

PART INDEX

1967

PASSENGER CAR

MAINTENANCE and LUBRICATION MANUAL



SERVICE PUBLICATIONS

MAINTENANCE SCHEDULE

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FOREWORD

This car maintenance manual provides the Service Technician with complete information for the maintenance operations on all 1967 Ford, Lincoln and Mercury cars, and the Bronco, Econoline, Falcon Club Wagon and Recreational Vehicles.

The maintenance information is grouped in three parts; maintenance schedule, maintenance operations, and lubrication charts and specifications. The maintenance operations include in-vehicle adjustments.

The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. The Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.



SERVICE PUBLICATIONS

Maintenance Schedule

PART

1

THOUSANDS OF MILES OR NUMBER OF MONTHS, WHICHEVER OCCURS FIRST	As Required	6	12	18	24	30	36	See Manual Page
ENGINE								
Check engine oil level				At Fuel Stops				2-1
Change engine oil and filter		X	X	X	X	X	X	2-1
Clean carburetor air cleaner and filter ①		X	X	X	X	X		2-1
Replace carburetor air cleaner filter ①							X	2-2
Replace carburetor air cleaner filter—closed crankcase emission system only ①			X		X		X	2-2
Clean and refill carburetor oil bath type air cleaner if so equipped ①		X	X	X	X	X	X	2-2
Clean crankcase oil filler breather cap ①		X	X	X	X	X	X	2-2
Check and adjust valve lash—mechanical (170 Six—Econoline and Bronco; 289-4V CID—Mustang; 427 CID Hi-performance engines only)			X		X		X	2-2
Check and adjust accessory drive belts	X							2-3
Clean emission system hoses, tubes (oil separator on 427 and 462 CID engines), fittings, carburetor spacer and replace emission control valve			X		X		X	2-4
Replace thermactor air pump filter if so equipped			X		X		X	2-7
Adjust carburetor—idle speed, idle mixture and fast (cold) idle speed	X							2-7
Check and adjust anti-stall dashpot—Econoline	X							
Adjust accelerator pump lever				Seasonal				2-7
Adjust accelerator pump linkage to environmental requirements—Bronco and Econoline	X							
Lubricate accelerator ball sockets, linkage friction points and carburetor lever kickdown actuating cam—Econoline and Bronco	X							2-15
Check and adjust distributor points	X							2-15
Inspect, clean, adjust and test spark plugs	X							2-16
Check and adjust ignition timing			X		X		X	2-17
Check exhaust control valve for free operation on vehicles so equipped		X	X	X	X	X	X	2-18
Check radiator coolant level				At Least Monthly				2-18
Check radiator coolant level—Econoline and Bronco	X			At Fuel Stops				2-18
Inspect cooling system hoses, lines and fittings—Econoline and Bronco		X						2-18
Replace engine coolant ①							X	2-18
Replace fuel filter—except 240 CID with air conditioner and/or thermactor emission control; 390-4V GT and 427 CID hi-performance; and Lincoln	X							2-19
Replace fuel filter—240 CID with air conditioner and/or thermactor emission control, 390-4V GT and 427 CID hi-performance only							X	2-19
Replace fuel filter—Lincoln		X		X		X		2-19

TRANSMISSION

Adjust automatic transmission front band (intermediate) except Econoline							X	2-20
Adjust automatic transmission intermediate band—Econoline ②		X						2-21
Adjust automatic transmission front band (intermediate)—289-4V CID hi-performance, 427 CID hi-performance, and 428-4V CID police interceptor engines only		X	X	X	X	X	X	2-21

① On engine items, more frequent intervals will be required if the vehicle is operated in extremely dusty areas, for extended periods of idling or short runs which prevent the engine from reaching normal operating temperatures.

② Drain at 36,000 miles or every two years (whichever comes first) when long life coolant is used. Drain every Spring and Fall if long life coolant is not used.

③ Check intermediate band at 6000 miles—no further check required.

☒ Indicates required intervals.

THOUSANDS OF MILES OR NUMBER OF MONTHS, WHICHEVER OCCURS FIRST	As Required	6	12	18	24	30	36	See Manual Page
TRANSMISSION—Continued								
Adjust automatic transmission rear band (reverse)—289-4V CID hi-performance, 427 CID hi-performance, and 428-4V CID police interceptor engines only			X		X			2-22
Adjust automatic transmission rear (reverse) band—Econoline	X							2-22
Check automatic and manual transmission fluid level		X	X	X	X	X	X	2-22
Check manual transmission lubricant level and clean breather—Econoline and Bronco		X	X	X	X	X	X	2-22
Lubricate automatic transmission shift linkage	X							2-22
Lubricate manual transmission shift control and linkage	X							2-22
Check and adjust transmission shift controls—Econoline and Bronco	X							2-22
Check transfer case lubricant level—Bronco 4-wheel drive		X	X	X	X	X	X	2-22
Drain and refill transfer case—Bronco 4-wheel drive					X			2-23
Lubricate speedometer cable—Econoline and Bronco					X			2-23
CHASSIS								
Check power steering reservoir fluid level		X	X	X	X	X	X	2-23
Check brake master cylinder fluid level		X	X	X	X	X	X	2-23
Check rear axle lubricant level		X	X	X	X	X	X	2-23
Check front axle lubricant level—Bronco 4-wheel drive		X	X	X	X	X	X	2-23
Drain and refill front and rear axle—Bronco								2-23
Relubricate king pin bearings and clean and repack Hublok bearings—Bronco								2-23
Lubricate front suspension ball joints (Except Econoline and Bronco)							X	2-23
Lubricate power steering actuator ball and stud—Comet, Cougar, Fairlane, Falcon and Mustang							X	2-24
Lubricate steering linkage—Ford, Mercury, Thunderbird and Lincoln							X	2-24
Lubricate steering linkage—Econoline and Bronco		X	X	X	X	X	X	2-24
Lubricate front axle spindle pins—Econoline		X	X	X	X	X	X	2-24
Change power steering fluid filter—Lincoln							X	2-24
Check wheel nut torque [ⓐ]	X							2-24
Lubricate clutch linkage, pivots and clevises—Econoline and Bronco	X							2-24
Lubricate universal joints and slip yoke—Econoline and Bronco		X	X	X	X	X	X	2-24
Check clutch linkage adjustment—manual and overdrive, if so equipped	X							2-24
Check steering system for looseness—Econoline and Bronco	X							2-27
Check steering gear pre-load—manual steering	X							2-27
Check steering gear over-center mesh load—power steering	X							2-29
Check steering stop adjustment—Econoline and Bronco	X							2-29
Check front end alignment, suspension and linkage	X							2-29
Check brake lines and lining, clean and pack front wheel bearings (Except Econoline and Bronco)						X		2-36
Check brake lines and lining, clean, pack and adjust front wheel bearings—Econoline and Bronco					X			2-38
Lubricate steering arm stops		X	X	X	X	X	X	2-40
Lubricate parking brake linkage and clevises—Econoline and Bronco		X	X	X	X	X	X	2-40
Lubricate brake pedal pivot—Econoline		X	X	X	X	X	X	2-40
Lubricate accelerator linkage—Econoline and Bronco	X							2-40
Check and adjust parking brake linkage	X							2-40
Inspect springs and tighten clips—Econoline and Bronco	X							2-42
Check exhaust system for leaks and deterioration—Econoline and Bronco	X							2-42
Check tire air pressures	X							2-42
Inspect and cross-switch wheels and tires	X							2-42
Inspect and cross-switch wheels and tires—Econoline and Bronco [ⓐ]		X	X	X	X	X	X	2-42
Check battery electrolyte level	X							2-42
Check battery electrolyte level—Econoline and Bronco								2-42
Check air conditioning system if so equipped								2-42

[ⓐ]Within 500 miles of new vehicle delivery or any removal of a wheel.

[ⓑ]Bronco only—balance front wheels after each tire cross-switch or tire change.

ⓧ Indicates required intervals.

THOUSANDS OF MILES OR NUMBER OF MONTHS, WHICHEVER OCCURS FIRST	As Required	6	12	18	24	30	36	See Manual Page
BODY								
Lubricate hood latch	X							2-43
Lubricate hood hinge pivots ①	X							2-43
Lubricate hood auxiliary catch	X							2-43
Lubricate door lock cylinders		X	X	X	X	X	X	2-43
Lubricate luggage compartment lock cylinder if so equipped		X	X	X	X	X	X	2-43
Lubricate door hinges, door check and strikes ①	X							2-43
Lubricate luggage compartment hinge pivots if so equipped ①	X							2-43
Lubricate tailgate lock cylinders if so equipped		X	X	X	X	X	X	2-43
Lubricate tailgate support and hinges if so equipped ①	X							2-44
Lubricate fuel filler door hinges if so equipped ①	X							2-44
Lubricate seat tracks—Econoline and Bronco	X							2-44
Clean body drain holes or examine dust valves for proper operation ①	X							2-44
Clean body and door drain holes—Econoline and Bronco ①	X	X						2-44
Replace windshield wiper blades	X							2-44
Check convertible top operation	X							2-44
Check convertible top fluid level	X							2-44
Lubricate engine compartment cover hinges, latch and lock—Econoline	X							2-44
Lubricate glove box door lock—Econoline and Bronco	X							2-44
Lubricate folding step mechanism—Econoline ①	X							2-44

ELECTRICAL—Additional Items for Econoline and Bronco

Clean distributor cap and rotor	X							2-44
Lubricate distributor bushing (oil cup)					X			2-44
Clean battery cables, terminals and top of battery	X							2-44
Replace distributor points	X							2-45
Check and adjust distributor spark advance	X							2-45
Check spark intensity of each spark plug wire	X							2-46
Check alternator output	X							2-46
Check alternator regulator	X							2-47
Check headlight alignment	X							2-48
Check windshield washer fluid level	X							2-48

① Check often in areas where moisture and humidity are high, or where chemicals are used for snow removal.

☒ Indicates required intervals.

Maintenance Operations

PART 2

Section	Page	Section	Page
1 Engine.....	2-1	4 Body.....	2-43
2 Transmission...	2-20	5 Electrical.....	2-44
3 Chassis.....	2-23		

The maintenance operations described herein are to be considered as minimum operations on vehicles which are in operating condition and require only periodic checkup and service. If, upon inspection, a component requires

more than adjustment, cleaning or simple replacement, refer to the applicable Group No. in the appropriate Shop Manual for complete information.

All variations of all Ford-built ve-

hicles cannot be covered in complete detail here. If a vehicle is found to have a special component installed that is not fully covered herein, refer to the Shop Manual for that vehicle for complete details.

1 ENGINE

CHECK ENGINE OIL LEVEL

Check the oil level dipstick to be sure it indicates the correct quantity of oil in the crankcase. Be sure the oil is clean.

CHANGE ENGINE OIL AND FILTER

REMOVAL

1. Raise the car.
2. Remove the oil pan drain plug, and allow the engine oil to drain into a container.
3. Place a drip pan under the filter assembly (Fig. 1).
4. Turn the filter counterclockwise and remove it from the adapter.

INSTALLATION

1. Clean the gasket surfaces at the adapter.
2. Coat the gasket on the filter with a light film of oil. Screw the filter onto the adapter until the gasket contacts the sealing surface, then advance it 1/2 turn. Do not overtighten the filter.
3. Remove the drip pan and lower the car.
4. Fill the crankcase to its required level with the proper type and grade of lubricant.
5. Start the engine. Operate the engine at fast idle and check for oil leakage.
6. Add additional lubricant if required.

CLEAN CARBURETOR AIR CLEANER AND FILTER ELEMENT

REMOVAL

1. Remove the wing nuts retaining



Fig. 1—Autolite Oil Filter Replacement

the air cleaner assembly to the carburetor and the air duct.

On a closed crankcase ventilation system equipped car, disconnect the crankcase ventilation system hose at the crankcase vent filter.

2. Remove the air cleaner assembly from the carburetor. To prevent dirt from entering the carburetor, the filter element must never be removed when the air cleaner body is mounted on the carburetor.

3. Remove the air cleaner cover and

filter element. Discard the air cleaner mounting gasket if it is excessively worn or damaged.

On a closed crankcase ventilation system air cleaner, remove the crankcase vent filter and gasket from the air cleaner body, if required.

CLEANING FILTER ELEMENT

The cellulose fiber filter element must never be cleaned with a solvent or cleaning solution. Also, oil must not be added to the surfaces of the filter element or air cleaner body.

There are two procedures that can be used to clean the air filter element. One method is performed with the use of compressed air. The other is performed by tapping the element on a smooth horizontal surface.

Compressed Air Method

Direct a stream of compressed air through the element in the direction opposite that of the intake air flow, that is, from the inside outward. Extreme care must be exercised to prevent rupture of the element material.

Tapping Method

Hold the element in a vertical position and tap it lightly against a smooth, horizontal surface to shake the dust and dirt out. Do not deform the element or damage the gasket surfaces by tapping too hard. Rotate the filter after each tap until the entire outer surface has been cleaned.

INSPECTING FILTER ELEMENT

Hold the filter in front of a back-up light and carefully inspect it for any splits or cracks. If the filter is split or cracked, replace it.

CLEANING BODY AND COVER

Clean the air cleaner body and cover with a solvent or compressed air. Wipe the air cleaner dry if a solvent is used. Inspect the air cleaner body and cover for distortion or damage at the gasket mating surfaces. Replace the cover or body if they are damaged beyond repair.

INSTALLATION

1. Install a new air cleaner mounting gasket on the carburetor, if necessary.

2. Install the air cleaner body on the carburetor so that the word **Front** faces the front of the car.

3. Place the air cleaner filter element in the air cleaner body. **Make sure the element is properly seated.** Install the cover and connect the air duct to the air cleaner. Tighten the retaining wing nuts.

On a closed crankcase ventilation system air cleaner, install the crankcase vent filter and gasket in the air cleaner body, if it was previously removed. Connect the crankcase vent hose to the crankcase vent filter and tighten the hose retaining clamp.

REPLACE CARBURETOR AIR CLEANER FILTER

REMOVAL

1. Remove the wing nuts retaining the air cleaner assembly to the carburetor and the air duct, if so equipped.

On a closed crankcase ventilation system equipped car, disconnect the crankcase ventilation system hose at the crankcase vent filter.

2. Remove the air cleaner assembly from the carburetor. **To prevent dirt from entering the carburetor, the filter element must never be removed when the air cleaner body is mounted on the carburetor.**

3. Remove the air cleaner cover and filter element. Discard the air cleaner mounting gasket if it is excessively worn or damaged.

On a closed crankcase ventilation system air cleaner, remove the crankcase vent filter and gasket from the air cleaner body, if required.

INSTALLATION

1. Install a new air cleaner mounting gasket on the carburetor, if necessary.

2. Install the air cleaner body on

the carburetor so that the word **Front** faces the front of the car.

3. Place the air cleaner filter element in the air cleaner body.

Make sure the filter is properly seated. If the word TOP is indicated on the filter element, make sure the word TOP faces up.

4. Install the cover and connect the air inlet duct and valve assembly, if so equipped, to the air cleaner with the wing-type retaining screws. Tighten the screws.

5. On a closed crankcase ventilation system air cleaner, install the crankcase vent filter and gasket in the air cleaner body, if it was previously removed. Connect the crankcase vent hose to the crankcase vent filter and tighten the hose retaining clamp.

CLEAN AND REFILL OIL BATH AIR CLEANER—ECONOLINE AND BRONCO

REMOVAL

1. Remove the carburetor to air cleaner retaining wing nut.

On a closed crankcase ventilation equipped engine, loosen the hose clamp at the air cleaner body and disconnect the hose.

On a 240 Six engine, remove the bolts securing the air cleaner body to the support brackets.

2. Remove the air cleaner. **Use care to prevent oil spillage.**

CLEANING AND INSPECTION

1. Drain the air cleaner reservoir. Wash the air cleaner components and duct (if so equipped) in cleaning solvent, and dry them with compressed air.

2. Inspect the gasket between the oil reservoir chamber and cleaner body and replace it if necessary.

3. Saturate the filter element with engine oil.

4. Fill the oil reservoir to the full mark with the recommended engine oil. **Do not overfill.**

INSTALLATION

1. Position the air cleaner on the carburetor and install the retaining wing nut. **Use care to prevent oil spillage.**

On a 240 Six engine, secure the air cleaner to the support brackets with the retaining bolts.

On a closed crankcase ventilation system air cleaner, connect the ventilation system hose to the air cleaner body and tighten the retaining clamp.

CLEAN CRANKCASE OIL FILLER BREATHER CAP

Remove the cap and wash it in a low-volatility, petroleum-base solvent. Probe the breather hole(s) to assure removal of any accumulated deposits. Shake the cap dry and install it. **Do not dry with compressed air as air pressure may damage the filter element.**

CHECK AND ADJUST VALVE LASH—MECHANICAL TAPPETS

It is very important that the valve lash be held to the correct specifications because:

If the lash is set too close, the valve will open too early and close too late, resulting in rough engine idle. Burning and warping of the valves will occur also because the valves cannot make firm contact with the seats long enough to cool properly. If the lash is excessive, it will cause the valve to open too late and close too early causing valve bounce. In addition, damage to the crankshaft lobe is likely because the tappet foot will not follow the pattern of the camshaft lobe, causing a shock contact between these two parts.

1. Be sure the engine is at normal operating temperature before attempting to set the valve lash.

If the engine is cold, start and operate it for a minimum of 30 minutes at 1200 rpm to stabilize engine temperatures.

2. Remove the air cleaner and other obstructing hardware.

3. Remove the valve rocker arm cover and gaskets.

4. With the engine idling, set the valve lash (Figs. 2, 3 or 4) **using a step-type feeler gauge only (go and no go).** The final (hot) intake and exhaust valve lash settings are listed in the Specifications Section in Group 8 of the appropriate Shop Manual.

For example, to obtain the correct

STEP-TYPE FEELER GAUGE

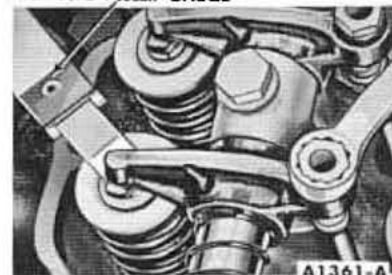
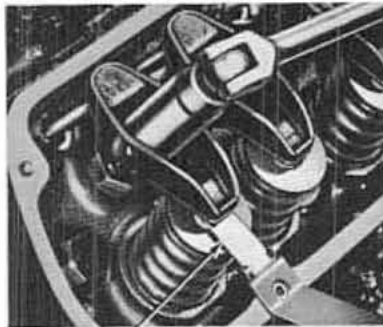
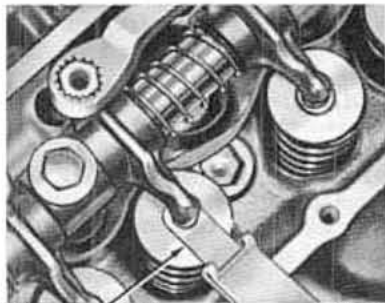


Fig. 2—Valve Lash Adjustment—170 Six Engine



Step-Type Feeler Gauge A2053-A

Fig. 3—Valve Lash Adjustment—289 Hi-Performance V-8



Step-Type Feeler Gauge A1466-A

Fig. 4—Valve Lash Adjustment—427 Hi-Performance Engine

setting if the valve lash is 0.019 inch, use a step-type feeler gauge of 0.018 inch (go) and 0.020 inch (no go). The go step should enter, and the no go step should not enter. The resultant setting will be to the required setting (0.019 inch).

5. Examine the valve rocker arm cover gasket. If necessary to replace, clean the old gasket off the valve rocker arm cover. Coat one side of a new valve rocker arm cover gasket with oil resistant sealer. Lay the cemented side of the gasket in place in the cover.

6. Install the cover, making sure that the gasket seats evenly around the cylinder head. The cover is tightened in two steps. First, torque the retaining bolts to specifications. Two minutes after the initial tightening, torque the bolts to the same specification.

7. Install the air cleaner and any hardware previously removed in step 1, above.

CHECK ENGINE ACCESSORY DRIVE BELTS

BELT TENSION

Properly tensioned drive belts minimize noise and also prolong service life of the belt. Therefore, it is recom-

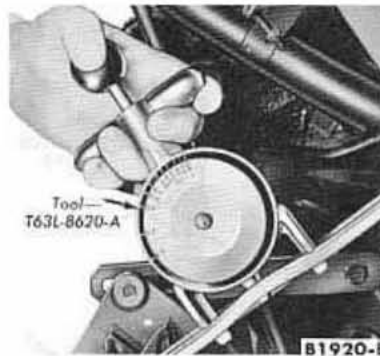


Fig. 5—Fan Drive Belt Tension Adjustment

mended that a belt tension gauge be used to check and adjust the belt tension.

If any belt is broken, glazed, or worn, replace it with a new belt. Use only the specified type of belt.

If belt is stretched so that it cannot be tightened sufficiently, install a new belt.

On a Lincoln with tandem belts, replace both belts.

Any belt that has operated for a minimum of 10 minutes is considered a used belt, and, when adjusted, it must be adjusted to the reset tension shown in the specifications.

Use the following procedure to run in a new drive belt:

When installing new belt(s), first adjust to new belt specifications. (Refer to Part 11-5 of the appropriate Shop Manual.)

Run the engine for 10 minutes, then check the tension of the belts to make certain that they are within the reset specifications. Adjust the belts, if required, to used belt specifications.

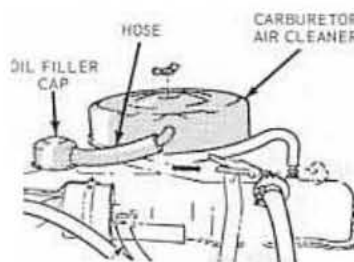
ALTERNATOR

1. On a Lincoln, remove the alternator splash shield.

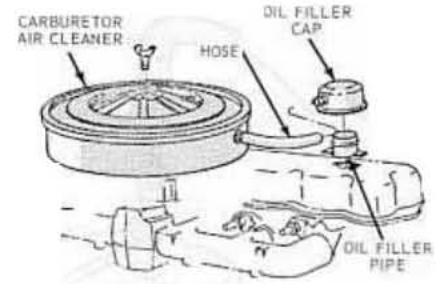
2. Install the belt tension tool T62L-8620-A on the drive belt. Check the tension following the instructions furnished with the tool (Fig. 5).

Due to the inaccessibility of the alternator belt on a Comet equipped with air conditioning and power steering, a belt tension gauge cannot be used. Therefore, it must be tensioned by the deflection method. Deflection should not exceed $\frac{1}{4}$ inch when thumb pressure is applied.

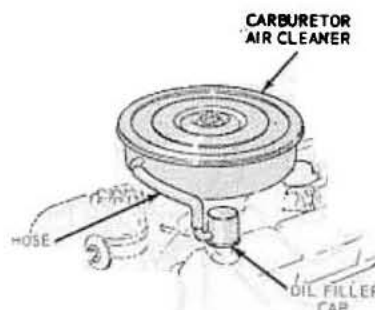
3. If adjustment is necessary, loosen the alternator mounting bolts and the alternator adjusting arm bolt. Move the alternator toward or away from the engine until the correct tension is obtained. Remove the gauge. Tighten the alternator adjusting arm bolt first,



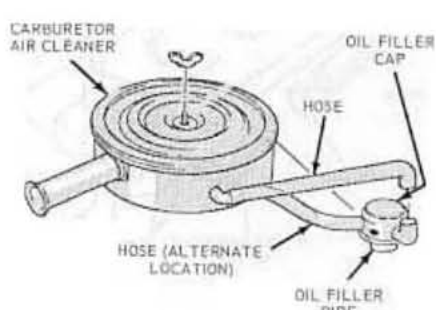
170-200 51X



240 51X



289 V-8

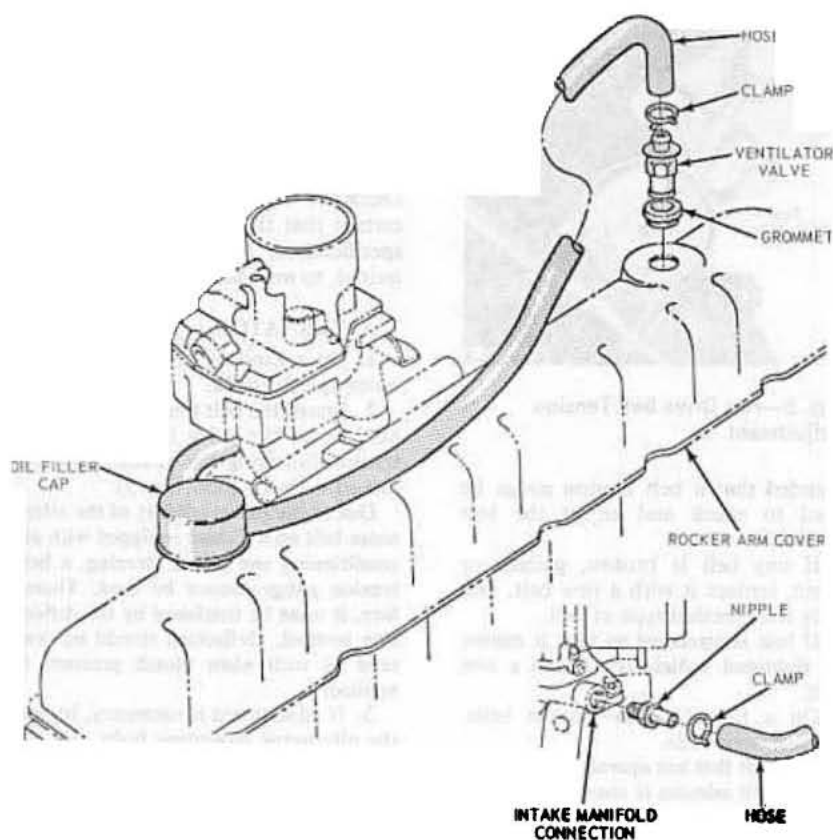


390 V-8

A 2605-

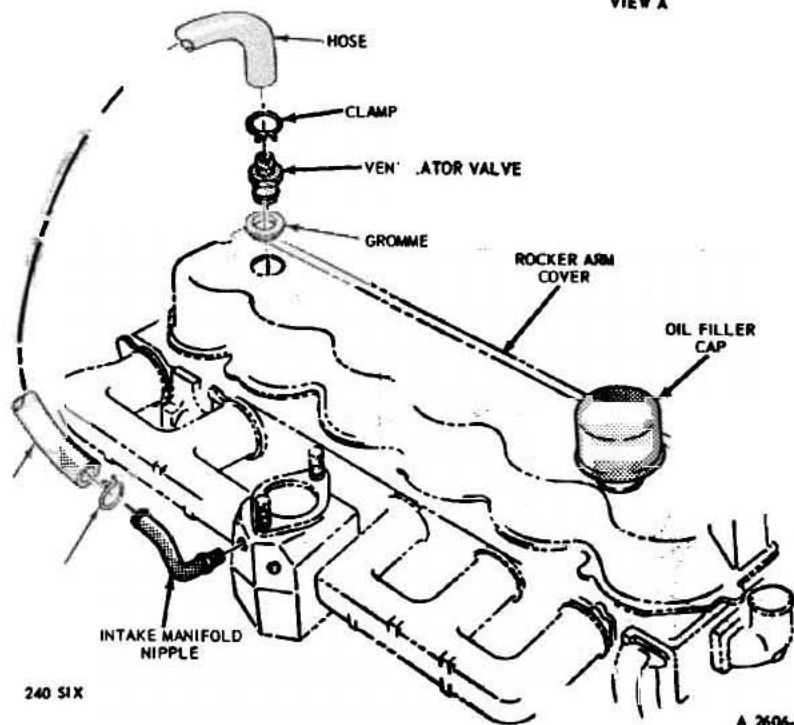
Fig. 6—Oil Filler Cap to Air Cleaner Hoses—Closed Ventilation System—Typical

PART 2 — Maintenance Operations



170-200 SIX

VIEW A



240 SIX

A 2606-A

Fig. 7—Crankcase Ventilation Regulator Valve, Hoses and Intake Inlets—Typical Six-Cylinder Installations

and then the mounting bolts. Install the tension gauge and check the belt tension.

