockwire. Apply the lower idler, thrust plate, and four 1/2"-13 bolts; torque to 75 ft-lbs, and lockwire.

10. Proceed with engine assembly.

## SUPPLEMENTARY DATA

CRANKCASE AND OIL PAN ASSEMBLIES

All new and used (back through 567C) case and pan assemblies are being supplied with four 5/8"-18 plugs 9433507 in the rear end plate at the position of the No. 1 idler gear stubshaft. As previously mentioned, these end plate holes are basic for all 1975 cases and necessary for the through-bolt stubshaft. The plugs are being applied as a precaution against loss of oil pressure at the No. 1 idler gear stubshaft, and to avoid oil leaks into the air box when the previous style stubshaft that does not have the through-bolting is applied.

The plugs must be removed with the application of the following stubshaft assemblies:

The plugs must not be removed with the application of any other stubshaft assembly.

TURBOCHARGED ENGINES

| PART NO. | DESCRIPTION |
|---|---|
| 8442661 | Stubshaft - Previous |
| 8470154 | Stubshaft - New |

BLOWER-TYPE ENGINES

| PART NO. | DESCRIPTION |
|---|---|
| 8484128 | Stubshaft - L.H. |
| 8484305 | Stubshaft - R.H. |

NOTE: Current Replacement Parts Price Book conditions apply to all prices.