4. On a Lincoln, install the alternator splash shield.

POWER STEERING

1. Loosen the mounting bolts incorporated on the front face of the pump cover plate (hub side) and the one nut at the rear.

2. Fix a 9/16-inch open end wrench on the projecting 1/2-inch boss and pry upward to correct tension. Do not pry against the reservoir to obtain proper belt load as it can be deformed and cause a leak.

3. Recheck the belt tension. When the tension has been correctly adjusted, tighten the bolts to specifications.

AIR CONDITIONING

Adjust the belt by repositioning the idler pulley if so equipped. Otherwise, follow this procedure:

1. Loosen the bolts securing the compressor to the compressor mounting bracket. On a Lincoln, first remove the bolts securing the compressor to the support bracket that is attached to the cylinder head.

2. Install the tension gauge on the compressor clutch drive belt. Move the compressor toward or away from the engine until the specified belt tension is obtained. Remove the gauge. Tighten the compressor to support bracket bolts. Install the tension gauge and check the belt tension.

THERMACTOR AIR PUMP

1. Loosen the air supply pump adjusting arm nut and bolt.

2. Loosen the air supply pump mounting bracket nut and bolt.

3. Move the air pump toward or away from the engine until the correct tension is obtained. Use a suitable bar and pry against the pump rear cover to hold belt tension while tightening the mounting bolts. Do not pry against the pump housing. Remove the gauge. Tighten the air pump adjusting arm and mounting bolts. Install the tension gauge and check the belt tension.

CLEAN POSITIVE CRANKCASE VENTILATION SYSTEM COMPONENTS—ALL VEHICLES EXCEPT LINCOLN

Current production vehicles which are equipped with positive crankcase ventilation systems have the components located at different points on each type of engine. The following procedure is a general procedure. Specific procedures will be found in Group

8 of the Shop Manual for the vehicle being serviced.

REMOVAL OF COMPONENTS Closed Ventilation System

Remove the following components from the crankcase ventilation system. Figs. 6 through 9 show typical components which should be removed. Refer to Group 8 of the appropriate Shop Manual for specific removal procedures.

1. Remove the oil filler cap and its connecting hose to the air cleaner.
2. Remove the air cleaner (and ducts, if so equipped). Refer to Group 10 of the appropriate Shop Manual for specific removal procedures.
3. Remove the hose (Figs. 7 or 8) or hose assembly (Fig. 9) from the ventilator valve in the rocker arm cover. Remove the other end of this hose (or hose assembly) from the intake manifold connection, or carburetor spacer connection, if so connected.

If a hose assembly was removed, disassemble the hoses from the tee or hot idle compensator, if so equipped.

4. Pull the ventilator valve from grommet in the rocker arm cover. Discard the ventilator valve assembly.

Open Ventilation System

Remove the following components from the crankcase ventilation system. Figs. 6 through 9 show typical components which should be removed. Refer to Group 8 of the appropriate Shop Manual for specific removal procedures.

1. Remove the hose (Figs. 7 or 8) or hose assembly (Fig. 9) from the ventilator valve in the rocker arm cover. Remove the other end of this hose (or hose assembly) from the intake manifold connection, or carburetor spacer connection if so connected.

If a hose assembly was removed, disassemble the hoses from the tee or hot idle compensator, if so equipped.

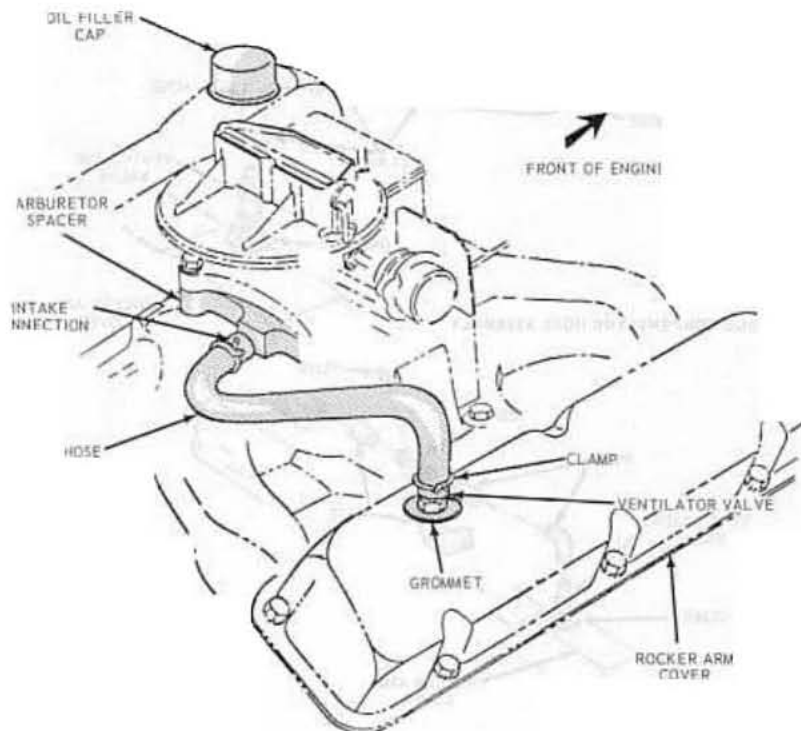
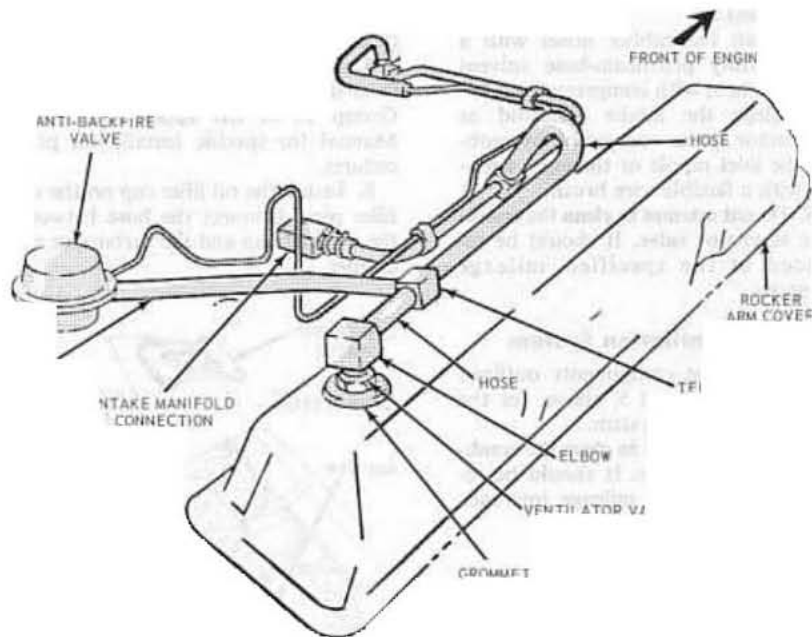
2. Pull the ventilator valve from the grommet in the rocker arm cover. Discard the ventilator valve assembly.

CLEANING

Closed Ventilation System

1. Wash the crankcase filler cap in a low-volatility, petroleum-base solvent. Shake the cap dry. Do not dry with compressed air, since air pressure may damage the filter element.

2. Remove the crankcase ventilation air filter (screen type) from the carburetor air cleaner body and clean it, using the same procedure as in step 1, and re-install it into the air cleaner body.



A 2607-A

Fig. 8—Crankcase Ventilation Regulator Valve, Hoses and Intake Inlets—Typical V-8 Installations

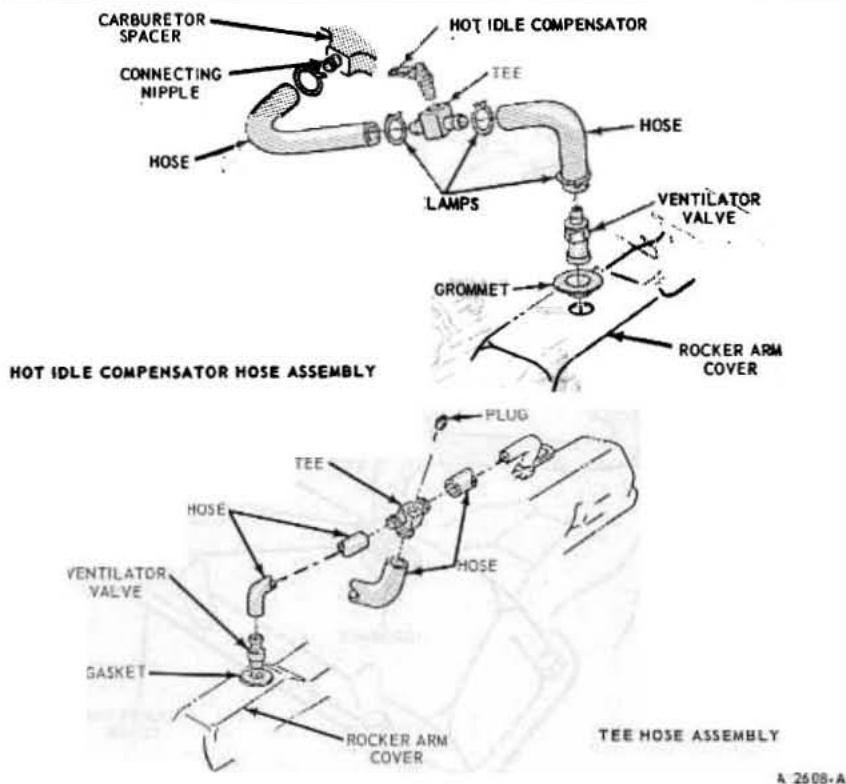


Fig. 9—Hose Assemblies—Typical

3. Clean the tees and hot idle compensator (if removed in conjunction with a hose assembly) in clean carburetor solvent and dry them with compressed air.

4. Clean the rubber hoses with a low-volatility petroleum-base solvent and dry them with compressed air.

5. Clean the intake manifold or carburetor spacer connection by probing the inlet nipple or threaded opening with a flexible wire brush.

6. Do not attempt to clean the crankcase ventillator valve. It should be replaced at the specified mileage intervals.

Open Ventilation System

1. Clean the components outlined in steps 1, 3, 4 and 5, above, for the closed ventilation system.

2. Do not attempt to clean the crankcase ventillator valve. It should be replaced at specified mileage intervals.

INSTALLATION

Closed Ventilation System

1. Install a new ventillator valve into the grommet in the rocker arm cover. If the grommet is loose or damaged, use a new grommet.

2. Assemble the components of the hose assembly (if an assembly was removed).

3. Connect one end of the hose (or hose assembly) to the ventillator valve.

4. Connect the other end of the hose (or hose assembly) to the fitting on the intake manifold, or carburetor spacer (if so connected).

5. Install the carburetor air cleaner (and ducts, if so equipped). Refer to Group 10 of the appropriate Shop Manual for specific installation procedures.

6. Install the oil filler cap on the oil filler pipe. Connect the hose between the oil filler cap and the carburetor air cleaner.

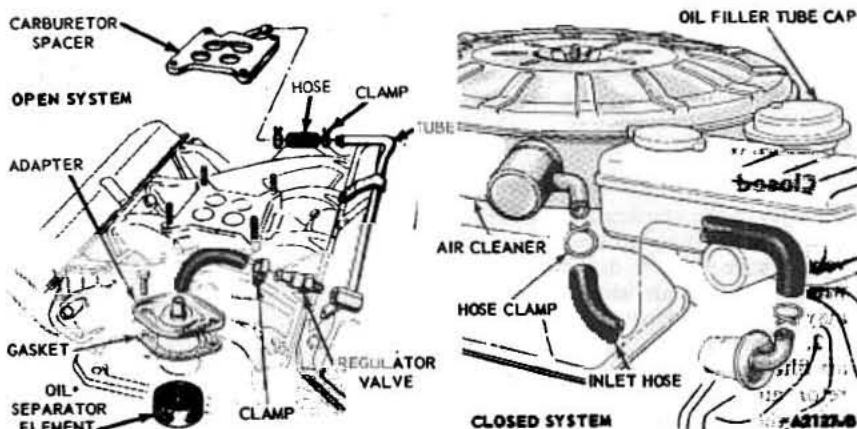


Fig. 10—Positive Crankcase Ventilation System—Lincoln

Open Ventilation System

Follow the same procedure outlined in steps 1 thru 4 for the Closed Ventilation System, above.

CLEAN POSITIVE CRANKCASE VENTILATION SYSTEM COMPONENTS—LINCOLN

REMOVAL

Open Ventilation System

1. Remove the air cleaner.

2. Loosen the clamp securing the hose to the regulator valve. Remove the hose and clamp. Remove the ventillator valve from the ventilation tube fitting (Fig. 10) and discard it.

3. Loosen the clamps securing the hose to the ventilation tube and carburetor spacer. Remove the hose and clamps.

4. Loosen the ventilation tube bracket retaining nuts and washers, then slide the ventilation tube out.

5. Remove the retaining bolts securing the outlet adapter to the valve push rod chamber cover. Remove the outlet adapter gasket and oil separator element.

Closed Ventilation System

1. Remove the carburetor air cleaner. When lifting the air cleaner off the carburetor, raise the rear end of the air cleaner and remove the crankcase vent filter from the air cleaner.

2. Remove the anti-backfire valve vacuum line from the crankcase ventilation tube assembly.

3. Pull the crankcase vent adapter out of the front of the block.

4. Loosen the clamps securing the crankcase vent hose to the crankcase vent filter and the crankcase vent adapter. Remove the hose and clamps.

5. Remove the remaining ventila-

tion system parts by following steps 2 through 5 under Open Ventilation System.

CLEANING

Closed Ventilation System

1. Wash the crankcase filler cap in a low-volatility, petroleum-base solvent. Shake the cap dry. Do not dry with compressed air, since air pressure may damage the filter element.

2. Remove the crankcase ventilation air filter from the carburetor air cleaner body and clean it, using the same procedure as in step 1, and re-install it on the air cleaner body.

3. Clean the oil separator element and long ventilator tube in clean carburetor solvent and dry them with compressed air.

4. Clean the rubber hoses with a low-volatility, petroleum-base solvent and dry them with compressed air.

5. Clean the carburetor spacer connection by probing the inlet nipple with a flexible wire brush.

6. Do not attempt to clean the crankcase ventilator valve. It should be replaced at the specified mileage intervals.

INSTALLATION

Open Ventilation System

1. Install the oil separator element in the valve push rod chamber cover (Fig. 10). Make certain the screen is positioned snugly around the edges of the opening.

2. Coat a new outlet adapter gasket with oil-resistant sealer and position it on the push rod chamber cover. Position the outlet adapter on the cover and install the retaining bolts.

3. Slide the ventilation tube brackets under the retaining washers and nuts. Tighten the nuts. Install a new ventilator valve in the ventilation tube fitting.

4. Install the hose and clamp on the outlet adapter and ventilator valve. Position and tighten the clamp.

5. Install the hose and clamps on the carburetor and ventilation tube.

6. Install the air cleaner.

Closed Ventilation System

1. Follow steps 1 through 5 under Open Ventilation System.

2. Connect the anti-backfire valve vacuum line to the crankcase ventilation tube assembly (Fig. 9).

3. Install the crankcase vent hose and clamps on the crankcase vent filter and the crankcase vent adapter.

4. Install the air cleaner and connect the crankcase vent filter to the air cleaner.

REPLACE THERMACTOR AIR CLEANER ELEMENT, IF SO EQUIPPED

1. Remove the wing nut (Fig. 11) and air horn assembly. Remove the filter element from the air horn assembly.

2. Wipe the air horn assembly and air cleaner with a clean, dirt-free cloth to remove any accumulated dirt or foreign matter. Under extremely dirty conditions it may be necessary to wash both the air horn and body in low-volatility mineral spirits. Be sure the parts are dry before installing them.

3. The filter element is not cleanable. Place a new filter element on the air horn assembly. Position the assembled air horn and filter element in the air cleaner body. Be sure the tang is fitted in the slot (Fig. 11). Install the wing nut.

4. Start the engine and check for leaks. Refer to Part 8-1 of the appropriate Shop Manual for procedures for testing for proper operation.

ADJUST CARBURETOR ACCELERATOR PUMP LEVER, IDLE SPEED, IDLE MIXTURE, AND FAST (COLD) IDLE SPEED

The following procedures apply to automatic choke type carburetors only. Manual choke carburetor adjustment procedures are given at the end of this group of procedures.

PRELIMINARY PREPARATION—ALL VEHICLES

The engine idle speed is adjusted to settings for a hot engine and a cold engine (fast idle speed during choke operation). All final idle speed and mixture adjustments must be made on a hot, normalized engine.

Refer to Figs. 12 through 20 for views of the idle fuel mixture and idle (hot engine) speed screws for the various carburetor applications.

1. Operate the engine until engine temperatures are stabilized. On a car with an air conditioner, operate the engine for twenty minutes before setting the engine idle speed. The engine idle speed is adjusted with the air conditioner operating.

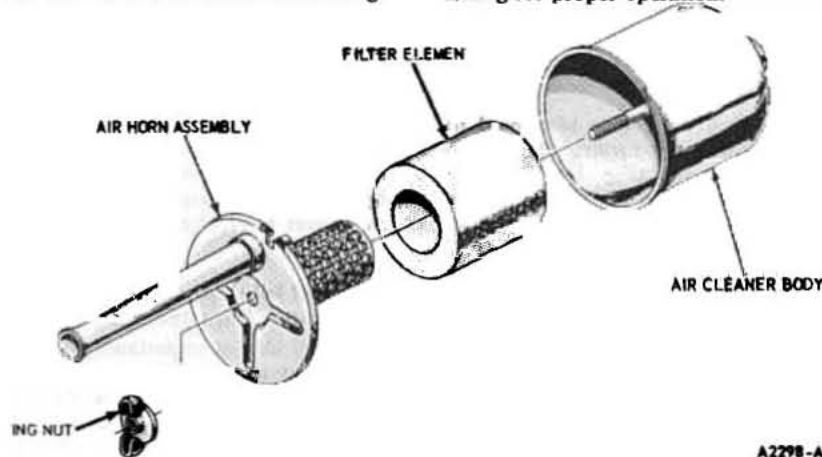
2. Position the transmission lever in neutral. Allow the throttle to drop back to the normal idle speed position. Attach a tachometer to the engine. Set the parking brake.

On cars equipped with a vacuum release parking brake, remove the vacuum line from the vacuum power unit of the automatic vacuum release parking brake assembly, and plug the vacuum line. Set the parking brake. It is necessary to inactivate the vacuum power unit to keep the parking brake engaged when the engine is running during the adjustment procedures.

3. Turn on the headlamps. It is necessary to place the alternator under a load condition in this manner in order to obtain the specified engine idle speed during the adjustment procedure.

4. On a car with a manual-shift transmission, the engine idle speed is checked and adjusted with the gear shift lever in neutral position. On a car with an automatic transmission, the engine idle speed is checked and adjusted first with the transmission selector lever in the neutral position and readjusted with the transmission selector lever in the drive range position. Adjust and check the engine idle speed. Be sure the dashpot (if so equipped) is not interfering with the throttle lever or the fast idle screw is not contacting the fast idle cam.

On a carburetor equipped with a hot idle compensator, be sure the compensator is seated to allow for proper idle adjustment.



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Fig. 11—Typical Thermoactor Exhaust Emission System Air Cleaner

When checking or adjusting idle (hot engine) speed on any Thermactor equipped engine with a thermal sensing valve in the distributor vacuum line, the valve must be bypassed. Disconnect the distributor vacuum hose at the sensing valve. Plug or pinch-off the manifold vacuum hose; then check or adjust the idle speed in the normal manner. Do not unplug and reconnect the hose until after the fast idle (cold engine) speed adjustments have been completed.

FORD 1-V CARBURETOR

Refer to Preliminary Preparation—All Vehicles, above.

Adjust Accelerator Pump Lever

The pump stroke is controlled by changing location of the roll pin in the lever stop hole (Fig. 12).

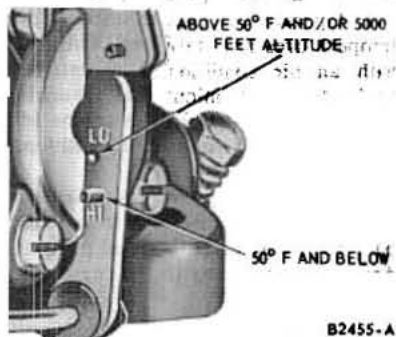


Fig. 12—Accelerating Pump Stroke Adjustment—Ford 1-V

1. For operation in ambient temperatures 50°F. and below, place the roll pin in the lever hole marked HI (lower hole).

For best performance and economy at normal ambient temperatures and high altitude (above 50°F. and/or above 5,000 feet altitude), place the roll pin in the LO (upper hole) of the lever.

2. Check the vent valve for proper adjustment.

Initial Idle Speed and Fuel Mixture Adjustments

Refer to Figs. 13 and 14 for views of the Ford 1-V carburetor idle fuel mixture and idle (hot engine) speed adjustment screws.

1. Set the initial idle fuel mixture by turning the idle mixture screw(s) (needle) inward (clockwise) until lightly seated; then, turn the screw(s) outward (counterclockwise) the specified turns. Do not turn the needle(s) tightly against their seat(s) as they may groove the end(s). If a needle is damaged, it must be replaced before a satisfactory fuel mixture can be obtained.

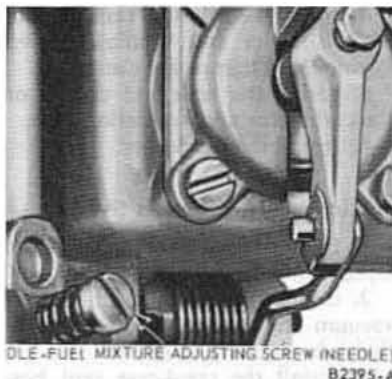


Fig. 13—Idle Fuel Mixture Adjustment—Ford 1-V
IDLE SPEED (HOT ENGINE) ADJUSTMENT SCREW

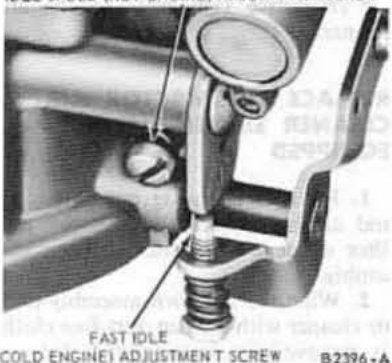


Fig. 14—Idle Speed Adjustments—Ford 1-V

2. Position the choke mechanism so that the choke plate is fully open. Seat the throttle plate in the throttle bore. It may be necessary to back off on the dashpot (if so equipped) adjustment screw to seat the throttle plate in the throttle bore. Set the idle speed adjustment screw to just make contact with the stop on the carburetor lower body and turn the screw inward (clockwise) the specified turns.

Final Idle (Hot Engine) Speed and Mixture Adjustments

1. Adjust the engine idle speed to specifications by turning the engine idle speed screw (Fig. 14) inward to increase the speed or outward to decrease the speed.

2. Turn the idle mixture needle (Fig. 14) inward until the engine rpm begins to drop, due to the lean mixture. On a car equipped with a Thermactor exhaust emission system, turn the needle outward ¼ turn. The outward adjustment of the idle fuel mixture needle is the final adjustment required. On a car without the Thermactor system, turn the needle outward until the engine rpm increases and begins to drop; then turn

the idle mixture needle inward for maximum rpm and engine smoothness.

3. After the correct engine idle mixture has been obtained, check the idle speed with the transmission selector lever in neutral and manually opening and closing the throttle. Adjust the idle speed to specification, if required.

If the car is equipped with an automatic transmission, position the selector lever in drive range to check and adjust the idle speed to specification, if necessary. Refer to Group 10 of the appropriate Shop Manual for specifications.

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

4. Shut off the engine. Check the fast (cold engine) idle speed.

On a Ford 1-V carburetor, the fast (cold engine) idle adjustment screw (Fig. 14) is located on the left side of the carburetor. Refer to Fast (Cold Engine) Idle Adjustment, below, for correct adjustment procedure.

FORD 2-V CARBURETOR

Refer to Preliminary Preparation—All Vehicles, above.

Adjust Accelerating Pump Lever

The primary throttle shaft lever (overtravel lever) has 4 holes and the accelerating pump link has 2 holes (Fig. 15) to control the accelerating pump stroke for various ambient temperatures and operating conditions of the engine.

The accelerating pump operating rod should be in the specified hole in the overtravel lever and the inboard hole (hole closest to the pump plunger) in the accelerating pump link (Fig. 15). (Refer to Group 10 of the appropriate Shop Manual for specifications.)

1. To release the rod from the retainer clip, press the tab end of the clip toward the rod; then, at the same time, press the rod away from the clip until it is disengaged.

2. Position the clip over the specified hole in the overtravel lever. Press the ends of the clip together and insert the operating rod through the clip and the overtravel lever. Release the clip to engage the rod.

Initial Idle Speed and Fuel Mixture Adjustments

It is of utmost importance that the idle fuel system on 2-V carburetors be balanced as closely as possible in order to obtain a satisfactory, stable, idle and fuel mixture adjustment. This is achieved by establishing initial idle speed and mixture adjustments before

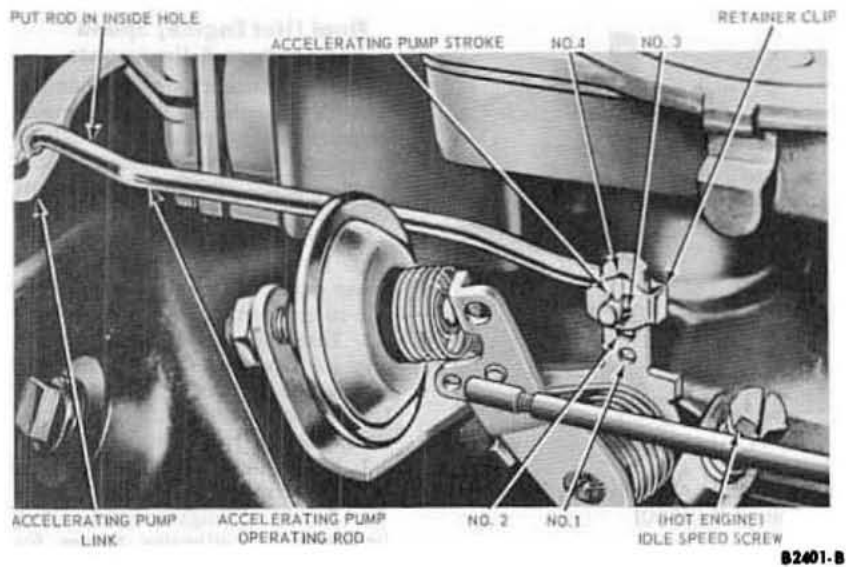


Fig. 15—Accelerating Pump Stroke and Idle (Hot Engine) Speed Adjustments—Typical for Ford 2-V

proceeding with the final idle speed and mixture adjustment, and the fast (cold engine) idle speed adjustment.

With the air cleaner removed, make the idle adjustments in the following sequence:

The idle fuel mixture and idle (hot engine) speed adjustment screws for the Ford 2-V carburetors are shown in Figs. 15 and 16.

1. Set the initial idle fuel mixture by turning the idle mixture screw(s) (needle) inward (clockwise) until lightly seated; then, turn the screw(s) outward (counterclockwise) the specified turns. (Refer to Group 10 of the appropriate Shop Manual for specifications.) Do not turn the needle(s) tightly against their seat(s) as they may groove the end(s). If a needle is damaged, it must be replaced before a satisfactory fuel mixture can be obtained.

2. Position the choke mechanism so that the choke plate is fully open. Seat the throttle plate in the throttle bore. It may be necessary to back off on the

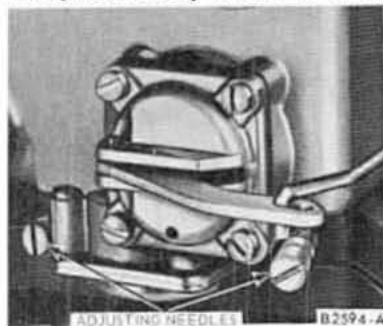


Fig. 16—Idle Fuel Mixture Adjustments—Typical for Ford 2-V

dashpot (if so equipped) adjustment screw to seat the throttle plate in the throttle bore. Set the idle speed adjustment screw to just make contact with the stop on the carburetor lower body, and turn the screw inward (clockwise) the specified turns.

Final Idle (Hot Engine) Speed and Mixture Adjustments

1. Adjust the engine idle speed to specifications by turning the engine idle speed screw (Fig. 15) inward to increase the speed or outward to decrease the speed. (Refer to Group 10 of the appropriate Shop Manual for specifications.)

2. Turn the idle mixture needle(s) (Fig. 16) inward until the engine rpm begins to drop, due to the lean mixture. On a car equipped with a Thermactor exhaust emission system, turn the needle(s) outward $\frac{1}{4}$ turn. The outward adjustment of the idle fuel mixture needles is the final adjustment required. On a car without the Thermactor system, turn the needle(s) outward until the engine rpm increases and begins to drop; then turn the idle mixture needle(s) inward for maximum rpm and engine smoothness. The needles should be turned evenly and alternately approximately the same amount. The final setting may vary about $\frac{1}{2}$ turn difference between needles.

3. After the correct engine idle mixture has been obtained, check the idle speed with the transmission selector lever in neutral and manually opening and closing the throttle. Adjust the idle speed to specification, if required.

If the car is equipped with an auto-

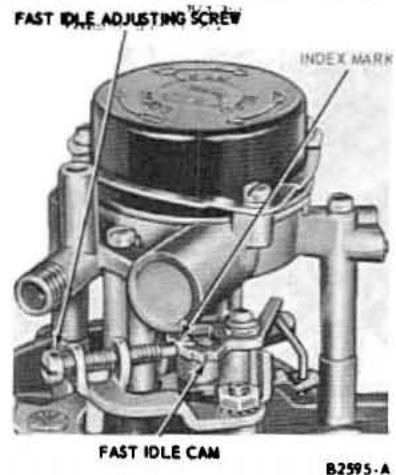


Fig. 17—Fast (Cold Engine) Idle Speed Adjustment—Ford 2-V

matic transmission, position the selector lever in drive range to check and adjust the idle speed to specification, if necessary.

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

4. Shut off the engine. Check the fast (cold engine) idle speed.

On a Ford 2-V carburetor the fast (cold engine) idle adjustment screw (Fig. 17) is located on the right side of the carburetor. Refer to Fast (Cold Engine) Idle Adjustment, below, for correct adjustment procedure.

AUTOLITE 4-V (4300) CARBURETOR

Refer to Preliminary Preparation—All Vehicles, above.

Adjust Accelerator Pump Stroke

The accelerator pump stroke (Fig. 18) has been calibrated to inject a predetermined quantity of fuel into the air stream with the pump pivot pin in the center (No. 2) hole. The amount of fuel injected into the air stream may be altered by inserting the pivot pin in the left hole (No. 1) to decrease the fuel quantity (summer operation) or to the right hole (No. 3) to increase the fuel quantity (winter operation).

Adjust the pump stroke as follows:

1. Remove the pump rod to pump arm retainer. Remove pump rod from pump arm.

2. Remove the pump pivot pin retainer. Remove pivot pin.

3. Insert the pivot pin into the desired hole.

The holes in the fuel bowl vent lever, main body casing and the pump lever must be in line.

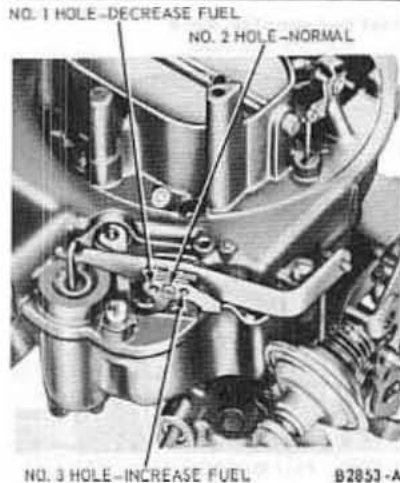


Fig. 18—Accelerator Pump Stroke Adjustment—Autolite 4-V (4300)

4. Install the pivot pin retainer. Position the pump rod end into the pump arm and install the retainer.

Initial Idle Speed and Fuel Mixture Adjustments

It is of utmost importance that the idle fuel system on Autolite 4-V (4300) carburetors be balanced as closely as possible in order to obtain a satisfactory, stable, idle and fuel mixture adjustment. This is achieved by establishing initial idle speed and mixture adjustments before proceeding with the final idle speed and mixture adjustment, and the fast (cold engine) idle speed adjustment.

With the air cleaner removed, make the idle adjustments in the following sequence:

The idle fuel mixture and idle (hot engine) speed adjustments for the Autolite 4-V (4300) carburetor are shown in Figs. 19 and 20.

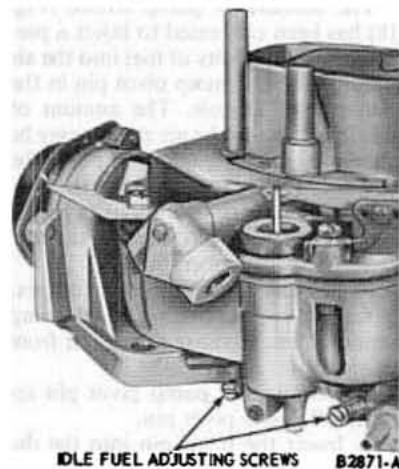


Fig. 19—Idle Fuel Adjustments—Autolite 4-V (4300)

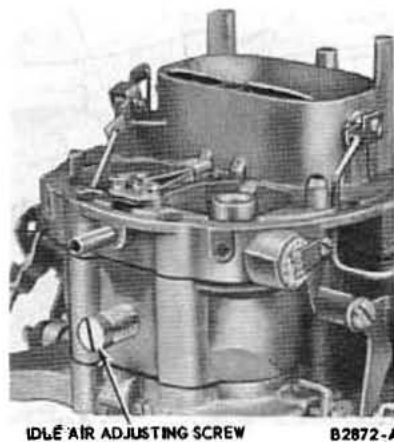


Fig. 20—Idle Air Adjusting Screw—Autolite 4-V (4300)

1. Set the initial idle fuel mixture by turning the idle mixture screws inward (clockwise) until they seat lightly; then, turn the screws outward (counterclockwise) $1\frac{1}{2}$ turns. Do not turn the screws tightly against their seats as they may groove the ends. If a needle end is damaged, it must be replaced before a satisfactory fuel mixture can be obtained.

2. Turn the idle by-pass screw inward (clockwise) until it seats lightly; then turn the screw outward (counterclockwise) $3\frac{1}{2}$ turns.

Final (Hot Engine) Speed and Mixture Adjustments

Final adjustments are made on the car with the engine running and engine temperatures normalized. Install a tachometer and check engine curb idle speed. Adjust to specifications as follows:

1. Turn the idle air adjusting screw (Fig. 19) clockwise (inward) to decrease engine rpm and counterclockwise to increase engine rpm.

2. Turn one idle fuel adjusting screw (Fig. 20) clockwise (inward) until the rpm begins to drop (idle lean point). Turn the screw counterclockwise (outward) one-quarter ($\frac{1}{4}$) turn.

3. Repeat step two for the other idle fuel adjusting screw.

4. Touch up (slightly rotate either direction) idle adjusting screws for smoothest idle quality. The screws should be within one-eighth ($\frac{1}{8}$) turn of each other.

5. After the correct engine idle mixture has been obtained, check the idle speed with the transmission selector lever in neutral and manually opening and closing the throttle. Adjust the idle speed to specification, if required.

If the car is equipped with an automatic transmission, position the selector lever in drive range to check and adjust the idle speed to specification if necessary.

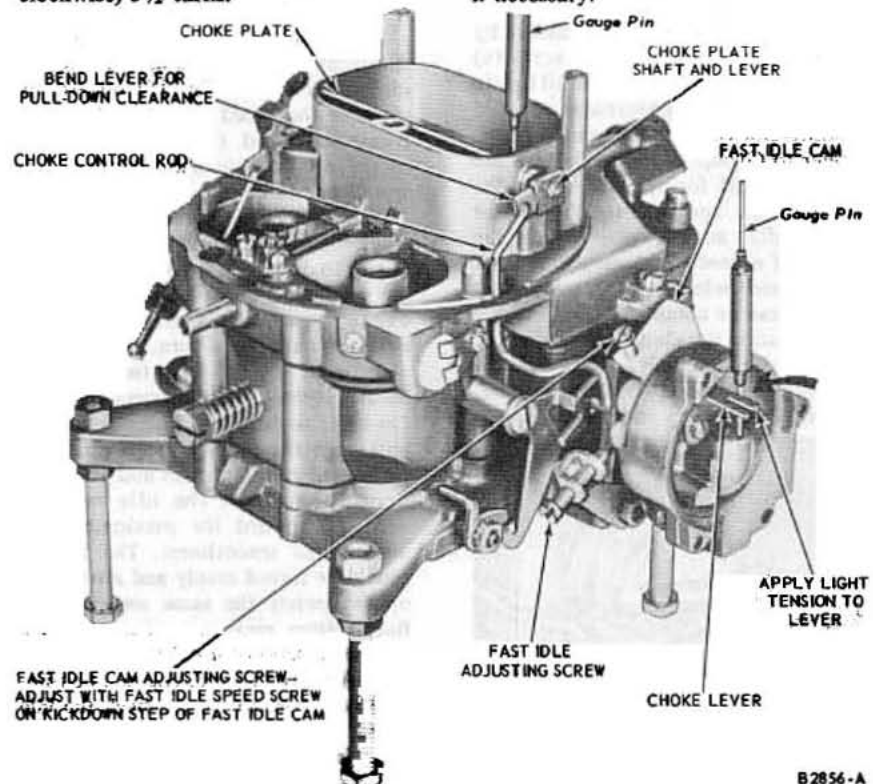


Fig. 21—Fast Idle Cam Adjustment—Autolite 4-V (4300)

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

6. Shut off the engine. Check the fast (cold engine) idle speed.

Fast (Cold Engine) Idle Speed Adjustment

On a Ford 4-V (4300) carburetor the fast (cold engine) idle adjustment screw location is shown in Fig. 21.

1. Loosen the choke cover so it can rotate. Be sure the thermostatic spring end is engaged in the choke lever slot.

2. Rotate the choke cover to a 90-degree rich position.

3. Position the fast idle speed adjusting screw end to the kickdown step on the fast idle cam and hold in this position.

4. Check the fast idle cam clearance between the lower edge of the choke plate and the air horn wall.

5. Adjust the fast idle cam clearance to specifications by turning the adjusting screw clockwise to increase the clearance or counterclockwise to decrease the clearance.

6. Install the thermostatic choke cover to the specified index setting and tighten the cover retaining screws.

7. Place the transmission selector lever in neutral and turn off the engine. Switch off the headlamps and the air conditioner (if so equipped). Remove the tachometer.

On cars equipped with a vacuum release parking brake, connect the vacuum line to the vacuum power unit of the automatic vacuum release parking brake assembly.

8. If the car is equipped with an automatic transmission, check the anti-stall dashpot for proper adjustment.

HOLLEY 4-V CARBURETOR

Refer to Preliminary Preparation—All Vehicles, above.

Adjust Accelerating Pump Lever

To satisfy acceleration requirements in various climates, the accelerating pump discharge can be adjusted. The bottom hole (No. 2) in the cam provides a maximum pump discharge for extreme cold weather and the top hole (No. 1) provides the minimum pump discharge for warm weather operation (Fig. 22).

For summer operation, install the adjustment screw in hole No. 1. For winter operation, install the adjustment screw in hole No. 2.

On cars equipped with Dual Holley 4-V carburetors, the screw should be in the same hole for each carburetor unit.

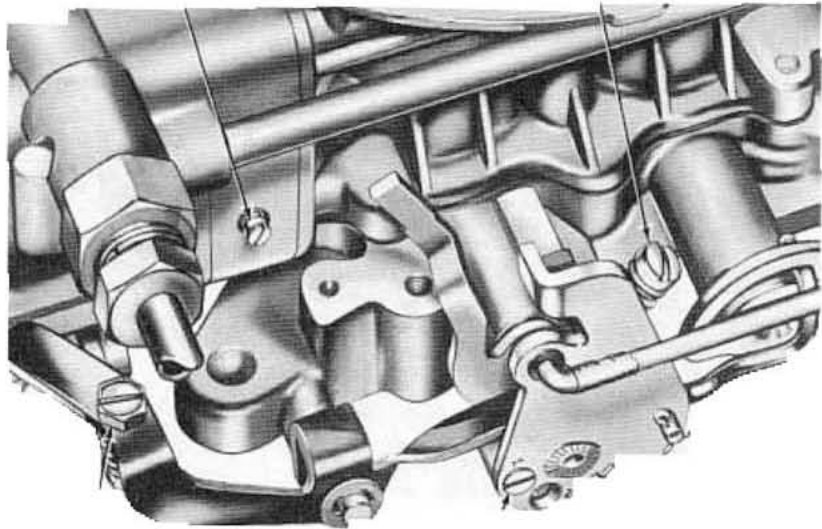


Fig. 22—Accelerating Pump, Idle Fuel Mixture and Idle (Hot Engine) Speed Adjustments—Holley Carburetors

Initial Idle Speed and Fuel Mixture Adjustments

The idle fuel mixture is controlled by the idle fuel mixture adjusting screws (needles) located in the primary metering blocks of the carburetors (Figs. 22, 23 or 24). The idle (hot engine) speed adjusting screw location for each carburetor is shown in Fig. 22.

1. Initially set the idle mixture by turning the idle mixture screws inward until they are lightly seated; then turn the screws outward the specified turns. Do not turn the needles tightly against the seat as this may groove the ends. If a needle is damaged, it must be replaced before a satisfactory fuel mixture can be obtained.

2. Turn the idle (hot engine) speed screw outward on each carburetor until the throttle plates close tight in the throttle bores. It may be necessary to back the front carburetor fast (cold engine) idle adjusting screw (Fig. 24) to close the plates tight in the bores. Set the idle speed adjustment screws to just make contact with the stops on the carburetor bodies and turn them inward the specified turns.

Refer to Group 10 of the appropriate Shop Manual for specifications.

Final Idle (Hot Engine) Speed and Mixture Adjustments

1. Adjust the engine idle speed to specifications by turning each idle

speed adjusting screw (Fig. 22) equally and alternately. Turn the screws inward to increase the speed and outward to decrease the speed. Be sure the fast idle screw is not touching the fast idle cam when performing this adjustment.

2. Adjust the idle fuel mixture by turning each idle mixture screw inward (Figs. 22, 23, or 24) evenly and alternately, starting with the front carburetor and finishing with the rear carburetor, until the engine rpm begins to drop (due to the lean mixture). Turn each screw outward until the engine rpm begins to drop (due to the rich mixture); then turn each screw inward for maximum engine rpm and smoothness. Always favor a slightly rich idle fuel mixture. Final adjustment of the idle fuel mixture screws should be within $\frac{1}{4}$ turn of each other.

3. After the correct engine idle mixture has been obtained, check the idle speed with the transmission selector lever in neutral and manually opening and closing the throttle. Adjust the idle speed to specification, if required.

If the car is equipped with an automatic transmission, position the selector lever in drive range to check and adjust the idle speed to specification if necessary.

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

4. Shut off the engine. Check the fast (cold engine) idle speed.

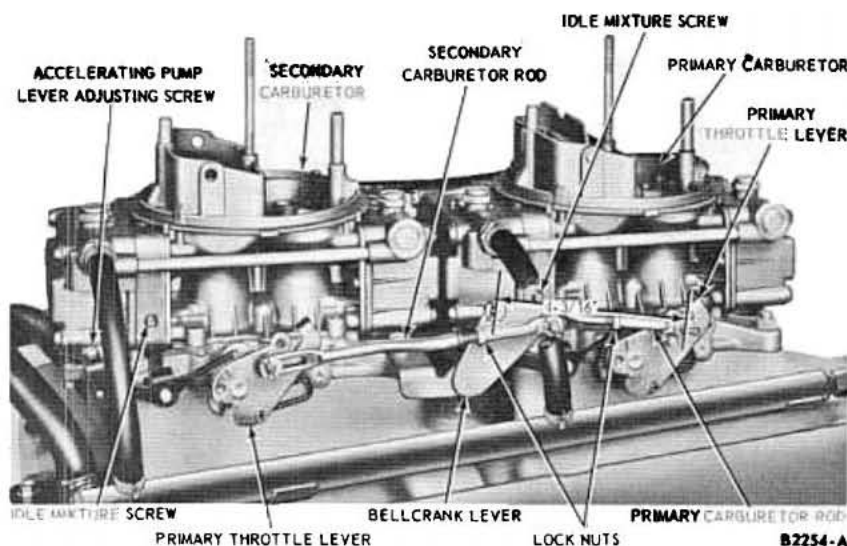


Fig. 23—Holley Dual 4-V Carburetors—Right Side View

On the Holley carburetor installation, the fast (cold engine) idle speed adjustment is performed on the front (primary) carburetor only. The fast idle speed screw is located on the left side of the front carburetor (Fig. 24).

Refer to Fast (Cold Engine) Idle Adjustment, below, for correct adjustment procedure.

HOLLEY DUAL 4-V CARBURETOR— CARBURETOR INTER- CONNECTING LINKAGE ADJUSTMENT

The following procedure is required for adjusting the inter-carburetor linkage to achieve proper progressive opening of the primary throttle plates to obtain the correct idle speed.

The secondary throttles are vacuum operated and are inter-connected by a rubber hose, located between the two secondary diaphragm vacuum operating chambers (Fig. 24), to assure synchronous action of the secondary throttle plates (no adjustment is required).

1. With the air cleaner removed, disconnect the inter-carburetor linkage at the front and rear carburetor primary throttle levers and at the bellcrank lever (Fig. 23). Disconnect the throttle control cable from the cross-shaft bellcrank lever.

2. Adjust the primary carburetor rod to a $4\frac{3}{16}$ inch length (Fig. 23) from the center line of the hole to the center line of the bent end (operating centers).

3. Install the primary carburetor rod

on the bellcrank lever and on the upper stud of the front carburetor lever (Fig. 23). Tighten the locknut and install the washers and retainer pins.

4. Move the bellcrank lever so that the front carburetor throttle is in the wide open position. Hold in this position.

5. Install the slotted end of the secondary carburetor rod on the throttle lever of the rear carburetor (Fig. 23).

6. Move the throttle lever of the rear carburetor to the wide open position; then, adjust the length of the secondary

carburetor rod so that the hole in the rod at the bellcrank lever just engages the stud on the bellcrank lever (Fig. 23). Install the washers and retainer pins and tighten the locknut on the rod.

7. Open the throttle wide by operating the left side of the bellcrank assembly (on the intake manifold). Be sure the accelerator lever is engaged between the pin and the pad of the accelerator pedal (inside the car). Have someone depress the accelerator to the floor and while holding the carburetor linkage open, see if the accelerator rod pin will engage the bellcrank lever. Adjust as necessary.

8. Check the idle fuel mixture and idle speed adjustments. Adjust the carburetors as required. Refer to Idle Fuel Mixture and Idle (Hot Engine) Speed Adjustments (in this section) for the proper procedure.

FAST (COLD ENGINE) IDLE SPEED ADJUSTMENT— AUTOMATIC CHOKE

The fast idle adjusting screw contacts one edge of the fast idle cam. The cam permits a faster engine idle speed for smoother running when the engine is cold during choke operation. As the choke plate is moved through its range of travel from the closed to the open position, the fast idle cam pick-up lever rotates the fast idle cam. Each position on the fast idle cam permits a slower idle rpm as engine temperature rises and choking is reduced.

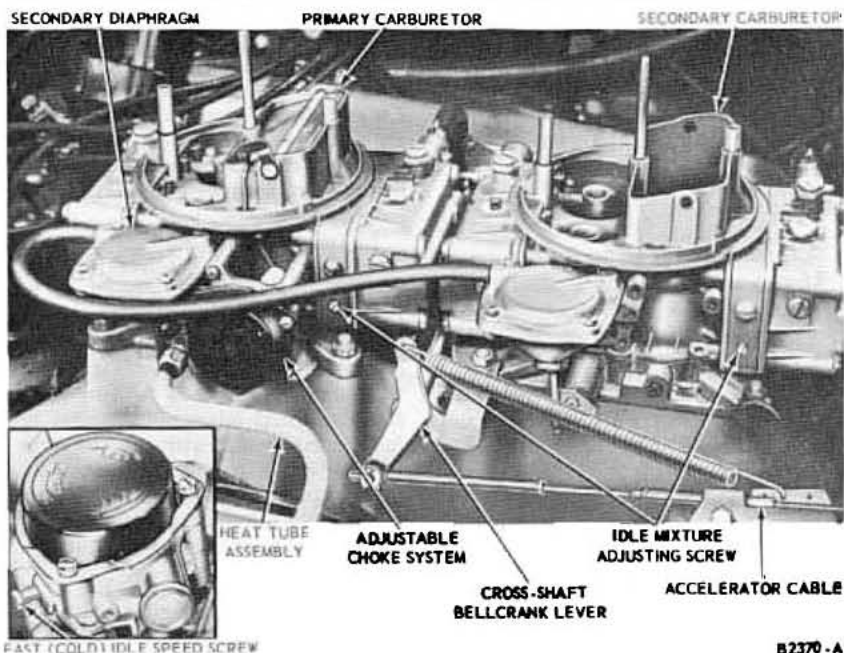


Fig. 24—Holley Dual 4-V Carburetors—Left Side View

Make certain the idle (hot engine) speed and mixture is adjusted to specification before attempting to set the fast idle speed.

1. With the engine operating temperature normalized (hot), air cleaner removed and the tachometer attached, manually rotate the fast idle cam until the fast idle adjusting screw rests adjacent to the shoulder of the highest step (screw aligned with arrow mark) on the cam.

2. Start the engine, and turn the fast idle adjusting screw inward or outward as required to obtain the specified idle rpm. (Under conditions specified in Preliminary Preparation—All Vehicles, steps 1 thru 4, above.)

3. Place the transmission selector lever in neutral and turn off the engine. Switch off the headlamps and the air conditioner (if so equipped). Remove the tachometer.

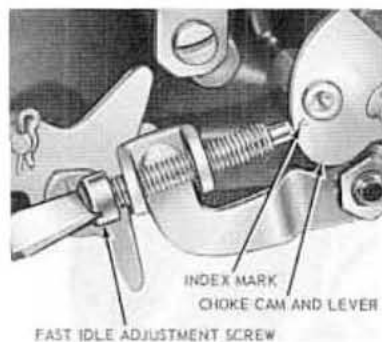
On cars equipped with a vacuum release parking brake, connect the vacuum line to the vacuum power unit of the automatic vacuum release parking brake assembly.

4. If the car is equipped with an automatic transmission, check the anti-stall dashpot for proper adjustment.

FAST (COLD ENGINE) IDLE SPEED ADJUSTMENT—MANUAL CHOKE

The adjusting screw on the right side of the carburetor contacts one edge of the choke cam and lever, (Fig. 25). The cam permits a faster engine idle speed for smoother running when the engine is cold during choke operation. As the choke cam and lever is moved through its range of travel from the open to the closed position, the fast idle pick-up lever rotates the throttle shaft.

1. Manually rotate the choke cam and lever until the fast idle adjusting screw rests on the index mark (arrow) on the cam (Fig. 25).



B2357-A

Fig. 25—Manual Choke Fast (Cold Engine) Idle Speed Adjustment

2. Turn the fast idle adjusting screw inward or outward (as required) so that the fast idle adjusting screw just contacts the fast idle cam at the index mark to obtain the specified fast idle rpm. (Refer to Group 10 of the appropriate Shop Manual for specifications.)

3. If the car is equipped with an automatic transmission, check the dashpot for proper adjustment.

LINCOLN CARBURETOR (CARTER)

NOTE: The carburetor installed in the Lincoln cars is not the same as in other Ford vehicles. The adjustment procedures given below must be used:

With the air cleaner removed, make the idle adjustments in the following sequence:

Adjust Accelerator Pump Stroke

The accelerator pump stroke adjustment compensates for the fuel needs of the engine during extremes of hot or cold temperature. Insert the accelerator pump operating rod into the appropriate hole in the pump arm for the climate in which the car is to be driven (Fig. 26).

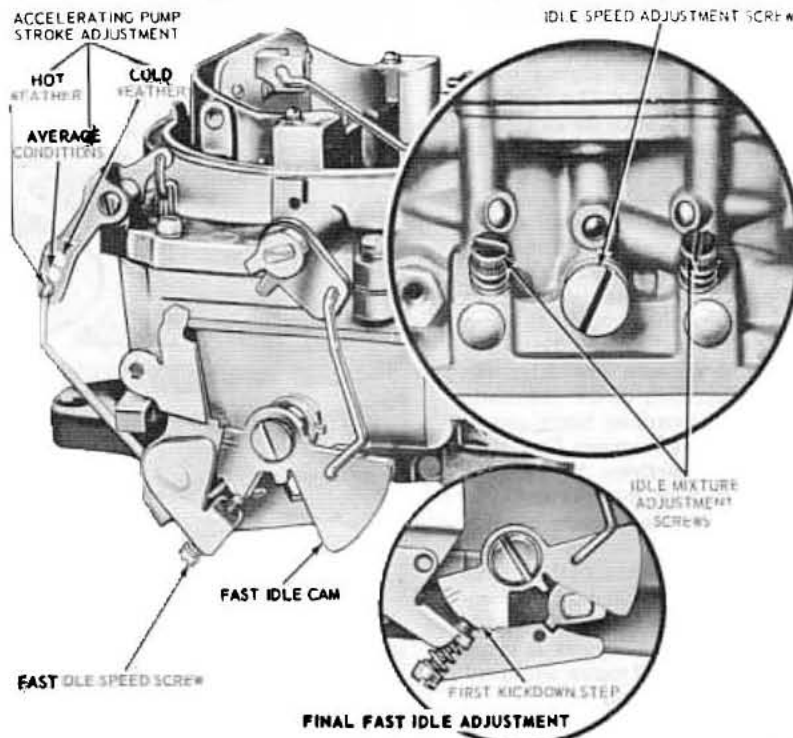
Initial Idle Speed and Mixture Adjustments

The idle fuel system must be balanced as closely as possible in order to

obtain a satisfactory idle speed and fuel mixture adjustment. This is achieved by performing initial idle speed and fuel mixture adjustments before proceeding with the final idle speed and fuel mixture adjustments and the fast (cold engine) idle speed adjustment.

1. Make an initial idle fuel mixture adjustment by turning the idle mixture adjustment screws (Fig. 15) inward until they lightly touch their seats; then, back them outward the specified number of turns. Refer to Group 10 of the Lincoln Shop Manual for specifications. Do not turn the idle fuel mixture adjustment screws (needles) tightly against their seats during the adjustment, as this may groove the needle ends. If a needle is damaged, it must be replaced to obtain satisfactory fuel mixture adjustments.

2. Make an initial idle speed (air mixture) adjustment by turning the idle mixture adjustment screws (Fig. 26) inward until they lightly touch their seats; then, back them outward the specified number of turns. Do not turn the idle fuel mixture adjustment screws (needles) tightly against their seats during the adjustment, as this may groove the needle ends. If a needle is damaged, it must be replaced to obtain satisfactory fuel mixture adjustments.



B2644-A

Fig. 26—Idle Fuel Mixture, Idle Speed and Accelerator Pump Stroke—Lincoln

3. Make an initial idle speed (air mixture) adjustment by turning the idle speed screw inward until it lightly touches its seat; then turn it outward the specified number of turns.

Final Idle (Hot Engine) Speed and Fuel Mixture Adjustments

The final engine idle speed and fuel mixture adjustments must be made with the engine at a hot, normalized operating temperature.

Turn the idle fuel mixture screws (Fig. 26) inward to lean the mixture and outward to enrich the mixture. Turn the idle speed (air) adjustment screw (Fig. 26) outward to increase the speed. Conversely, turn the screw inward to decrease the speed. If one of the idle adjustments is changed, the other idle adjustments may be affected. It is necessary that the adjustments be made in the order listed below and all of the idle adjustments that follow the one being made must be checked:

1. Idle (Hot Engine) Speed Adjustment.
2. Idle Fuel Mixture Adjustment.
3. Fast (Cold Engine) Idle Adjustment.

When setting the engine idle speed and fuel mixture adjustments on a car equipped with an air conditioner, the air conditioner should be turned off. If the air conditioner is turned on with the air cleaner removed, a slightly rough engine idle may be noted. This condition can be disregarded, since the air cleaner traps fuel vapors and allows them to enrich the mixture to again regain a smooth idle.

1. Operate the engine until engine temperatures are stabilized at the normal (hot) operating temperature.

2. Position the transmission lever in neutral. Allow the throttle to drop back to the normal idle speed position. Remove the vacuum line from the vacuum power unit of the automatic vacuum release parking brake assembly and plug the vacuum line. It is necessary to inactivate the vacuum power unit to keep the parking brake engaged during the adjustment procedures.

3. Attach a tachometer to the engine.

4. Turn on the headlamps. It is necessary to place the alternator under a load condition in this manner in order to obtain the specified engine idle speed during the adjustment procedure.

5. Place a small weight on the hot idle compensator spring to hold the compensator closed. If the hot idle compensator was allowed to remain open (due to high underhood tempera-

tures) the idle speed adjustment would be incorrect when the idle compensator is in the closed position (normal temperatures).

6. Adjust the engine idle speed (air mixture) adjustment screw (Fig. 26) to obtain the specified engine idle speed with the transmission lever in DRIVE position.

7. Turn each idle mixture adjustment screw (Fig. 26) inward, evenly and alternately, until the engine rpm begins to drop, due to the lean mixture. Turn the screws outward, evenly and alternately, until the engine rpm increases and begins to drop. On cars equipped with a Thermactor exhaust emission system, the outward adjustment of the needles is the final adjustment required. On cars without a Thermactor system, turn the idle fuel mixture screws inward, evenly and alternately, for the maximum idle rpm and engine smoothness. Each idle fuel mixture adjustment screw should have been approximately the same amount. The final setting may vary $\frac{1}{2}$ turn difference between screws.

8. Check the idle speed adjustment by placing the transmission selector lever in NEUTRAL and manually opening and closing the throttle. Position the selector lever in DRIVE range and check the idle speed. Adjust the idle speed to specification, if necessary.

The final engine idle speed may be varied to suit the conditions under which the car is to be operated.

9. Check the fast (cold engine) idle speed for proper adjustment.

The fast idle adjusting screw (Fig. 26) contacts one edge of the fast idle cam. The cam permits a faster engine idle speed when the engine is cold during choke operation. As the choke plate is moved through its range of travel from the closed to the open position, the fast idle cam pick-up lever rotates the fast idle cam. Each position (step) on the fast idle cam permits a slower idle rpm as engine temperature rises and choking is reduced.

The final fast (cold engine) idle speed adjustments must be made with the engine at a hot, normalized, operating temperature.

Initial Fast Idle Adjustment

1. Hold the choke plate and the primary throttle shaft fully closed. Turn the fast idle screw outward (counter clockwise) until it clears the fast idle cam; then, rotate the fast idle cam to align the index mark on the cam with the center of the screw end.

2. With the choke plate and throttle shaft still fully closed, turn the screw inward until the end of the

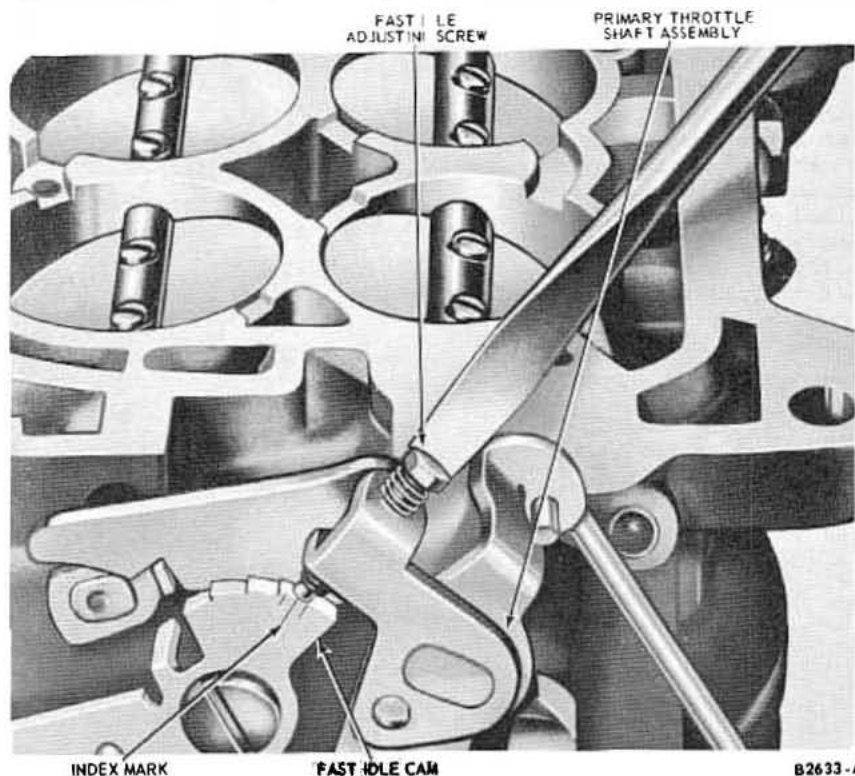


Fig. 27—Fast Idle Adjustment—Lincoln

B2633-A

screw just touches the cam at the index mark (Fig. 27). Release the throttle shaft and turn the fast idle screw inward one full turn.

Final Fast Idle Adjustment

Make certain the idle (hot engine) speed and mixture is adjusted to specification before attempting to set the final fast idle speed.

1. With the engine at a stabilized normal operating temperature, tachometer installed, headlamps turned on, idle compensator closed, **parking brake on** and the transmission selector lever in **NEUTRAL**; position the fast idle screw on the first kickdown step (Fig. 26), located next to the highest (index marked) step on the fast idle cam. Adjust the fast idle screw to obtain the specified fast idle rpm.

2. Turn off the engine. Remove the tachometer. Remove the weight from the hot idle compensator. Turn off the headlamps. Connect the vacuum line to the vacuum power unit of the vacuum release parking brake assembly.

3. Check the anti-stall dashpot and accelerating pump for proper adjustment. Install the air cleaner assembly.

LUBRICATE ACCELERATOR BALL SOCKETS AND CARBURETOR LEVER KICK-DOWN ACTUATING CAM—ECONOLINE AND BRONCO

Lubricate the accelerator pedal shaft and kickdown actuating cam on all engines. When equipped with automatic transmission, lubricate all friction points in the accelerator to carburetor linkage with specified lubricant.

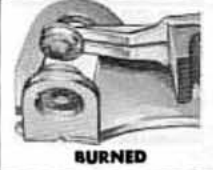
CHECK DISTRIBUTOR POINTS AND ADJUST DWELL

Unsnap the distributor cap retaining clips, lift the distributor cap off the distributor housing, and position the cap out of the way (if necessary, remove the air cleaner and/or the high tension wire to gain access to the distributor).

Lift the rotor off the cam. Remove the dust cover (transistorized ignition).

BREAKER POINT INSPECTION

Breaker points should be inspected, cleaned and adjusted as necessary. Breaker points can be cleaned with chloroform and a stiff bristle brush. **Caution: Make sure there is adequate ventilation.** Replace the breaker point assembly if the contacts are badly burned or excessive metal transfer between the points is evident (Fig. 28).

CONDITION	CAUSED BY
	Any discoloration other than a frosted slate grey shall be considered as burned points.
	Incorrect alignment. Incorrect voltage regulator setting. Radio condenser installed to the distributor side of the coil. Ignition condenser of improper capacity. Extended operation of the engine at speeds other than normal.

B1443-B

Fig. 28—Breaker Point Inspection

Metal transfer is considered excessive when it equals or exceeds the gap setting.

BREAKER POINT ALIGNMENT

The vented-type breaker points used in Ford distributors must be accurately aligned in order to realize the full advantages provided by this design, and to assure normal breaker point life. Any misalignment of the breaker point surfaces will cause premature wear, overheating, and pitting.

1. Turn the distributor cam so that the breaker points are closed and check the alignment of the points (Fig. 29).

2. Align the breaker points to make full face contact by bending the stationary breaker point bracket (Fig. 30). Do not bend the breaker arm.

3. After the breaker points have been properly aligned, adjust the breaker point gap or dwell.

DWELL ANGLE ADJUSTMENT

Use a dwell meter to check the contact dwell. It is not advisable to use a feeler gauge to adjust or to check the gap of used breaker points because the roughness of the points makes an accurate gap reading or setting impossible.

If the used points are serviceable, set the gap using a dwell meter as follows:

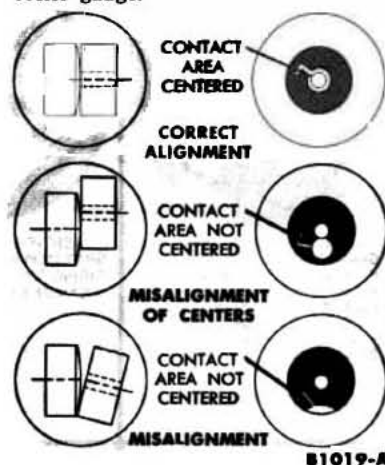
1. Connect the dwell meter following the manufacturer's instructions. In a car equipped with transistor ignition, make sure that the dwell meter is connected to the tachometer block rather than the coil.

2. Operate the engine at idle speed and note the reading on the dwell meter.

3. Stop the engine and adjust the gap (decreasing the gap increases the dwell). Now check the dwell again.

4. Repeat this procedure until specified dwell is obtained.

If new points are installed, set the gap to specifications using a feeler gauge.



B1019-A

Fig. 29—Breaker Point Alignment Guide

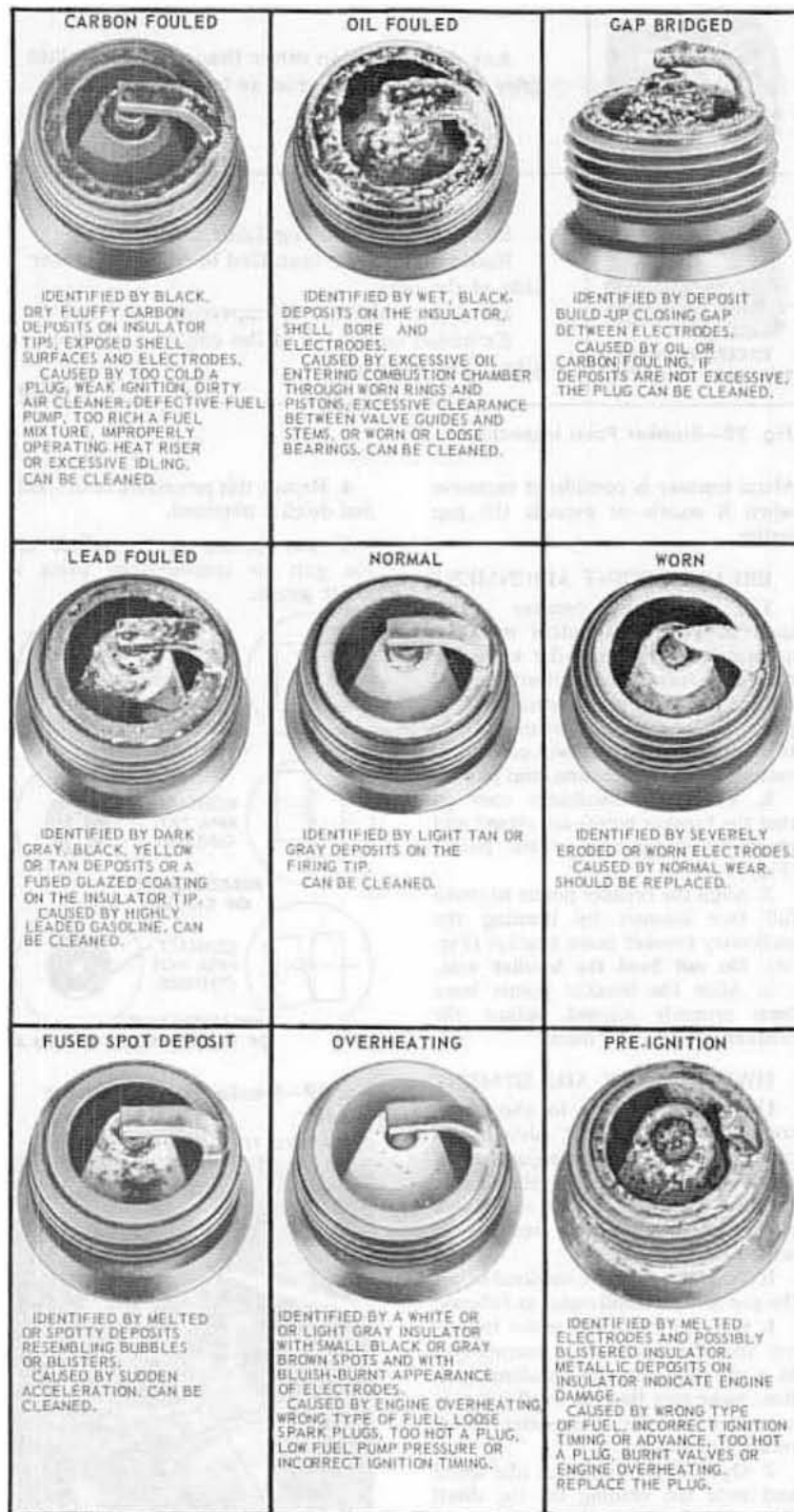
Tool—KD-111 or TK-410-A



BEND STATIONARY BRACKET

B2351-A

Fig. 30—Aligning Breaker Points—Typical



B2581-A

Fig. 31—Spark Plug Inspection Guide

5. Install the dust cover (transistorized ignition).

6. Install the rotor. Install the distributor cap on the distributor housing and snap the retaining clips in place.

INSPECT, CLEAN, ADJUST AND TEST SPARK PLUGS REMOVAL

1. Remove the wire from each spark plug by grasping, twisting and then pulling the moulded cap of the wire only. Do not pull on the wire because the wire connection inside the cap may become separated or the weather seal may be damaged.

2. Clean the area around each spark plug port with compressed air, then remove the spark plugs.

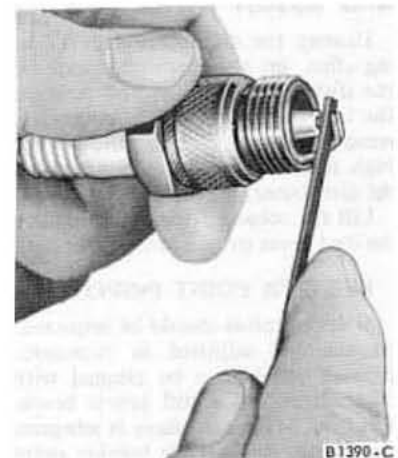
CLEANING AND INSPECTION

1. Examine the firing ends of the spark plugs, noting the type of deposits and the degree of electrode erosion. Refer to Fig. 31 for the various types of spark plug fouling and their causes.

2. Clean the plugs on a sand blast cleaner, following the manufacturer's instructions. Do not prolong the use of the abrasive blast as it will erode the insulator. Remove carbon and other deposits from the threads with a stiff wire brush. Any deposits will retard the heat flow from the plug to the cylinder head causing spark plug overheating and pre-ignition.

3. Clean the electrode surfaces with a small file (Fig. 32). Dress the electrodes to secure flat parallel surfaces on both the center and side electrode.

4. After cleaning, examine the plug carefully for cracked or broken insulators, badly pitted electrodes, and



B1390-C

Fig. 32—Cleaning Spark Plug Electrode



Fig. 33—Checking Spark Plug Gap

other signs of failure. Replace as required.

ADJUSTMENT

Set the spark plug gap to specifications by bending the ground electrode. (Fig. 33). **Never bend the center electrode.** (Refer to Group 9 Specifications in the appropriate Shop Manual for gap settings.)

TESTING

After the proper gap is obtained, check the plugs on a testing machine. Compare the sparking efficiency of the cleaned and gapped plug with a new plug. Replace the plug if it fails to pass the test as outlined in the tester instruction manual.

Test the plugs for compression leakage at the insulator seal. Apply a coating of oil to the shoulder of the plug where the insulator projects through the shell, and to the top of the plug, where the center electrode and terminal project from the insulator. Place the spark plug under pressure with the tester's high tension wire removed from the spark plug. Leakage is indicated by air bubbling through the oil. If the test indicates compression leakage, replace the plug. If the plug is satisfactory, wipe it clean.

INSTALLATION

1. Install the spark plugs and torque each plug to 15-20 ft-lbs.

When a new spark plug is installed in a new replacement cylinder head, torque the plug to 20-30 ft-lbs.

2. Connect the spark plug wires. Push all weather seals into position.

CHECK AND ADJUST IGNITION TIMING

TIMING MARK LOCATIONS

Six Cylinder Engines. The timing pointer (Fig. 34), has five timing marks ranging from top dead center (TDC) to 14° before top dead center

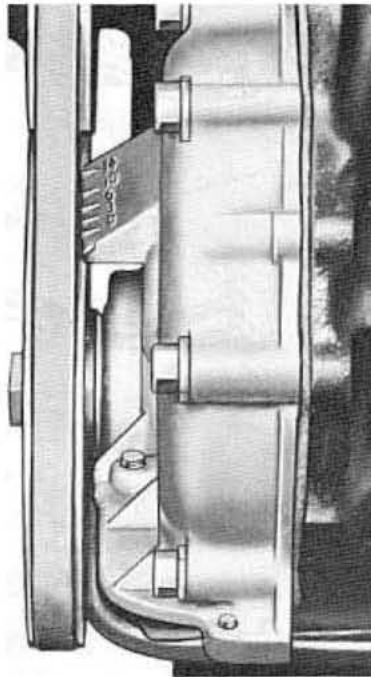


Fig. 34—Typical Six-Cylinder Engine Timing Marks

(BTDC). The crankshaft pulley or damper has a timing notch.

V-8 Engines. The crankshaft damper for the 289 V-8 engine (Fig. 35) has five timing marks ranging from top dead center (TDC) to 12° before top dead center (BTDC).

The crankshaft damper for all V-8 engines except the 289 has 15 timing marks ranging from top dead center (TDC) to 30° before top dead center (BTDC) (Fig. 36). Refer to specifications for the correct ignition timing.

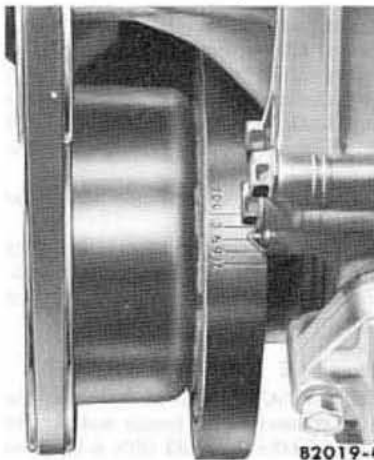


Fig. 35—289 V-8 Engine Timing Marks

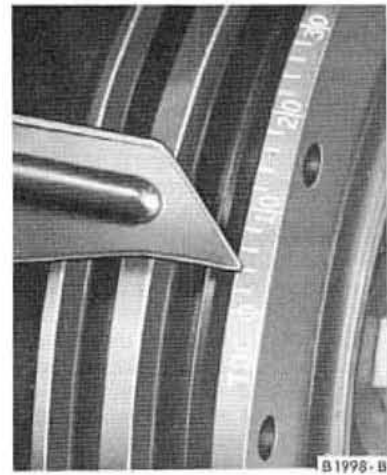


Fig. 36—Typical V-8 Engine Timing Marks—Except 289

TIMING PROCEDURE

To check and adjust the timing with a Rotunda 13-07 power timing light, proceed as follows:

1. Remove the plug wire from the number 1 spark plug.
2. Install the spark plug adaptor on the spark plug.
3. Connect the plug wire to the spark plug adaptor.
4. Clamp the timing light spark plug lead to the spark plug adaptor.
5. Connect the timing light battery leads to the battery terminals.
6. Disconnect the distributor vacuum line (if so equipped).
7. If necessary, clean and mark the timing marks.
8. Connect a tachometer to the engine.

NOTE: When connecting a tachometer to a car equipped with a transistorized ignition, connect the leads to the tachometer block (positive lead to red terminal, negative to black).

9. Start the engine and adjust the speed to the specified rpm for initial timing adjustment. Allow the engine to warm up and point the timing light at the timing pointer.

10. If the timing is incorrect, loosen the distributor hold down bolt and rotate the distributor until the desired initial advance is obtained.

11. Tighten the distributor hold down bolt and check the timing again.

12. Turn off the engine.

13. Remove the timing light and connect the vacuum line.

CHECK EXHAUST CONTROL VALVE FOR FREE OPERATION, IF SO EQUIPPED

The exhaust control valve, if the car is so equipped, should be checked to make certain it is operating properly. A valve that is stuck in the open position will result in poor engine performance during initial warm-up, because the heat passing through the intake manifold heat riser is insufficient for proper fuel atomization.

On V-8 engines, if the valve is stuck in the closed position, the intake manifold will be supplied with excessive heat after the initial warm-up period. This will cause poor acceleration, a lack of power, and will cause poor high speed performance in general.

Check the thermostatic spring of the valve (Fig. 37) to make sure it is hooked on the stop pin. The spring stop is at the top of the valve housing when the valve is properly installed.

To check the exhaust control valve on the vehicle, make sure the spring holds the valve closed. Actuate the counterweight by hand to make sure it moves freely through approximately 90° of rotation without binding.

The valve is closed when the engine is cold. However, a properly operating valve will open when very light finger pressure is applied to the counterweight. Rapidly accelerate the engine to make sure the valve momentarily opens. The valve is designed to open when the engine is at normal operating temperature and is operated at high rpm.

Lubricate the valve with Rotunda Exhaust Control Valve Solvent (COAA-19A501-A.)

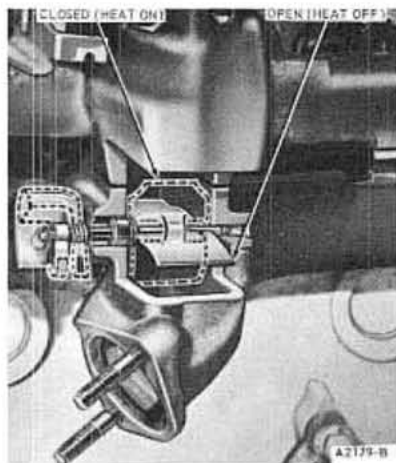


Fig. 37—Six-Cylinder Engine Exhaust Control Valve—Typical

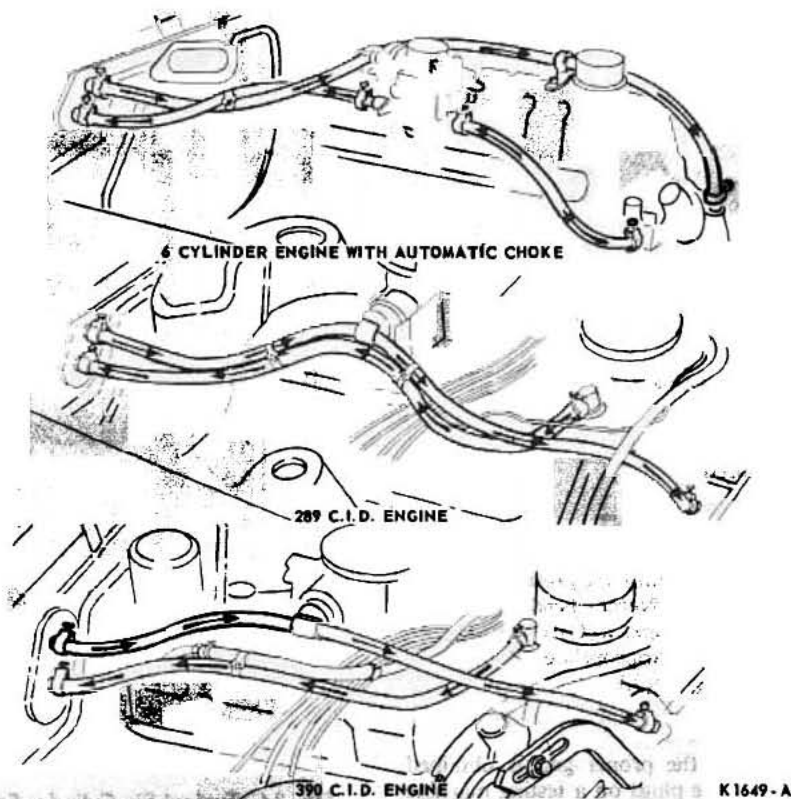


Fig. 38—Heater Hose Routings—Typical Six and Eight Cylinder Engines

CHECK RADIATOR COOLANT LEVEL

The coolant level should be kept one inch below the bottom of the radiator filler neck.

Use care when removing the radiator cap to avoid injury from escaping steam or hot water.

INSPECT COOLING SYSTEM HOSES AND LINES —ECONOLINE AND BRONCO

Inspect the cooling system hoses for evidence of cracking, checking or extreme weathering. Replace cracked hoses. Check for leaking or porous hoses and tighten or replace.

Make sure all supporting brackets for hoses are in place and that the hoses are properly installed in the support.

Inspect the radiator core and tanks for seepage or leaks.

Check all fittings to see that they are tight and in good condition. Examine the hoses at the fittings for cuts or weakness.

REPLACE ENGINE COOLANT

IMPORTANT: On all vehicles, the hose connecting the heater water valve to the intake manifold (this is the hose that feeds hot water to the heater, Fig. 38) must be replaced each time the engine coolant is replaced.

To drain the radiator, open the drain cock located at the bottom of the radiator and remove the cylinder block drain plug(s). The 6-cylinder engine block has one drain plug located at the right rear of the cylinder block ahead of the starter (Fig. 39). The V-8 engines have a drain plug on each side of the cylinder block (Fig. 40).

To fill the cooling system, close the drain cock. Install the block drain plug(s). Disconnect the heater outlet hose at the water pump to bleed or release trapped air in the system. When the coolant begins to escape, connect the heater outlet hose.

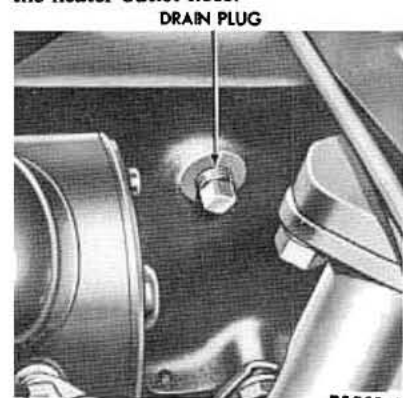


Fig. 39—Typical Cylinder Block Drain Plug—Six

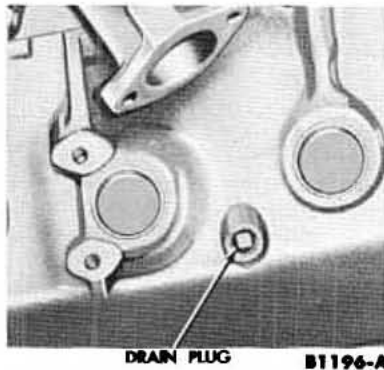


Fig. 40—Typical Cylinder Block Drain Plug—V-8

All coolant added should be a 50-50 mixture of Rotunda permanent anti-freeze and water.

To avoid possible overheating in very hot weather, do not use mixtures with more than 50% anti-freeze except in areas where anti-freeze protection below -35° is required. In this case, refer to the coolant mixture chart on the Rotunda permanent anti-freeze container.

Whenever the system is completely refilled, add a can of Rotunda Radiator Rust Inhibitor.

A standard ethylene glycol hydrometer can be used to check the protection level of the long-life coolant.

Operate the engine until normal operating temperature is reached, and add more coolant, if necessary, to fill the radiator to the proper level, one inch below bottom of the radiator filler neck.

After the initial fill the coolant level may drop approximately one quart after the engine has been operated about 20 minutes at 2000 rpm. This is due to the displacement of entrapped air. Refill to the proper level.

REPLACE FUEL FILTER OR ELEMENT

FUEL FILTERS—ALL EXCEPT 427 V-8 AND LINCOLN

The in-line fuel filter used on all engines except the 427 V-8 is of one-piece construction and cannot be cleaned. Replace the filter if it becomes clogged or restricted.

1. Remove the air cleaner.

2. Loosen the retaining clamp securing the fuel inlet hose to the fuel filter (Fig. 41).

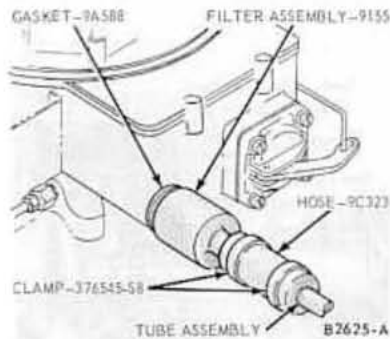


Fig. 41—In-Line Fuel Filter—All Except 427 V-8 and Lincoln

3. Unscrew the fuel filter from the carburetor and discard the gasket. Disconnect the fuel filter from the hose and discard the retaining clamp.

4. Install a new clamp on the inlet hose and connect the hose to the filter. Place a new gasket on the new fuel filter and screw the filter into the carburetor inlet port. Tighten the filter.

5. Position the fuel line hose clamp and crimp the clamp securely.

6. Start the engine and check for fuel leaks.

7. Install the air cleaner.

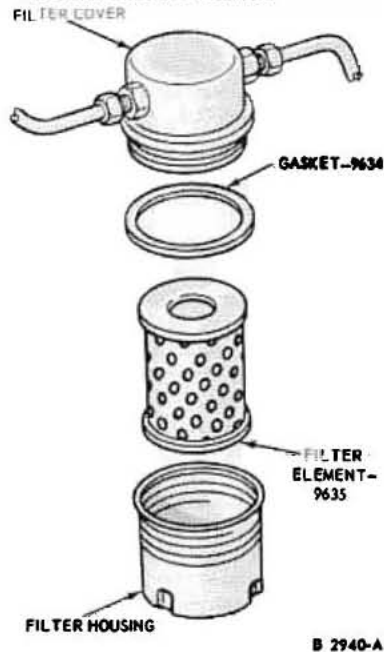


Fig. 42—In-Line Fuel Filter—427 V-8

FUEL FILTER ELEMENT—427 V-8

The in-line fuel filter for the 427 V-8 engine (Fig. 42) contains a replaceable filter element.

1. Unscrew the filter housing from the fuel filter cover (Fig. 42). Remove and discard the filter element and gasket.

2. Clean the filter housing in solvent.

3. Coat a new gasket with light engine oil and position the gasket on the filter housing. Position a new filter element over the spout on the cover. Only a filter element displaying installation instructions should be used. Install the filter element according to the printed instructions on the element.

4. Screw the filter housing onto the cover (Fig. 42). Hand tighten the filter housing until the gasket makes contact with cover; then, advance it $\frac{1}{8}$ turn.

5. Start the engine and check for fuel leaks.

FUEL FILTER—LINCOLN

A replaceable fuel filter is located between the fuel pump and the carburetor fuel inlet line (Fig. 43).

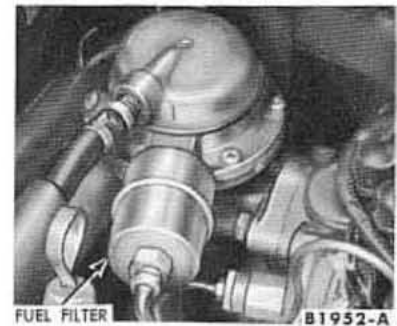


Fig. 43—Fuel Filter—Lincoln

1. Disconnect the fuel line from the filter. Unscrew the filter from the fuel pump.

2. Screw the new filter into the fuel pump. Do not overtighten it. Connect the fuel line to the fuel filter. Use a wrench on the filter connection to prevent distorting or damaging the filter case.

3. Operate the engine and check the fuel line and filter connections for leaks.

2 TRANSMISSION

ADJUST AUTOMATIC TRANSMISSION BAND(S)

Automatic transmissions used in current production vehicles are variations of three basic transmissions: Cruise-O-Matic, or Merc-O-Matic (referred to as MX-FX in the following paragraphs) C6, or C4. As a guide to band adjustment, Table 1 lists the combination of bands used in each transmission. For a complete diagnosis chart of automatic transmission troubles for any vehicle, refer to Group 7 of the Shop Manual for that vehicle.

TABLE 1. Band Arrangement of Automatic Transmissions.

TRANSMISSION	BAND LOCATION	USED FOR
MX-FX		
C6		
C4	Front	
	Rear	

MX-FX TRANSMISSION

Front Band Adjustment

1. Disconnect the fluid filler tube from the oil pan, and drain the fluid from the transmission. **If the same fluid is to be used again in the transmission after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Make sure that the container is clean. Re-use the fluid only if it is in good condition.**

2. Remove and thoroughly clean the oil pan, then remove the fluid screen and clip from the transmission. Clean the inside of the oil pan. **Do not attempt to clean the filter. If dirty install a new one.** Discard the oil pan gasket. Remove all gasket material from oil pan and pan mounting face of case.

3. Loosen the front servo adjusting screw locknut two full turns.

4. Pull back on the actuating lever, then insert the Gauge Block, Tool 7225-C13-B, of front band adjusting Tool 7225-C, (Fig. 44) between the servo piston stem and adjusting screw.

Tighten the adjusting screw until the wrench overruns (this should be exactly 10 in-lbs). Remove the gauge block. Tighten the adjusting screw an additional $\frac{3}{4}$ turn. Hold the ad-

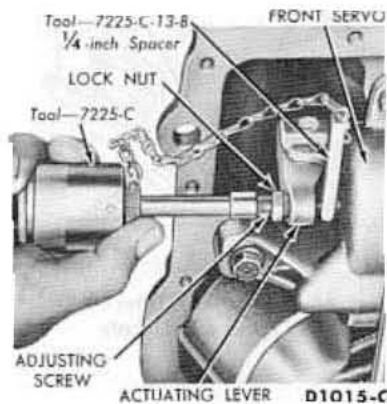


Fig. 44—Typical Front Band Adjustment—MX-FX

justing screw stationary and tighten the locknut to specifications.

5. Install the transmission fluid screen. Install the pan, using a new gasket.

6. Connect the transmission fluid filler tube to the oil pan.

7. Refill the transmission to the FULL mark on the dipstick.

8. Start the engine and engage the transmission in each drive range to fill all fluid passages, then place the selector in the "P" position. Check the fluid level and add enough fluid to bring the level up to the FULL mark on the dipstick.

Alternate Front Band Adjustment

1. Disconnect the fluid filler tube from the oil pan, and drain the fluid from the transmission. **If the same fluid is to be used again in the transmission after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Re-use the fluid only if it is in good condition.**

2. Remove and thoroughly clean the oil pan and screen. Discard the oil pan gasket.

3. Loosen the front servo adjusting screw locknut two full turns with a $\frac{1}{2}$ -inch wrench. Check the adjusting screw for free rotation in the actuating lever after the lock nut is loosened, and free the screw if necessary.

4. Pull the adjusting screw end of the actuating lever away from the servo body, and insert the $\frac{1}{4}$ " adjusting tool gauge block (Fig. 45) between the servo piston stem and the adjusting screw.

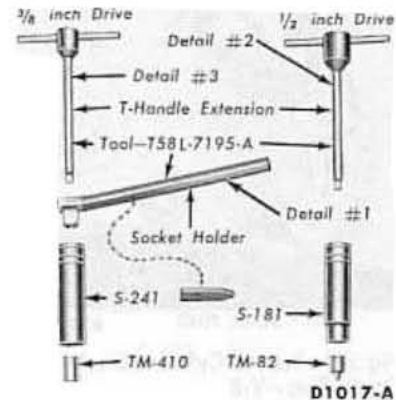


Fig. 45—Front and Rear Band Adjusting Tools—FX-MX

5. Install the socket handle on the $\frac{1}{16}$ -inch socket.

6. Insert the T-handle extension through the socket handle and socket, and install the screwdriver socket on the T-handle extension.

7. Place the tool on the adjusting screw so that the screwdriver socket engages the screw and the $\frac{1}{16}$ -inch socket engages the lock nut.

8. With a torque wrench on the T-handle extension, torque the adjusting screw to 10 in-lbs. Remove the gauge block. Tighten the adjusting screw an additional $\frac{3}{4}$ turn.

9. Hold the adjusting screw stationary, and torque the lock nut to specification.

10. Place a new gasket on the oil pan, and install the screen and pan on the transmission.

11. Connect the filler tube to the oil pan and tighten the fitting securely.

12. Add 3 quarts of transmission fluid. Run the engine for 2 minutes. Place selector lever in P position. Check the fluid level and add enough fluid to bring the level up to the FULL mark on the dipstick.

Rear Band Adjustment

1. Fold back the floor mat to expose the right side of the floor pan.

2. Remove the access hole cover from the floor pan. Remove all dirt from the adjusting screw threads, then oil the threads.

3. Loosen the rear band adjusting screw lock nut with the tool shown in Fig. 46. Using the T-handle portion of the tool, tighten the adjusting screw until the wrench overruns.

If the screw is found to be tighter than wrench capacity (10 ft-lbs

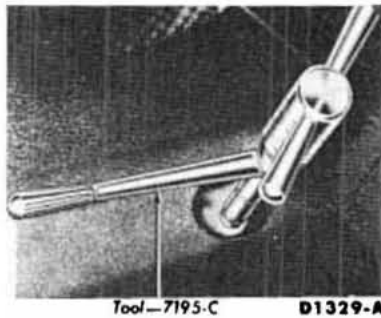


Fig. 46—Adjusting Rear Band—FX-MX

torque), loosen the screw and tighten until the wrench overruns.

4. Back off the adjusting screw $1\frac{1}{2}$ turns. Hold the adjusting screw stationary, and tighten the adjusting screw lock nut to specifications.

Severe damage may result if the adjusting screw is not backed off exactly $1\frac{1}{2}$ turns.

Alternate Rear Band Adjustment

The tool shown in Fig. 45 may be used to adjust the rear band.

1. Place the socket holder on the $\frac{3}{4}$ -inch socket (Fig. 45). Insert the T-handle extension through the handle and socket.

2. Place the $\frac{5}{16}$ -inch 8-point socket on the extension. Place a torque wrench on the T-handle extension.

3. Insert the assembled tool in the access hole so that it engages the adjusting screw and the lock nut.

4. Loosen the adjusting screw lock nut.

5. Torque the adjusting screw to 10 ft-lbs.

6. Remove the torque wrench from the T-handle extension and back off the adjusting screw exactly $1\frac{1}{2}$ turns. Severe damage may result to the transmission if the adjusting screw is not backed off exactly $1\frac{1}{2}$ turns.

7. Hold the adjusting screw stationary.

Rear Band Adjustment With Console

Part of the console assembly will have to be removed to adjust the rear band.

1. Loosen the two forward screws that attach the glove compartment to the console panel.

2. Remove the gear shift lever knob.

Rem

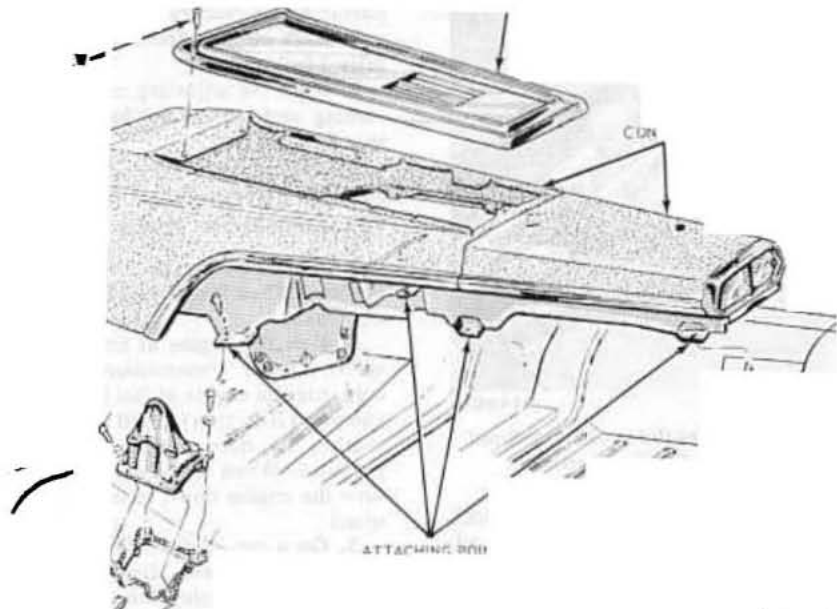


Fig. 47—Console Component Parts—MX-FX

attach the console finish panel casting to the console panel, and remove the casting (Fig. 47).

4. Remove the four bolts that secure the gear shift indicator to the support assembly.

5. Remove the twelve screws that attach the console panel mouldings to the console panel and remove the mouldings (Fig. 47).

6. Remove the eight screws that attach the console panel to the console support assembly.

7. Position the console panel out of the way and adjust the transmission rear band. Refer to Rear Band Adjustment, or Alternate Rear Band Adjustment, above.

8. Install the console panel and secure to the support assembly with eight screws.

9. d the twelve attaching screws.

10. Secure the gear shift indicator with the four attaching bolts.

11. Install the console finish panel and secure with the four screws. Also tighten the two forward screws of the glove compartment.

12. Install the gear shift lever

C6 TRANSMISSION INTERMEDIATE BAND ADJUSTMENT

1. Raise the car on a hoist stands

2. Clean the threads of the intermediate band adjustment screw.

3. Remove and discard the adjustment screw lock nut. Install a new lock nut on the adjustment screw, and leave it loose.

4. Tighten the band adjustment screw as shown in Fig. 48 until the wrench overruns (this should be exactly 10 ft-lbs), then back it off 1 turn.

5. Hold the adjusting screw stationary and torque the lock nut to specifications.

6. Lower the car.

C-4 TRANSMISSION

Front (Intermediate) Band Adjustment

1. Clean all the dirt from the band adjusting screw area. Remove and

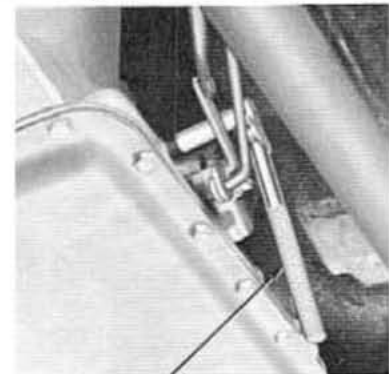
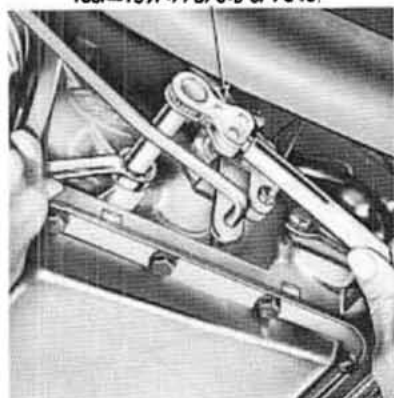


Fig. 48—Intermediate Band Adjustment—C6 Transmissior

Tool—T59P-77370-B or 7345.



D1460-A

Fig. 49—Front (Intermediate) Band Adjustment—C4 Transmission

discard the adjustment screw lock nut. Install a new lock nut on the adjustment screw, and leave it loose.

2. With the tool shown in Fig. 49, tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench which clicks and overruns when the torque on the adjusting screw reaches 10 ft-lbs.

3. Back off the adjusting screw exactly $1\frac{3}{4}$ turns.

4. Hold the adjusting screw from turning and torque the lock nut to specification.

Rear (Low-Reverse) Band Adjustment

1. Clean all the dirt from the band adjusting screw area. Remove and discard the adjustment screw lock nut. Install a new lock nut on the adjustment screw and leave it loose.

2. With the tools shown in Fig. 50, tighten the adjusting screw until the tool handle clicks. The tool is a preset torque wrench which clicks and overruns when the torque on the ad-

Tool—T59P-77370-B



D1461-A

Fig. 50—Rear (Low-Reverse) Band Adjustment—C4 Transmission

justing screw reaches 10 ft-lbs.

3. Back off the adjusting screw exactly 3 full turns.

4. Hold the adjusting screw from turning and torque the lock nut to specification.

CHECK AUTOMATIC TRANSMISSION FLUID LEVEL

1. Make sure that the car is standing level. Then firmly apply the parking brake.

2. Run the engine at normal idle speed. If the transmission fluid is cold, run the engine at fast idle speed (about 1200 rpm) until the fluid reaches its normal operating temperature. When the fluid is warm, slow the engine down to normal idle speed.

3. On a car equipped with a vacuum brake release, disconnect the release line and plug the end of the line; otherwise the parking brake will not hold the transmission in any drive position.

4. Shift the selector lever through all positions, and place the lever at P. Do not turn off the engine during the fluid level checks.

5. Clean all dirt from the transmission fluid dipstick cap before removing the dipstick from the filler tube.

6. Pull the dipstick out of the tube, wipe it clean, and push it all the way back into the tube. Be sure it is properly seated.

7. Pull the dipstick out of the tube again, and check the fluid level. If necessary, add enough fluid to the transmission through the filler tube to raise the fluid level to the F (full) mark on the dipstick. **Do not overfill the transmission.** Install the dipstick, making sure it is fully seated in the tube.

8. Connect the vacuum brake release line if so equipped, and test it for proper operation.

CHECK MANUAL TRANSMISSION LUBRICANT LEVEL AND CLEAN BREATHER

All Vehicles with Manual Shift Transmissions

1. Clean dirt and grease from the area around the filler plug, and remove the filler plug from the side of the case.

2. If lubricant does not flow from the filler hole, fill the case with the specified lubricant until it is level with the bottom of the filler hole.

3. Install the filler plug.

Econoline and Bronco

Clean dirt and grease from the breather air vent opening and see that the opening is clear.

LUBRICATE MANUAL TRANSMISSION SHIFT CONTROL AND LINKAGE

Clean and lubricate the shift linkage, trunnions and external shift mechanism (floor shift) as necessary. Use Lithium base grease. **Do not use Polyethylene Grease for this application.**

LUBRICATE AUTOMATIC TRANSMISSION KICKDOWN LINKAGE

Lubricate all pivot points in the kickdown linkage with the specified engine oil.

CHECK AND ADJUST TRANSMISSION SHIFT CONTROLS—ECONOLINE AND BRONCO

If the transmission shifts hard, or if it will not engage, the gear shift levers may need adjustment at the cross-over. Move the selector lever through all shift positions to see if cross-over operation is smooth. If cross-over operation is not smooth, adjust the gear shift levers.

1. Loosen the trunnion nuts at the transmission shift levers. Loosen the nuts sufficiently to allow the shift rods to slide freely in their trunnion.

2. Insert a $\frac{1}{4}$ -inch rod through the pilot hole in the shift tube floor-mounted bracket until it enters all the adjustment holes of the shift levers.

3. Place the transmission shift levers in the neutral position, and tighten the trunnion nuts.

4. Remove the $\frac{1}{4}$ -inch rod from the pilot hole, and check the operation of the selector lever in all shift positions.

CHECK TRANSFER CASE FLUID LEVEL—BRONCO 4-WHEEL DRIVE

1. Clean dirt and grease from the area around the filler plug, and remove the filler plug from the side of the case.

2. If lubricant does not flow from the filler hole, fill the case with the specified lubricant until it is level with the bottom of the filler hole.

3. Install the filler plug.

DRAIN AND REFILL TRANSFER CASE —BRONCO 4-WHEEL DRIVE

Clean dirt and grease from the area around the fill plug, remove the transfer case drain and fill plugs and allow the lubricant to drain completely. Install the drain plug and refill the transmission with the specified lubricant until the lubricant is level

with the fill plug hole. Install the fill plug.

LUBRICATE SPEEDOMETER CABLE

1. To lubricate the speedometer drive cable, disconnect the cable housing from the speedometer, and pull the cable out of the housing. Wipe off all of the old lubricant.

2. Inspect the cable for kinks or frayed strands. Replace it if damaged.

3. Lubricate the cable with Rotunda Speedometer Cable Lubricant, B5A-19581-A (do not over lubricate), insert it all the way into the housing, and twist it slightly to make sure that the squared drive is engaged in the speedometer driven gear.

3 CHASSIS

CHECK POWER STEERING RESERVOIR FLUID LEVEL

Run the engine until the fluid is at normal operating temperature. Then turn the steering wheel all the way to the left and right several times, and shut off the engine.

1. Check the fluid level in the power steering reservoir. The level must be at the full mark on the dipstick.

2. If the level is low, add enough automatic transmission fluid C1AZ-19582-A to raise the level to the F mark on the dipstick. **Do not overfill the reservoir.**

CHECK BRAKE MASTER CYLINDER FLUID LEVEL

1. Remove the filler cap from the master cylinder (Fig. 51). The diaphragm which seals the master cylinder should come off with the cap.

2. Fill the reservoir to $\frac{1}{4}$ to $\frac{1}{2}$ -inch from the top.

3. Install the filler cap, making sure that the diaphragm is properly seated in the cap.

CHECK REAR AXLE LUBRICANT LEVEL

Clean dirt and grease from the

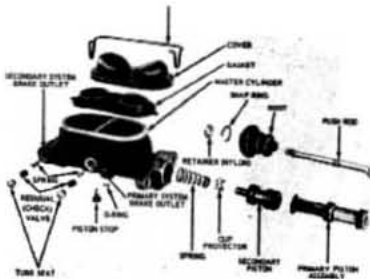


Fig. 51—Master Cylinder—Typical

area around the filler plug, and remove the filler plug at the locations shown on the Lubrication Charts in this manual. The level should be maintained at the bottom of the filler plug. If additional lubricant is required, use only the specified type. Refer to Group 21, Lubricant Specifications.

When checking lubricant level, the axle must be in running position (normal curb attitude). If checked on a frame contact hoist, use safety stands to hold the axle in normal curb attitude.

CHECK FRONT AXLE LUBRICANT LEVEL— BRONCO 4-WHEEL DRIVE

Follow the same procedure described for Rear Axle, above.

DRAIN AND REFILL FRONT AND REAR AXLE LUBRICANT—BRONCO

The front and rear axles should be drained and refilled **only when the car has been operated in water**, and then it should be done daily.

FRONT AXLE

1. Clean dirt and grease from the area around the fill plug, remove the fill plug and the cover lower bolt, and let the lubricant drain out at the bottom of the cover.

2. After all the old lubricant has drained out, install the cover lower bolt.

3. Fill the axle with specified lubricant until the lubricant is level with the bottom of the fill plug hole. **The axle must be in running position (normal curb attitude).** If on a frame contact hoist, use safety stands to hold the axle in normal curb attitude. Install the fill plug.

REAR AXLE

1. Clean dirt and grease from the area around the fill plug, remove the

fill plug, and draw out all the old lubricant through the fill plug hole with a suction pump.

2. Fill the axle with specified lubricant until the lubricant is level with the bottom of the fill plug hole. **The axle must be in running position (normal curb attitude).** If on a frame contact hoist, use safety stands to hold the axle in normal curb attitude.

3. Install the fill plug.

LUBRICATE KING PIN BEARINGS—BRONCO 2-WHEEL DRIVE

When the vehicle is operated in water, the **front king pin bearings** should be lubricated daily, preferably at the end of each day's operation.

Two fittings are located at each king pin; one at the top, for lubricating the king pin and upper pivot point, and the other at the bottom for lubricating the king pin and spindle assembly lower pivot point. The king pin is held with a tapered pin at the axle to prevent it from turning and does not require lubrication. **Before and after lubricating wipe off all fittings with a clean rag to prevent road grit from being forced in through the fitting.** Use enough lubricant to force out the old lubricant at the axle face. Wipe away any old lubricant around the axle to prevent road grit from entering at the axle bearing face.

LUBRICATE FRONT SUSPENSION BALL JOINTS

If the vehicle has been parked in a temperature below 20°F, park it in a heated garage for 30 minutes, or until the joints will accept lubricant.

Wipe any accumulated dirt from around the lubrication plugs.

Remove the plugs and install lubrication fittings. Lubricate the ball joints and remove the lubrication fittings. Install the plugs.

LUBRICATE POWER STEERING ACTUATOR VALVE BALL STUD

Wipe the lubrication fitting clean and apply the specified lubricant.

On some models it will be necessary to remove the lubrication plug and install a fitting in its place. Remove the fitting and replace the plug after lubrication.

CAUTION: Care should be exercised to stop the addition of lubricant when the boot seal begins to inflate or bulge.

LUBRICATE STEERING

COMET, COUGAR, FAIRLANE, FALCON AND MUSTANG

These cars are equipped with permanent-type rubber linkage joints which do not require lubrication.

FORD, MERCURY, THUNDERBIRD AND LINCOLN

If the car has been parked in a temperature below 20°F, park it in a heated garage for 30 minutes, or until the joints will accept lubricant.

1. Wipe any accumulated dirt from around the lubrication plugs.
2. Remove plugs and install fittings.
3. Apply the recommended lubricant to each steering linkage fitting with a pressure gun.
4. Remove the fittings and replace the plugs.

ECONOLINE AND BRONCO

If the vehicle has been parked in a temperature below 20°F, park it in a heated garage for 20 minutes, or until the joints will accept lubricant.

Lubricate all fittings on the steering linkage with Rotunda Long Life Ball Joint and Chassis Lubricant C1AZ-19590-B, R-156-A.

Steering linkage fittings are located at the following points:

1. At the drag line where it joins the steering knuckle arm.
2. At the drag line where it joins the pitman arm.
3. One at each end of the tie rod.

LUBRICATE FRONT AXLE SPINDLE PINS—ECONOLINE AND BRONCO

If the vehicle has been parked in a temperature below 20°F, park it in a heated garage for 30 minutes, or until the joints will accept lubricant.

Two fittings are located at each

spindle pin; one at the top, for lubricating the spindle pin and upper pivot point, and the other at the bottom, for lubricating the spindle pin and spindle assembly lower pivot point. The spindle pin is held with a tapered pin at the axle to prevent it from turning and does not require lubrication. **Before and after lubricating wipe off all fittings with a clean rag to prevent road grit from being forced in through the fitting.** Use enough lubricant to force out the old lubricant at the axle face. Wipe away any old lubricant around the axle to prevent road grit from entering at the axle bearing face.

CHANGE POWER STEERING FLUID FILTER—LINCOLN

Remove the power steering pump reservoir cover, spring, and washer. Remove all fluid from the reservoir with a suction gun. Lift the filter from the reservoir. Wipe the reservoir clean with a lint-free cloth. Place a new filter on the seat. Position the washer and spring on the cover stud. Install a new gasket in the cover. Install the cover on the reservoir and add fluid.

CHECK WHEEL NUT TORQUE

The wheel nut torque should be checked within 500 miles of new car delivery or whenever a wheel and tire have been removed, to determine that all hub bolts and nuts are secure and capable of maintaining torque specifications. Tighten each nut until a torque value between 55-85 ft-lbs is obtained. Replace any nut that is worn or does not meet the above torque specifications.

LUBRICATE CLUTCH PIVOTS, LINKAGE AND CLEAVES—ECONOLINE AND BRONCO

Lubricate the clutch pivot points on Econoline models (Fig. 52) with a pressure gun, using the specified lubricant. Lubricate clevises with 10W motor oil, applied sparingly. Wipe off any excess oil.

Apply lubricant to the clutch pedal pivot (Fig. 53) with a pressure gun.

LUBRICATE UNIVERSAL JOINTS AND SLIP YOKE—ECONOLINE AND BRONCO

If the vehicle has been parked in a temperature below 20°F, park it in a heated garage for 30 minutes, or until the joints will accept lubricant.

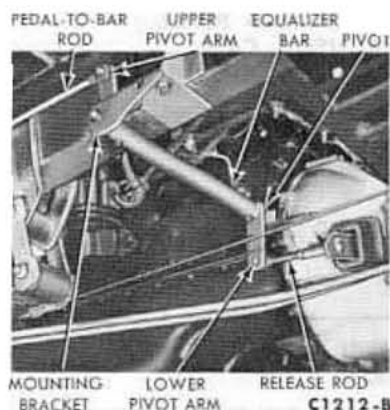


Fig. 52—Clutch Pivot Points—Econoline

CHECK CLUTCH LINKAGE AND ADJUST CLUTCH PEDAL TRAVEL

Adjust the clutch pedal free travel whenever the clutch does not disengage properly, or when new clutch parts are installed. **Improper adjustment of the clutch pedal free travel is one of the most frequent causes of clutch failure and can be a contributing factor in some transmission failures.**

COMET, COUGAR, FAIRLANE, FALCON AND MUSTANG

Manual Shift Transmission

1. Measure the total travel of the

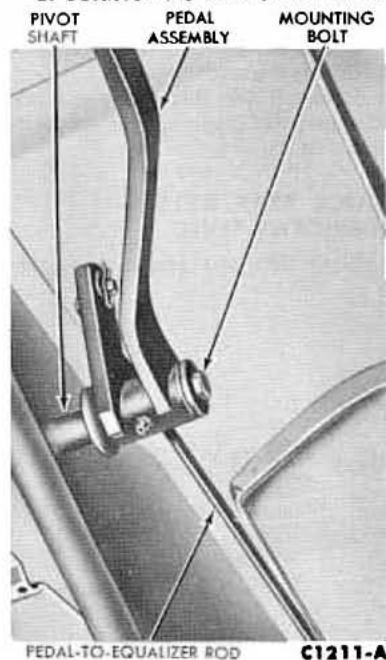


Fig. 53—Clutch Pedal Pivot—Econoline



C1466-A

Fig. 54—Typical Clutch Pedal Free-Travel Measurement

pedal (Fig. 54). If the total travel is less than 6½ inches or more than 6¾ inches, move the clutch pedal bumper and bracket up or down until the travel is within these limits.

Always check and adjust total travel before checking free travel.

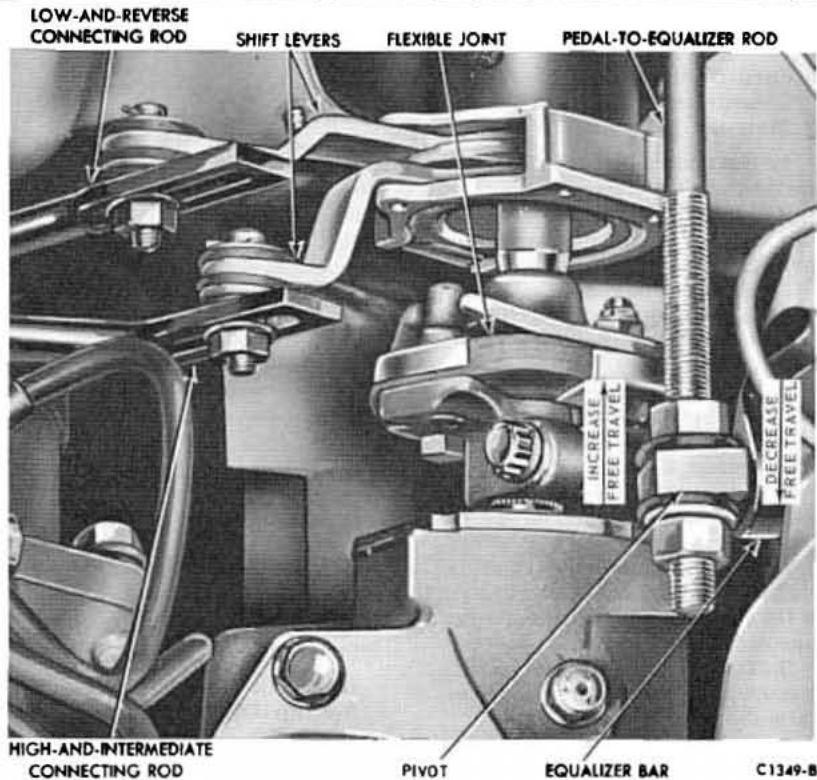
2. With the clutch pedal against its bumper (pedal release), measure the overall length of the spring. The overall length should be as specified in Group 5 of the appropriate Shop Manual.

3. With the engine idling, depress the pedal just enough to take up the free travel and note the reading on the tape (Fig. 54). The difference between this reading and the reading where the pedal is released is the clutch pedal free travel. If the free travel is not within specification, adjust the clutch pedal to equalizer rod (Fig. 55). To increase the free travel loosen the rearward adjusting nut and tighten the forward nut. To reduce the free travel, loosen the forward nut and tighten the rearward nut. **Both nuts must be tightened against the trunnion after making the adjustment.**

4. As a final check, measure the pedal free travel with the transmission in neutral and the engine running at about 3000 rpm. If the free travel at this speed is not ½ inch, readjust the clutch pedal to equalizer rod to obtain the specified free travel. Otherwise, the release fingers may contact the release bearing continuously, resulting in premature bearing and clutch failure. Free travel must be exactly to specification.

Interlock (Overdrive Models Only)

Be sure that the clutch linkage is correctly adjusted before adjusting



C1349-B

Fig. 55—Typical Clutch Pedal Travel Adjustment—Comet, Cougar, Fairlane, Falcon and Mustang

the interlock mechanism (Fig. 56).

1. Place the gearshift lever in neutral position.

2. Loosen the adjustment lock nut on the interlock rod.

3. Disconnect the rod from the interlock lever.

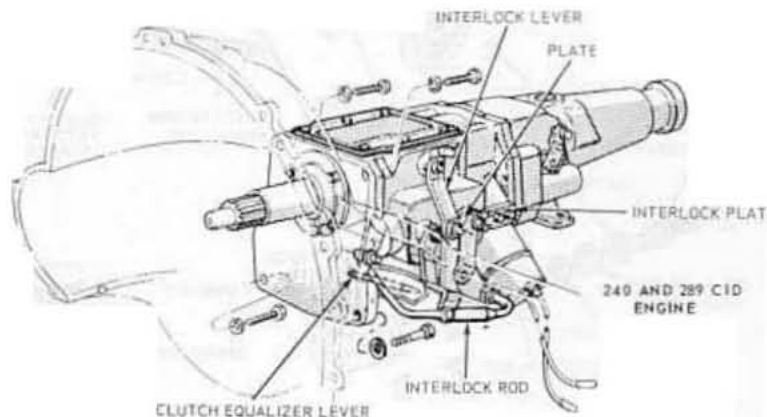
4. Loosen the interlock pawl attaching screws. Move the interlock lever forward as far as possible to seat the interlock pawl on the first and reverse-speed shift lever. Tight-

en the two pawl attaching screws.

5. Adjust the length of the interlock rod so that it can be connected to the interlock lever while being held in the forward position. Connect the rod to the lever.

6. Shift the transmission into low and into neutral to check operation of the interlock. Readjust the interlock pawl for snug fit if necessary.

7. Use COAZ-19584-A lubricant as required for the interlock linkage.



C 1738-A

Fig. 56—Interlock Mechanism—Overdrive Transmission

FORD AND MERCURY

**Ford (Manual and Overdrive)
Mercury (Manual Only)**

1. Disconnect the clutch return spring from the release lever.
2. Loosen the release lever rod locknut (Fig. 57) approximately three or four turns.
3. If there is no free travel, shorten the rod (by turning at square wrench area) until it is free of the clutch release lever.
4. Move the clutch release lever rearward until the release bearing lightly contacts the clutch pressure plate release fingers.
5. Adjust the rod length until the rod just contacts its seat in the release lever.
6. Using a feeler gauge, adjust the locknut to obtain approximately 0.206 inch clearance between the nut and the rod sleeve end.
7. Turn the rod at the square wrench area until the nut just contacts the rod sleeve end.
8. Tighten the locknut against the

sleeve while holding the rod with a wrench.

9. Install the clutch return spring.

10. Check the free travel at the pedal for conformance to specification. Re-adjust if necessary. As a final check, measure the free travel with the engine idling. This dimension should not be less than $\frac{1}{2}$ inch.

11. Without disturbing the assist spring, lubricate each spring seat with C3VY-19586-A grease.

12. As a final check, measure the pedal free travel with the transmission in neutral and the engine running at about 3000 rpm. If the free travel at this speed is not a minimum of $\frac{1}{2}$ inch, readjust the clutch pedal free travel. Otherwise, the release fingers may contact the release bearing continuously, resulting in premature bearing and clutch failure. **Free travel must be exactly to specification.**

Interlock (Ford Overdrive Models Only)

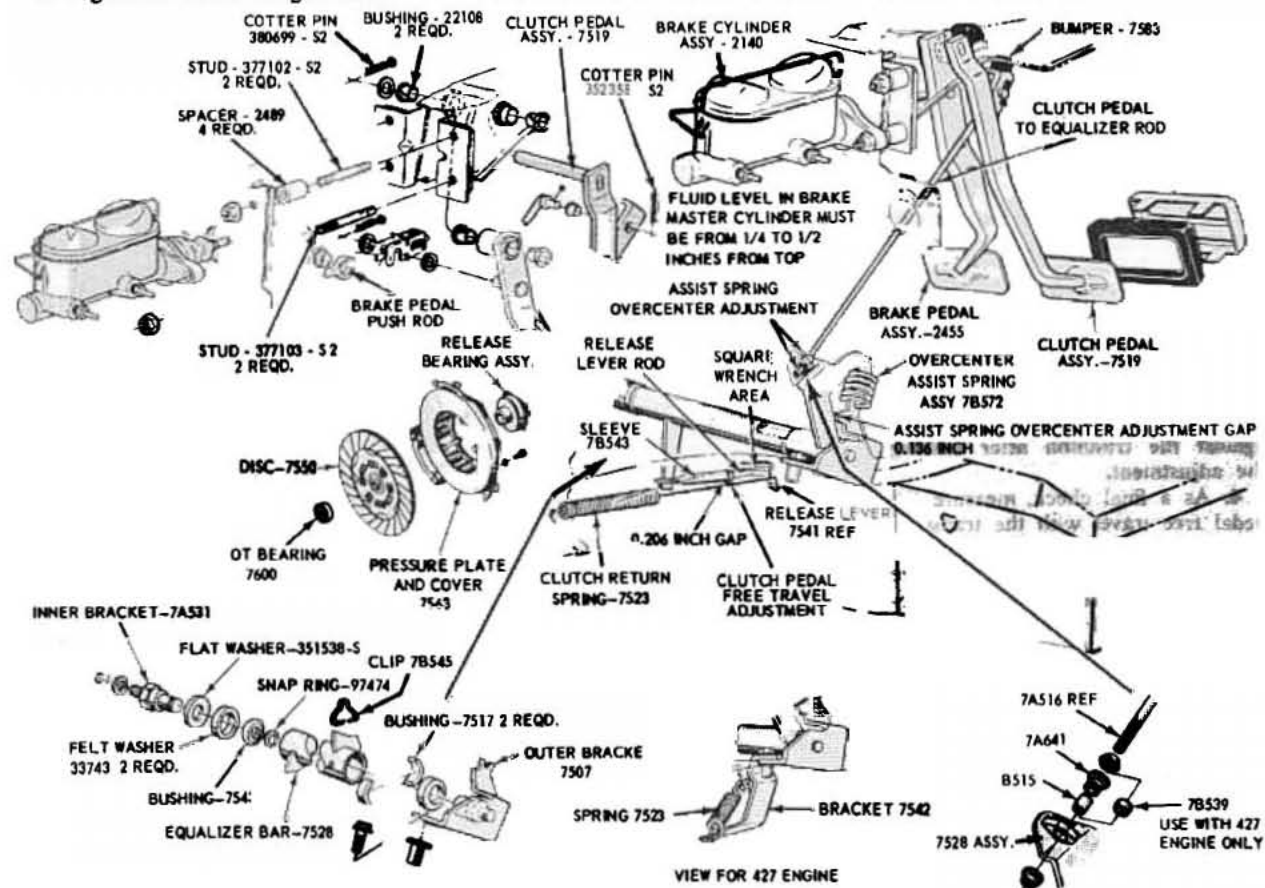
Be sure that the clutch linkage is

correctly adjusted before adjusting the interlock (Fig. 56).

1. Place the gearshift lever in the neutral position.
2. Loosen the adjustment lock nut on the interlock rod.
3. Disconnect the rod from the interlock lever.
4. Loosen the interlock plate attaching screws. Move the interlock lever forward as far as possible to seat the interlock plate on the first and reverse-speed shift lever pawl. Tighten the two attaching screws.
5. Adjust the length of the interlock rod so that it can be connected to the interlock lever while being held in the forward position. Connect the rod to the lever.
6. Shift the transmission into low and into neutral to check operation of the interlock. Readjust the interlock plate for snug fit if necessary.
7. Use COAZ-19584-A lubricant as required for the interlock linkage.

ECONOLINE

The clutch pedal-to-clutch release lever linkage is so constructed that

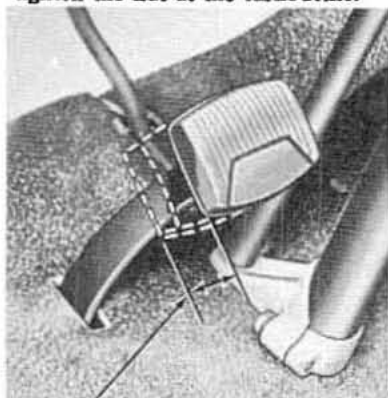


C 1546-C

Fig. 57—Typical Clutch Linkage—Ford and Mercury

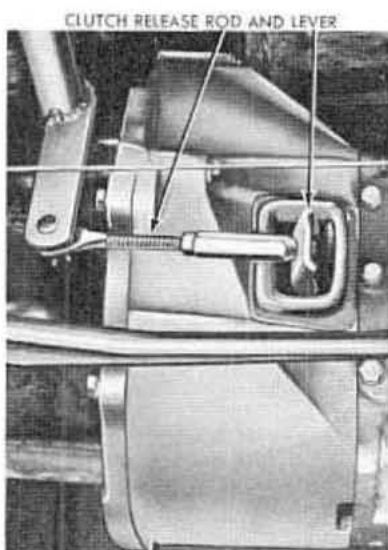
only the one free travel adjustment is required; therefore, if the free travel is within specification, the total travel will also be correct.

To check and adjust the pedal free travel measure and note the distance from the floor pan to the top of the pedal; then depress the pedal slowly until the clutch release fingers contact the clutch release bearing. Note the reading on the tape. The difference between the reading with the pedal in the depressed position and the reading with the pedal in the fully released position is the pedal free travel (Fig. 58). If the free travel is not within specification, loosen the nut at the turnbuckle on the clutch release rod (Fig. 59). Adjust the turnbuckle until the free travel is within specification, and then tighten the nut at the turnbuckle.



PEDAL FREE TRAVEL C1209-A

Fig. 58—Clutch Pedal Travel Measurement—Econoline



C1210-A

Fig. 59—Clutch Adjustment—Econoline and Bronco Six

BRONCO

Six Cylinder Engines

1. Measure the total travel of the pedal (Fig. 54). If the total travel is less than 6 $\frac{1}{2}$ inches or more than 6 $\frac{3}{4}$ inches, move the clutch pedal bumper and bracket up or down until the travel is within these limits. **Always check and adjust total travel before checking free travel.**

2. To check and adjust the pedal free travel, measure and note the distance from the floor pan to the top of the pedal; then depress the pedal slowly until the clutch release fingers contact the clutch release bearing. Note the reading. The difference between the reading with the pedal in the depressed position and the reading with the pedal in the fully released position is the pedal free travel (Fig. 54). The free travel should be 1 $\frac{1}{8}$ –1 $\frac{3}{8}$ inches. If not within these limits, loosen the nut at the turnbuckle on the clutch release rod. Adjust the turnbuckle (Fig. 59) until the free travel is within the specified limits, and then tighten the nut at the turnbuckle.

V-8 Engines

Using Fig. 60 as a guide, use the same clutch linkage adjustment procedure given for the Ford and Mercury, in this section.

CHECK STEERING SYSTEM FOR LOOSENESS (INCLUDES PRE-LOAD) —ECONOLINE AND BRONCO

Refer to Check Steering Gear Preload (in this section), steps 4, 15 and 20. If looseness is beyond the specified limits, make a complete Steering Gear Preload Adjustment.

CHECK STEERING GEAR PRELOAD—MANUAL STEERING ALL VEHICLES (IF SO EQUIPPED) EXCEPT BRONCO

The ball nut assembly and the sector gear must be adjusted properly to maintain minimum steering shaft end play (a factor of preload adjustment) and minimum backlash between sector gear and ball nut. There are only two possible adjustments within the recirculating ball-type steering gear, and **these should be made in the following order to avoid damage or gear failure.**

1. On an Econoline, fold the floor mat out of the way, pull up the rub-

ber seal, and remove the steering column floor pan cover (six retaining screws).

On other vehicles the floor mat need not be disturbed.

2. Raise the front of the vehicle and install safety stands under the front axle. **Do not use a bumper jack to raise the vehicle.**

3. On a Comet, Cougar, Fairlane, Falcon or Mustang, disconnect the Pitman arm from the sector shaft. Use tool 3950-FCA or 3600-A-A if required (Fig. 61).

On a Ford, Mercury or Econoline, disconnect the Pitman arm from the drag link.

4. Remove the horn button or ring, spring assembly, centering cone and other hardware necessary to expose the steering shaft nut.

5. Check the alignment of the shaft to the bearing. If the shaft is not centered in the bearing, make the check described in steps 6, 7 and 8. If the shaft is centered, proceed with step 9.

6. Attach a 30 to 50 lb capacity spring scale to the end of the shaft.

7. Center the shaft by pulling on the spring scale. Note the reading.

8. If more than 20 lbs pull is required to center the shaft, the steering column should be aligned. Refer to Group 3 of the appropriate Shop Manual for the proper procedure. If less than 20 lbs pull will center the shaft, it need not be adjusted. Proceed to step 9.

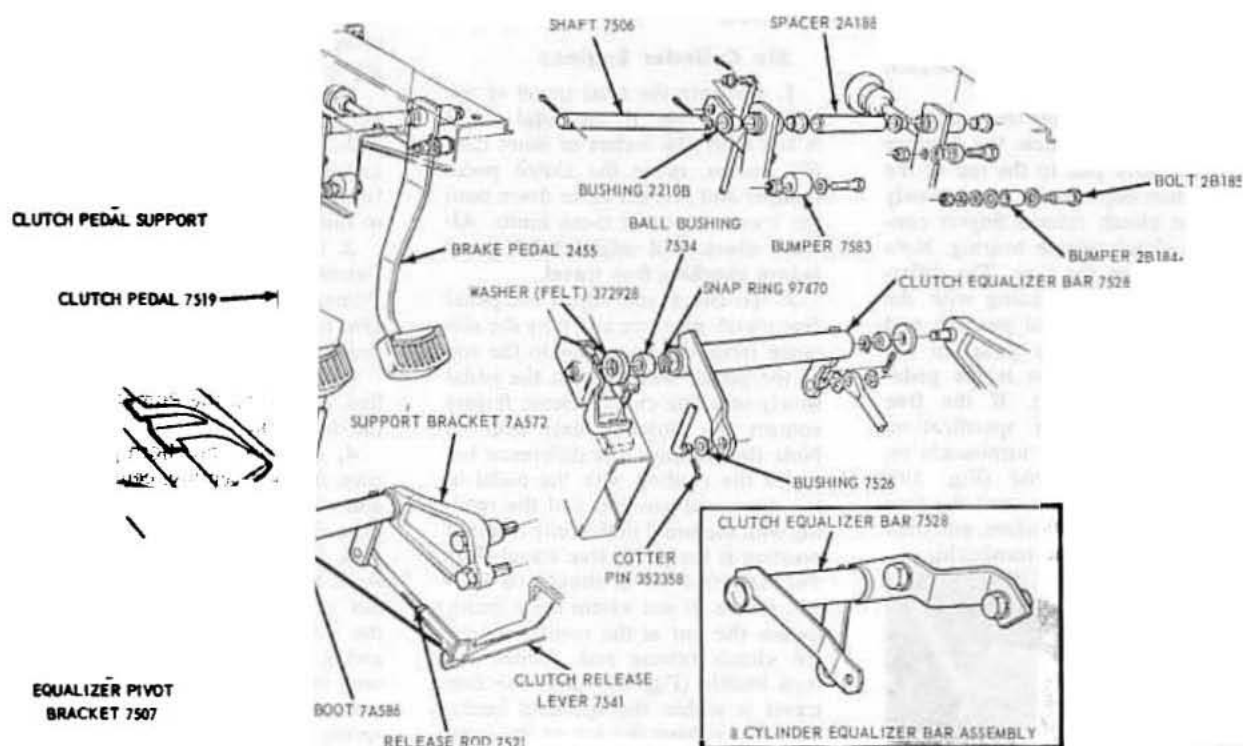
9. Loosen the nut which locks the sector adjusting screw (Fig. 62), and turn the adjusting screw counterclockwise. (On the Econoline this is done from inside the cab.)

10. Measure the worm bearing preload by attaching an in.-lb. torque wrench to the steering wheel nut (Figs. 63 and 64). With the steering wheel off center, read the pull required to rotate the input shaft approximately 1 $\frac{1}{2}$ turns either side of center. If the torque or preload is not within specification (refer to Group 3 of the appropriate Shop Manual), adjust as explained in the next step.

11. Loosen the steering shaft bearing adjuster lock nut, and tighten or back off the bearing adjuster (Figs. 63 and 64) to bring the preload within the specified limits.

12. Tighten the steering shaft bearing adjuster lock nut, and recheck the preload.

13. Turn the steering wheel slowly to either stop. Turn gently against the stop to avoid possible damage



C 1709-A

Fig. 60—Clutch Linkage—Bronco V-8 Engine

to the ball return guides. Then rotate the wheel $2\frac{1}{4}$ turns ($2\frac{1}{4}$ turns for Ford or Mercury cars) to center the ball nut.

14. Turn the sector adjusting screw clockwise until the specified pull is necessary to rotate the worm past its center (high spot).

15. Check the steering wheel mesh backlash. **No perceptible backlash is permissible at 30° on either side of center.**

Check the steering wheel center mesh backlash using the following procedure:

With the steering gear positioned



Fig. 61—Removing Pitman Arm—Typical

on center and the sector shaft retained to prevent rotation, apply a 15-in. lb. torque on the steering gear input shaft, in both right and left turn directions. The total angular travel of the input shaft cannot exceed $8\frac{1}{2}$ degrees with 8-in. lb. net meshload.

16. While holding the sector adjusting screw, tighten the locknut to specification and recheck the backlash adjustment.

17. Connect the Pitman arm and verify secureness of associated steering linkage.

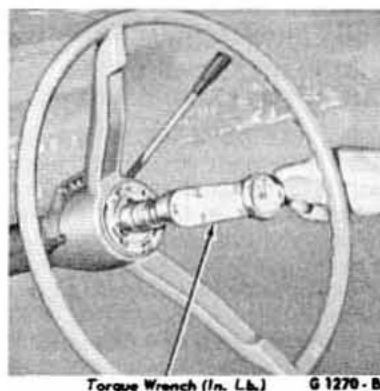


Fig. 62—Checking Pre-Load—Manual Steering—Typical

18. Check, and tighten where required, the instrument panel-to-steering column bracket bolts.

19. Check the steering gear for correct alignment (steps 6, 7 and 8).

20. Install horn button, ring, springs and other hardware removed in step 4.

21. On an Econoline, install the steering column floor pan cover (six retaining screws), position the rub-

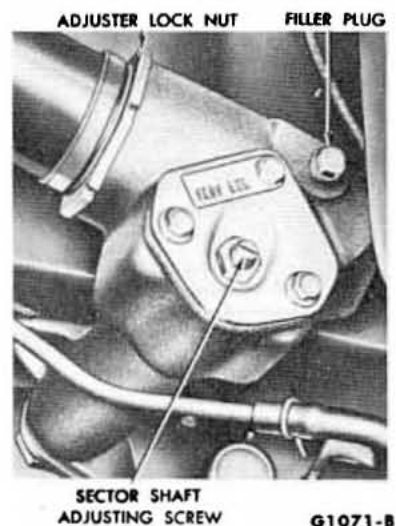


Fig. 63—Typical Steering Gear Adjustments—Comet and Fairlane

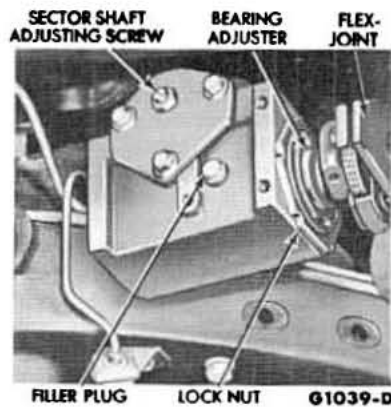


Fig. 64—Steering Gear Adjustments—Ford and Mercury

ber seal, and lay the floor mat in proper position.

BRONCO

Check the worm bearing preload before checking and adjusting the worm and roller mesh. Be sure to check the worm and roller mesh after checking and adjusting the worm bearing preload.

Worm Bearing Preload Adjustment

1. Disconnect the Pitman arm from the sector shaft with Tool 3600-AA (Fig. 61).
2. Disconnect the wire socket at the horn relay. Remove the horn button and spring.
3. Turn the steering wheel to the end of its travel in either direction.
4. Place an in.-lb torque wrench on the steering wheel attaching nut (Fig. 62) and measure the torque required to keep the wheel moving at a constant rate for approximately $2\frac{1}{2}$ turns. If the torque, or preload is not within specifications, remove or add gasket shims between the worm shaft bearing retainer cover and the steering gear housing (Fig. 65) to adjust the worm bearing preload to specification. Install the cover and torque the attaching bolts to specification.

Worm and Roller Mesh Adjustment

1. Install an in.-lb torque wrench on the steering wheel nut, and measure the torque required to turn the wheel through the straight-ahead (high-point) position. The high point is the point of least clearance between the worm and roller, and is at the mid-point of the worm and roller

travel.

2. To adjust the mesh, loosen the adjusting screw lock nut (Fig. 65), and adjust the worm and roller mesh by turning the adjusting screw inward (clockwise) to tighten the mesh, or by turning it outward (counterclockwise) to loosen the mesh.

3. After adjusting the mesh, hold the adjusting screw stationary with a screwdriver and tighten the lock nut.

4. Check the mesh backlash adjustment. (Refer to step 15, above.) If the mesh is still not correct, repeat the adjustment procedure.

5. Install the horn button and spring. Connect the wire socket at the horn relay.

6. Install the Pitman arm on the sector shaft and torque to specifications.

7. Check the steering gear lubricant level and add lubricant as necessary.

CHECK OVER-CENTER MESH LOAD—POWER STEERING

1. Disconnect the Pitman arm from the sector shaft.
2. Disconnect the fluid return line at the reservoir. At the same time, cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and cycle the steering wheel in both directions as required to discharge the fluid from the gear.
4. Remove the ornamental cover from the steering wheel hub and turn the steering wheel to 45° from the left stop.
5. Using an inch-pound torque wrench on the steering wheel nut,

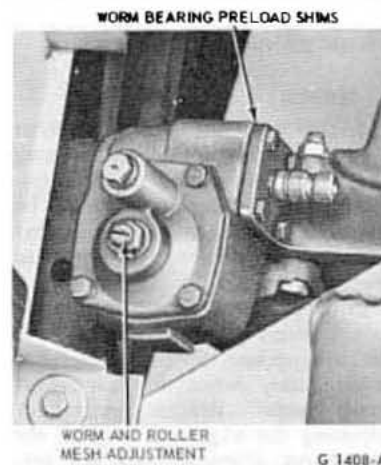


Fig. 65—Steering Gear Adjustments—Bronco

determine the torque required to rotate the shaft slowly through an approximate $\frac{1}{8}$ turn from the 45° position.

6. Turn the steering gear back to center, then determine the torque required to rotate the shaft back and forth across the center position. Loosen the adjuster nut, and turn the adjuster screw in (Fig. 66) until the reading is 8-9 in.-lb greater than the torque 45° from the stop (max. 14 in.-lb).

Tighten the lock nut while holding the screw in place.

7. Recheck the readings and replace the Pitman arm and steering wheel hub cover.

8. Connect the fluid return line to the reservoir and fill the reservoir with the specified lubricant to the proper level.

CHECK STEERING STOP ADJUSTMENT

The steering stops (Fig. 67) should be adjusted so that neither the right nor left front wheel turns out more than 33° from the straight-ahead position.

Turning the stop-bolt clockwise increases the outward angle of that spindle. Turning the stop bolt counterclockwise decreases the outward angle. Tighten the lock nuts after adjusting the stops.

CHECK FRONT WHEEL ALIGNMENT AND LINKAGE

The procedure for checking the front wheel alignment is different for each model group. It is important to follow the exact procedure for each model group as outlined in the following paragraphs:

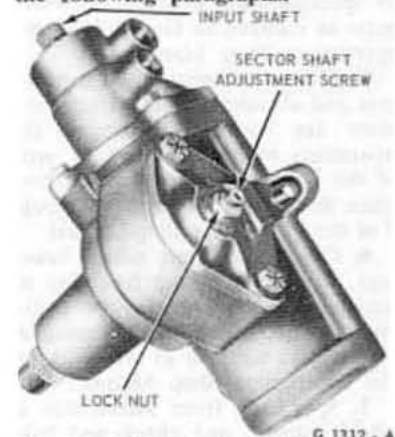


Fig. 66—Adjusting Power Steering Mesh Load—Typical

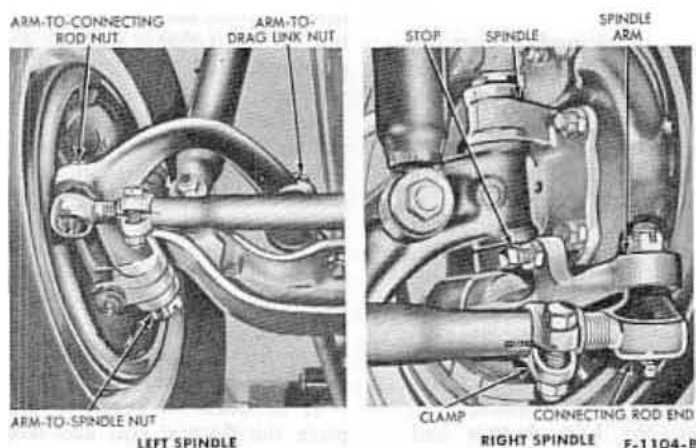


Fig. 67—Left and Right Spindles—Econoline

ALL VEHICLES— PRELIMINARY

Do not check and adjust front wheel alignment without first making the following inspection for front-end maladjustment, damage, or wear.

1. Check for specified air pressures in all four tires.
2. Raise the front of the vehicle off the floor.

CAUTION: Do not raise the vehicle by means of the lower suspension arms. This will release the tension on the lower ball joints.

3. Check for looseness at the tie-rod ends. Looseness can affect the toe-in readings and adjustment.

4. Shake each front wheel grasping the upper and lower surfaces of the tire. Check the front suspension ball joints and mountings for looseness, wear and damage. Check the brake caliper attaching bolts. Torque all loose nuts and bolts to specifications. Replace all worn parts as outlined in Group 3 of the appropriate Shop Manual.

5. Check the steering gear mountings and all steering linkage connections for looseness. Torque all mountings to specifications. If any of the linkage is worn or bent, replace the parts as outlined in Group 3 of the appropriate Shop Manual.

6. Check the front wheel bearings. If any in-and-out free play is noticed, adjust the bearings to specification. Replace worn or damaged bearings as outlined in Group 3 of the appropriate Shop Manual.

7. Spin each front wheel with a wheel spinner, and check and balance each wheel as required.

8. Check the action of the shock

absorbers. If the shock absorbers are not in good condition, the car may not settle in a normal, level position, and front wheel alignment may be affected.

Wheel Inspection

Wheel hub nuts should be inspected and tightened to specification at pre-delivery. Loose wheel hub nuts may cause shimmy and vibration. Elongated stud holes in the wheels may also result from loose hub nuts.

Keep the wheels and hubs clean. Stones wedged between the wheel and rotor or rear drum and lumps of mud or grease can unbalance a wheel and tire.

Check for damage that would affect the runout of the wheels. Wobble or shimmy caused by a damaged wheel will eventually damage the wheel bearings. Inspect the wheel rims for dents that could permit air to leak from the tires.

Notes:

1. Check all the factors of front wheel alignment except the turning angle before making any adjustments. The turning angle should be checked only after caster, camber and toe-in have been adjusted to specifications.

2. The front wheel alignment specifications given in Group 3 of the appropriate Shop Manual are correct only when the car is at "curb height". Before checking or adjusting the alignment factors, the suspension alignment spacers (except Econoline and Bronco) must be installed to obtain the curb height.

Equipment Installation

Equipment used for front wheel alignment inspection must be accurate. Whenever possible, front wheel alignment checks should be performed on stationary wheel aligning equipment. In the absence of such equipment, portable equipment may be used and the work may be performed on a level floor. The floor area should be level within $\frac{1}{4}$ inch from front to rear of the car and within $\frac{1}{8}$ inch from side to side. It might be well, if portable equipment is used frequently, to mark off a known level area on the shop floor.

LINCOLN, THUNDERBIRD, FORD AND MERCURY

Alignment height spacers (Figs. 68 thru 73) are used to check caster, camber and toe-in. If the car is operated under abnormal load conditions, the spacers should be omitted when checking toe-in.

1. Check the runout of each front wheel and tire using a dial indicator

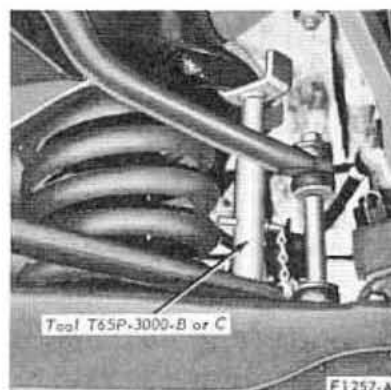


Fig. 68—Alignment Spacer
Installation—Front (Lincoln)
Tool T65P-3000-B or C

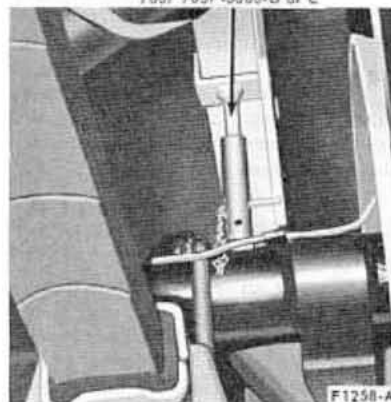


Fig. 69—Alignment Spacer
Installation—Rear (Lincoln)

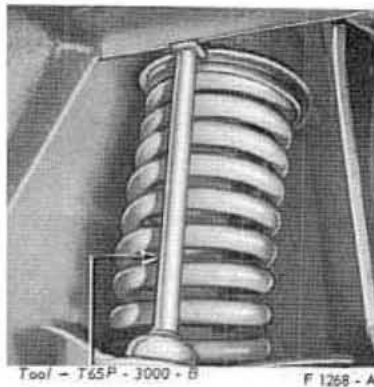


Fig. 70—Alignment Spacer Installation—Front (Thunderbird)

against the rim outer band. If the runout exceeds $\frac{1}{8}$ inch, correction may be made by rotating the wheel on the drum. When the minimum runout has been obtained, mark the point of greatest runout so the wheels can be positioned as shown in Fig. 74 when checking the front end alignment. Hold a piece of chalk against the wheel rim or the tire sidewall while spinning the wheel. The chalk will mark the rim or tire at the point of greatest runout.

2. Drive the car in a straight line far enough to establish the straight-ahead position of the front wheels, and then mark the steering wheel hub and the steering column collar (Fig. 75). **Do not adjust the steering wheel spoke position at this time.** If the front wheels are turned at any time during the inspection, align the marks to bring the wheels back to the straight-ahead position.

3. With the car in position for the front end alignment inspection and adjustment, install the suspension alignment spacers as follows to establish the curb height.



Fig. 71—Alignment Spacer Installation—Rear (Thunderbird)

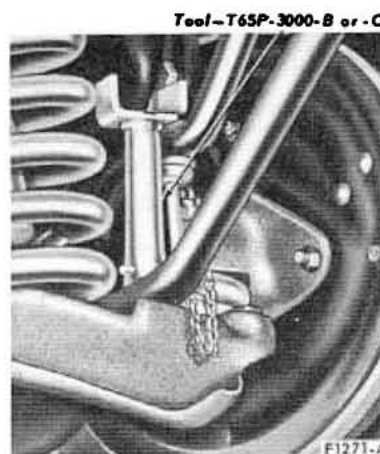


Fig. 72—Alignment Spacer Installation—Front (Ford and Mercury)

Lift the front of the car and position the suspension alignment spacers between the suspension lower arm and the frame spring pocket as shown in Fig. 68, 70 or 73. **Be sure the spacer pin is placed in the correct hole for the car being checked.** The lower end of the alignment spacers should be placed over the head of the strut front attaching bolt. Remove the bumper from the right and left rear side rails. Position the rear alignment spacers between the rear axle and the frame side rail as shown in Figs. 69, 71 or 73. Lower the rear of the car so that the weight of the body will hold the alignment spacers in place.

4. Install the wheel alignment equipment on the car. Whichever type of equipment is used, follow the installation and inspection in-

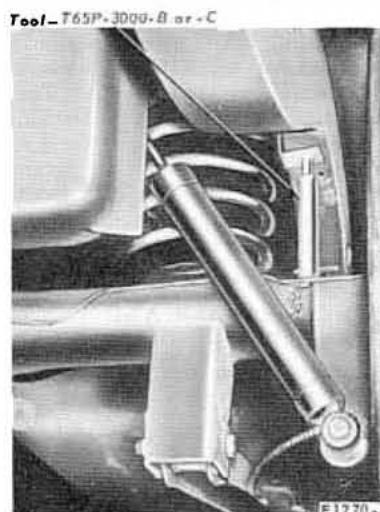


Fig. 73—Alignment Spacer Installation—Rear (Ford and Mercury)



Fig. 74—Front Wheel Position for Checking Alignment

structions provided by the equipment manufacturer.

COMET, COUGAR, FAIRLANE, FALCON AND MUSTANG

Check the wheel runout and the straight-ahead position of the wheels as outlined in Lincoln, Thunderbird, Ford and Mercury procedure, steps 1 and 2, above.

1. With the car in position for the front end alignment inspection and adjustment, install the alignment spacers as follows to establish the curb height:

Insert the pin in the spacer hole marked for the model being checked (Mustang and Cougar rear does not use the pin).

Raise the front of the car and position the alignment spacers between the suspension upper arm and

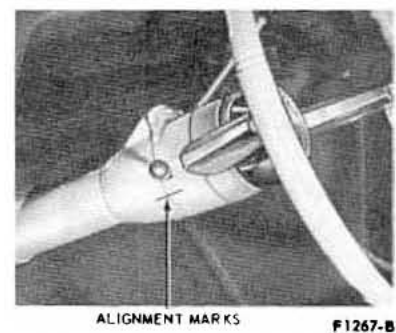


Fig. 75—Typical Straight Ahead Position Marks

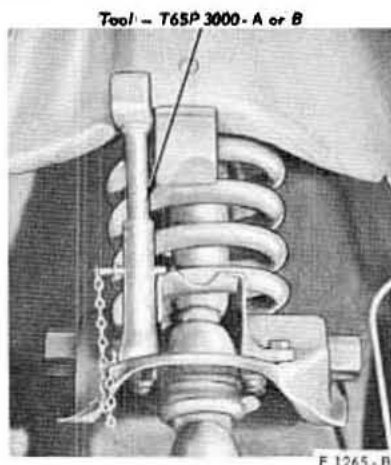


Fig. 76—Alignment Spacer Installation—Front (Comet, Cougar, Fairlane, Falcon and Mustang)

the spring tower as shown in Fig. 76. The lower end of the spacer should be placed over the head of the ball joint front outside attaching rivet. Position the alignment spacers for the rear of the car between the rear axle and the side rail as shown in Fig. 77.

2. Install the wheel alignment equipment on the car. Whichever type of equipment is used, follow the installation and inspection instructions provided by the equipment manufacturer.

ECONOLINE AND BRONCO

Check the wheel runout and the straight-ahead position of the wheels as outlined for Lincoln, Thunderbird, Ford and Mercury, steps 1 and 2.

1. Install the wheel alignment equipment on the vehicle. Which-

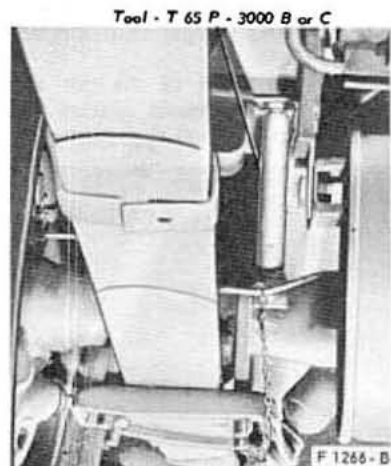


Fig. 77—Alignment Spacer Installation—Rear (Comet, Cougar, Fairlane, Falcon and Mustang)

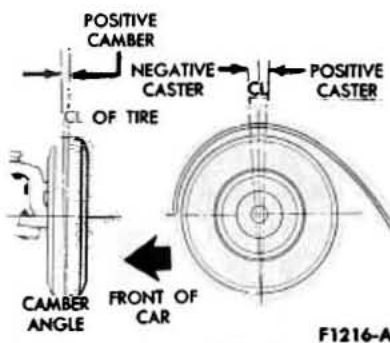


Fig. 78—Caster and Camber Angles

ever type of equipment is used, follow the installation and inspection instructions provided by the equipment manufacturer.

CHECK CASTER—ALL VEHICLES EXCEPT ECONOLINE AND BRONCO

Check the caster angle at each front wheel. Caster is the forward or rearward tilt at the top of the wheel spindle (Fig. 78). If the spindle tilts to the rear, caster is positive. If the spindle tilts to the front, caster is negative. The correct caster angle, or tilt is specified in Group 3 of the appropriate Shop Manual.

The maximum difference between both front wheel caster angles should not exceed $\frac{1}{2}^\circ$. However, a difference of not more than $\frac{1}{4}^\circ$ is preferred.

CHECK CAMBER—ALL VEHICLES EXCEPT ECONOLINE AND BRONCO

Check the camber angle at each front wheel. The camber angle is the amount the front wheels are tilted at the top (Fig. 78). If a wheel tilts outward, camber is positive. If a wheel tilts inward, camber is negative. The correct camber angle, or outward tilt, is specified in Group 3 of the appropriate Shop Manual. The maximum difference between both front wheel camber angles should not exceed $\frac{1}{2}^\circ$. However, a difference of not more than $\frac{1}{4}^\circ$ is preferred.

CHECK CASTER AND CAMBER—ECONOLINE

Camber. With the normal, unloaded vehicle weight on the front wheels, check the camber angle of each wheel with a suitable gauge. If the camber angle is within the specified limits, omit the king pin inclination check.

King Pin Inclination. The king pin inclination should always be

checked when the camber angle is not within the specified limits. Check the king pin inclination at both front wheels.

Caster. Adjust the gauge on the front wheels, and check the caster angle.

The caster angle reading on the gauge is true only when the vehicle frame is horizontal from front to rear. If sagging springs on the front, or large tires on the rear, cause the frame not to be level, the caster angle reading must be modified to take this into consideration. Setting the front wheels on blocks of appropriate height, or letting air out of the rear tires to level the frame are other methods of compensation.

BRONCO CASTER AND CAMBER

The caster and camber angles are designed into the front axle and cannot be adjusted.

CHECK TOE-IN—LINCOLN

Alignment height spacers are used on all cars to check and adjust toe-in, except on those operated under abnormal conditions. Toe-in should only be checked and adjusted after the caster and camber have been adjusted to specifications.

Check the toe-in with the front wheels in the straight-ahead position. Measure the distance between the extreme front and also between the extreme rear of both front wheels. The difference between these two distances is the toe-in.

Correct toe-in, or inward pointing of both front wheels at the front, is specified in Group 3 of the appropriate Shop Manual.

CHECK TOE-IN—ALL VEHICLES EXCEPT LINCOLN, ECONOLINE AND BRONCO

Before attempting to check toe-in, remove all the alignment spacers. Toe-in should only be checked and adjusted after the caster and camber have been adjusted to specifications. Check the toe-in with the front wheels in the straight-ahead position. Run the engine so that the power steering control valve will be in the center (neutral) position if so equipped. Measure the distance between the extreme front and also between the extreme rear of both front wheels. The difference between these two distances is the toe-in. Specifications are in Group 3 of the appropriate Shop Manual.

CHECK TOE-IN— ECONOLINE AND BRONCO

Push the vehicle backwards for about 6 feet, and then pull it forward about 3 feet. Place a suitable toe gauge between the front wheels, and check the toe-in. Toe-in is measured between the extreme front of both front wheels and between the extreme rear of both front wheels, and is the difference between the two distances.

CHECK FRONT WHEEL TURNING ANGLE— ALL VEHICLES

When the inside wheel is turned 20°, the turning angle of the outside wheel should be as specified in Group 3 of the appropriate Shop Manual. The turning angle cannot be adjusted directly because it is a result of the combination of caster, camber, and toe-in adjustments and should therefore, be measured only after these adjustments have been made. If the turning angle does not measure to specifications, check the spindle or other suspension parts for a bent condition.

After front wheel alignment factors have been checked, make the necessary adjustments.

ADJUST FRONT WHEEL ALIGNMENT AND LINKAGE

If the front wheels were found misaligned in the preceding checks, use the following procedures for correct realignment:

Do not attempt to adjust front wheel alignment by bending the suspension or steering parts (except Econoline).

ADJUST CAMBER AND CASTER—LINCOLN

Preliminary Steps

1. With the car properly positioned and wheel alignment measuring equipment properly installed, raise the hood and scribe chalk marks around the bolts and lock washers that secure the upper arm shaft to the frame member.

2. Loosen the arm shaft retaining bolts, raise the front end of the car, and lower it again. This will break the arm shaft loose from the frame member.

3. With a pry bar, move the arm shaft back into alignment with the chalk marks made in Step 1, and tighten the shaft retaining bolts. The bolts should be tightened just

enough to hold the shaft in position without preventing its being moved with the pry bar.

Caster

1. With the aid of a pry bar, move the shaft in or out, as required, to meet specifications. A movement of approximately $\frac{3}{32}$ inch at either the front or rear bolt location will change the caster $\frac{1}{2}^\circ$. Inboard movement of the front bolt, or outboard movement of the rear bolt, will change caster in the negative direction. Outboard movement of the front bolt, or inboard movement of the rear bolt, will change caster in the positive direction.

2. When the caster is correct, torque the shaft retaining bolt to specification and recheck the caster and camber to insure that the readings have not changed.

Camber

1. With the aid of a pry bar, move the shaft in or out, as required, to meet specifications. A movement of approximately $\frac{3}{16}$ inch of the entire shaft will change the camber $\frac{1}{4}^\circ$. Inboard movement will change the camber in the negative direction (Fig. 78). Outboard movement will change the camber in the positive direction.

2. When the camber is correct, torque the shaft retaining bolts to specification and recheck the camber and caster to insure that the readings have not changed. Remove all alignment equipment and alignment spacers and install the right and left side rail bumpers.

ADJUST CAMBER AND CASTER—FORD, MERCURY AND THUNDERBIRD

Caster and camber can be adjusted by loosening the bolts that attach the upper suspension arm inner shaft to the frame side rail, and moving the arm assembly in or out in the elongated bolt holes. Since any movement of the arm affects both caster and camber, both factors should be balanced against one another when making the adjustment.

Caster

To adjust caster, install the adjusting tool as shown in Fig. 79. Loosen both upper arm inner shaft retaining bolts, as required, and move either the front or rear of the shaft inboard or outboard as necessary to increase or decrease the



Tool—T65P-3000-A

Fig. 79—Adjusting Caster and Camber—Ford and Mercury

caster angle. Then, tighten the bolt to retain the adjustment.

Camber

To adjust the camber, loosen both upper arm inner shaft retaining bolts as required, and move both the front and rear ends of the shaft inboard or outboard as necessary with Tool-T65P-3000-A to increase or decrease the camber angle. Tighten the bolts and again check the caster and re-adjust if necessary. Then, remove the alignment spacers.

ADJUST CAMBER AND CASTER—COMET, COUGAR, FAIRLANE, FALCON AND MUSTANG

Caster

Caster is controlled by the front suspension strut (Fig. 80). To obtain positive caster, loosen the strut front nut and tighten the strut rear nut against the bushing. To obtain negative caster, loosen the strut rear nut and tighten the strut front nut against the bushing.

Camber

Camber is controlled by the eccentric cam located at the lower arm attachment to the side rail

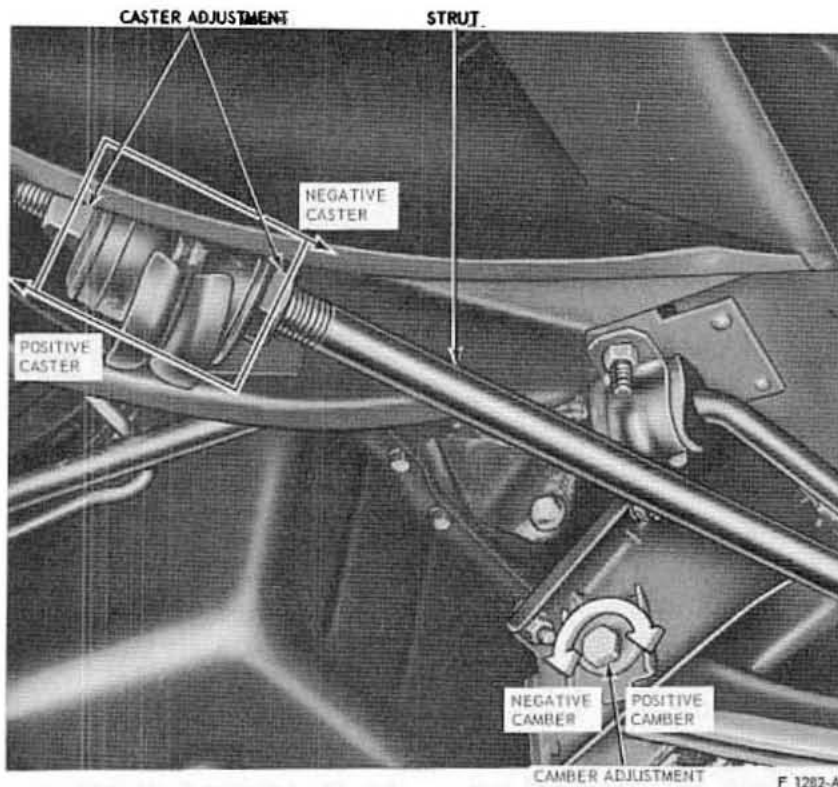


Fig. 80—Caster and Camber Adjustments—Comet, Falcon, Fairlane

(Fig. 80). To adjust the camber, loosen the eccentric bolt nut and rotate the bolt and eccentric clockwise from the high position to increase camber or counterclockwise to decrease camber.

After the caster and camber have been adjusted to specification, torque the lower arm eccentric bolt nut and the strut front nut to specification.

ADJUST CAMBER AND CASTER—ECONOLINE

Be sure that the vehicle is unloaded when making adjustments.

Camber

Camber can be adjusted by bending or straightening the front axle beam. Figure 81 shows a typical tool installation for increasing the camber angle. Figure 82 shows a tool installation for decreasing the camber angle.

In all cases, the bend should be made between the front spring pad and the spindle. Otherwise, the spring pads will be thrown out of parallel with each other.

When making camber adjustments with this type of tool, pull the bottom of the jack forward as the pressure is applied, so that the tool hangs at about the same angle as the

spindle bolt (caster angle). This will prevent fore and aft bends from occurring in the axle beam. Use a combination of blocks or shims that holds the tool in the best position.

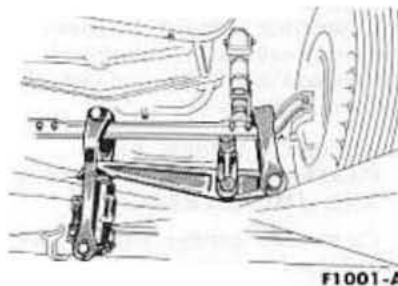


Fig. 81—Typical Tool Installation for Camber Increase (Econoline)

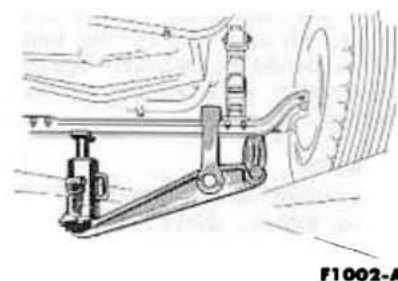


Fig. 82—Typical Tool Installation for Camber Decrease (Econoline)

Caster

The caster angle is controlled by the angle of the front spring pads, and changes as the load on the front axle increases or as the springs sag. The spring pads must be parallel to each other. Any change in the caster angle results from a twisted axle or spring sag.

If the springs have sagged, the caster angle can be adjusted by replacing the springs or by installing tapered wedges between the springs and the spring pads. An equal number of wedges should be installed on both sides. Position the thick edge of the wedges toward the rear of the truck to increase the caster, or toward the front to decrease the caster. When installing wedges, be sure that the front spring tie bolts extend through the wedges and into the axle pilot hole.

CAMBER AND CASTER—BRONCO

The caster and camber angles are designed into the front axle and cannot be adjusted.

ADJUST TOE-IN—ALL VEHICLES EXCEPT LINCOLN, ECONOLINE AND BRONCO

Check the steering wheel spoke position when the front wheels are in the straight-ahead position. If the spokes are not in their normal position, they can be properly adjusted while toe-in is being adjusted.

Toe-in is adjusted by means of the sleeve (Fig. 83) at the outer end of each spindle connecting rod. The toe-in specification is specified in Group 3 of the appropriate Shop Manual.

1. Set the front wheels in the straight-ahead position. To be sure the wheels are straight-ahead, push the car backward about six feet; then, pull it forward about three

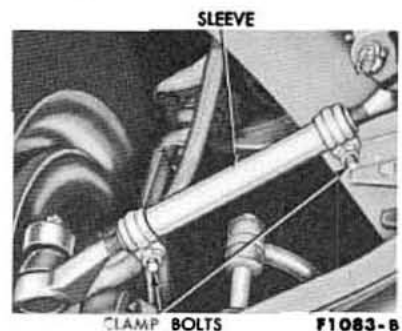


Fig. 83—Spindle Connecting Rod Sleeve—Typical

feet. The last movement of the car must be forward to position the wheels properly.

2. To adjust toe-in, loosen the two clamps on each spindle connecting rod sleeve (Fig. 83). Lengthen or shorten both spindle connecting rods an equal amount to obtain the cor-

rect toe-in. Lengthening both rods increases toe-in. Shortening both rods decreases toe-in (Fig. 84).

3. If the steering wheel spokes are not in their normal position, make the necessary rod adjustments to obtain correct toe-in and steering wheel spoke alignment.

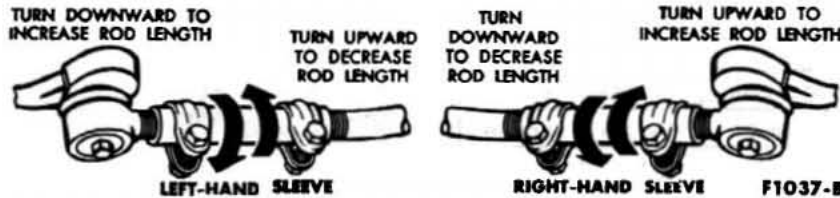


Fig. 84—Spindle Connecting Rod Adjustment (All Cars)

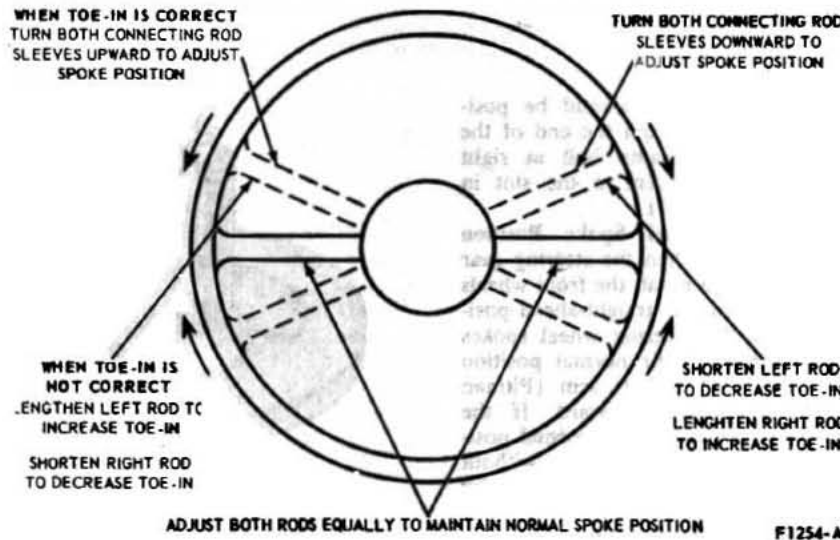


Fig. 85—Toe-in and Steering Wheel Spoke Adjustments—Two-Spoke Steering Wheels

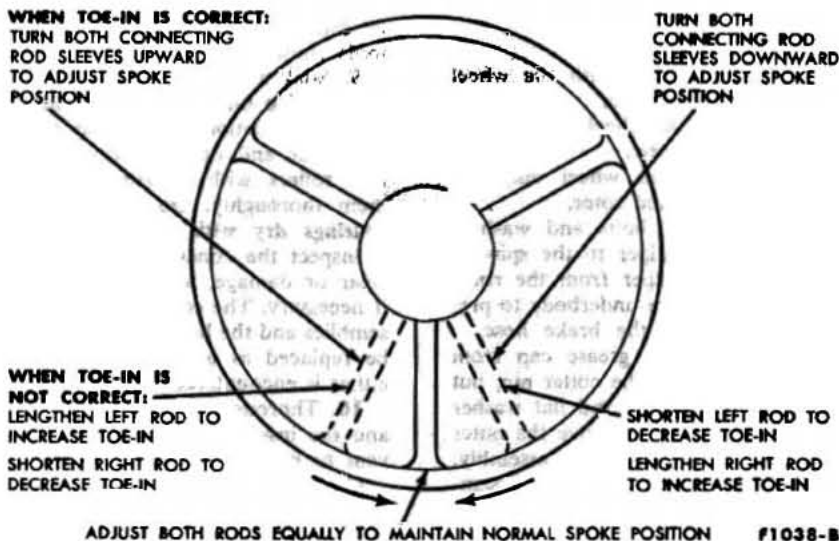


Fig. 86—Toe-in and Steering Wheel Spoke Adjustments—Three-Spoke Steering Wheels

4. Recheck toe-in and the steering wheel spoke position. If toe-in is correct and the steering wheel spokes are still not in their normal position, turn both connecting rod sleeves upward or downward the same number of turns to move the steering wheel spokes (Figs. 85 and 86).

5. When toe-in and the steering wheel spoke position are both correct, torque the clamp bolts on both connecting rod sleeves to specification.

The final sleeve position for each model group should be as indicated in the following paragraphs:

Sleeve Position—Ford, Mercury and Thunderbird

The sleeve position should not be changed when the clamp bolts are tightened.

Sleeve Position—Comet, Cougar, Fairlane, Falcon and Mustang

The sleeve position should be as shown in Fig. 87 when the clamp bolts are tightened.

ADJUST TOE-IN—LINCOLN

Toe-in is adjusted by means of the sleeve at the outer end of each spindle connecting rod. The toe-in specification is specified in Group 3 of the appropriate Shop Manual.

1. Set the front wheels in the straight-ahead position. To be sure the wheels are straight-ahead, push the car backward about six feet; then, pull it forward about three feet. The last movement of the car must be forward to position the wheels properly.

2. Remove the cap from the steering wheel hub by pressing downward and turning the cap to the left. Make sure the alignment mark on the hub of the steering wheel is lined up with the mark on the end of the steering shaft. The mark on the end of the shaft indicates the high-point of the steering gear. With the front wheels straight-ahead, the alignment marks should be vertical and the steering wheel spokes should be in their normal position. If repositioning is required, the spokes can be repositioned without changing the toe-in setting (Fig. 86).

3. To adjust toe-in, loosen the two clamps on each spindle connecting rod sleeve. Lengthen or shorten both spindle connecting rods an equal amount to obtain the correct toe-in. Lengthening both rods increases toe-

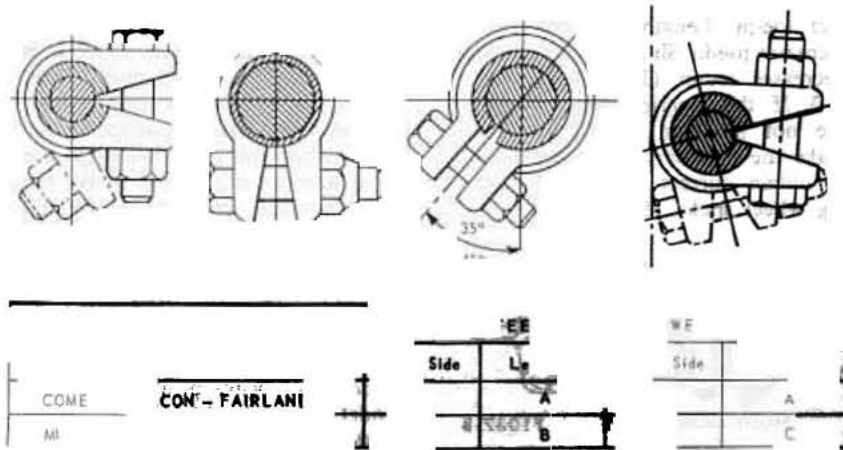


Fig. 87—Spindle Connecting Rod Sleeve Clamp Positions—Comet, Cougar Fairlane, Falcon and Mustang

in. Shortening both rods decreases toe-in (Fig. 84).

4. Torque the adjusting sleeve clamp bolts to specification. To prevent interference, both bolts should be in a vertical position on the rear side of the sleeve and the clamps should not project beyond the ends of the sleeve (Fig. 88).

5. Install the hub on the steering wheel and remove any grease or fingermarks.

ADJUST TOE-IN—ECONOLINE AND BRONCO

Toe-in. Push the vehicle backwards for about 6 feet, and then pull it forward about 3 feet. Loosen the clamp bolts at each end of the spindle connecting rod tube (Fig. 67). Rotate the tube until the correct toe-in is obtained, and torque the clamp bolts to specifications. (Refer to Group 3 of the appropriate Shop Manual.) Recheck the toe-in to make sure that no changes occurred when the bolts were tight-

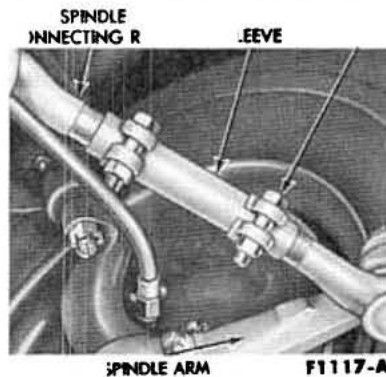


Fig. 88—Spindle Connecting Sleeve Clamp Position—Lincoln

ened. The clamps should be positioned $\frac{3}{8}$ inch from the end of the rod with the clamp bolt at right angles and adjacent to the slot in the rod (Fig. 67).

Steering Wheel Spoke Position Adjustment. When the steering gear is on the high point, the front wheels should be in the straight-ahead position and the steering wheel spokes should be in their normal position with the sector shaft arm (Pitman arm) pointing downward. If the spokes are not in their normal position, they can be adjusted without disturbing the toe-in adjustment by removing and repositioning the steering wheel, which is splined to the steering shaft.

CLEAN AND PACK FRONT WHEEL BEARINGS

DISC BRAKES

1. Raise the car until the wheel and tire clear the floor.
2. Remove the wheel cover or hub cap from the wheel.
3. Remove the wheel and tire from the hub and rotor.
4. Remove 2 bolts and washers retaining the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.
5. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.
6. Pull the hub and rotor assembly off the wheel spindle.
7. Remove the grease retainer (Fig. 89) and the inner bearing cone and roller assembly from the hub.
8. Clean the lubricant off the



Fig. 89—Removing Grease Retainer

inner and outer bearing cups with solvent and inspect the cups for scratches, pits, excessive wear, and other damages. If the cups are worn or damaged, remove them with the tools shown in Fig. 90.

9. Soak a new grease retainer in light engine oil at least 30 minutes before installation. Thoroughly clean the inner and outer bearing cones and rollers with solvent, and dry them thoroughly. **Do not spin the bearings dry with compressed air.**

Inspect the cones and rollers for wear or damage, and replace them if necessary. The cone and roller assemblies and the bearing cups should be replaced as a set if damage to either is encountered.

10. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean cloth, and brush all loose dust and dirt from the splash shield. To prevent getting dirt on the spindle, carefully remove the cloth from the spindle.

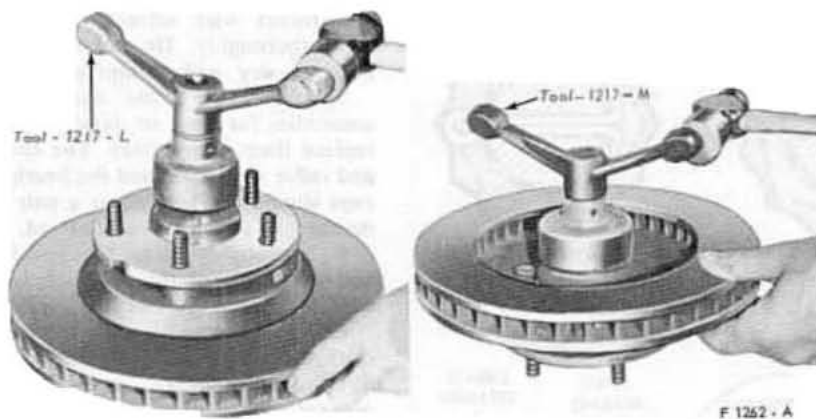


Fig. 90—Front Wheel Bearing Cup Removal

11. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tools shown in Fig. 91. Be sure to seat the cups properly in the hub.

12. Pack the inside of the hub with the specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing

cups. All old grease should be completely cleaned from the bearings before repacking with new grease.

13. Pack the bearing cone and roller assemblies (Fig. 92) with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

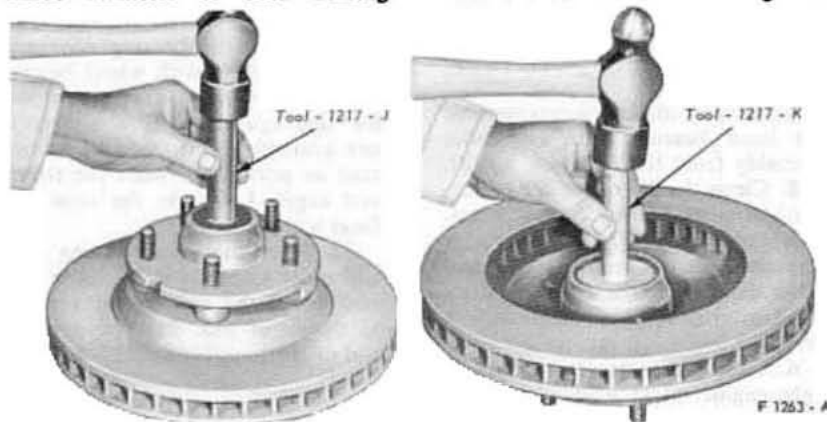


Fig. 91—Front Wheel Bearing Cup Installation

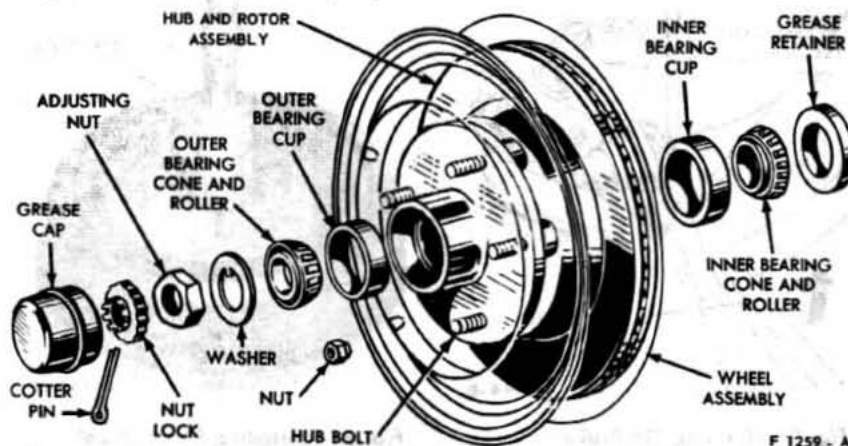


Fig. 92—Front Hub and Rotor, Bearings, and Grease Retainer

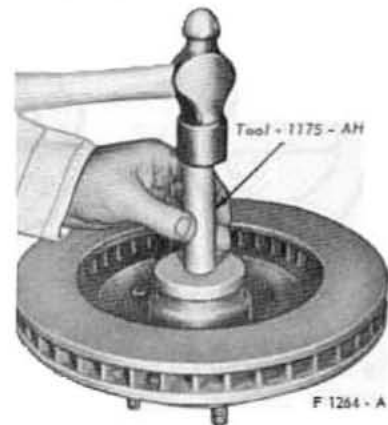


Fig. 93—Grease Retainer Installation

14. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer with the tool shown in Fig. 93. Be sure the retainer is properly seated.

15. Install the hub and rotor assembly on the wheel spindle. Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.

16. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut.

17. While rotating the wheel, hub, and drum assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 94).

18. Locate the nut lock on the adjusting nuts so that the castellations on the lock are aligned with the cotter pin hole in the spindle.

19. Back off both the adjusting nut and the nut lock together until the next castellation on the nut lock aligns with the cotter pin hole in the spindle.

20. Measure the bearing end play. It should be between .0005 and .0065 inch. If beyond these limits, back off the nut and nut lock, disengage the nut from the nut lock, and insert the nut one notch forward (if end play is more than .0065 in), or one notch back (if end play is less than .0005 in). Repeat steps 17, 18 and 19. If adjustment is still not correct, repeat steps 17 thru 20 until the end play is within the specified limits.

21. Install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio static collector in the grease cap. Install the grease cap.

22. Install the caliper to the spindle and tighten the retaining bolts to specifications. Check for the correct flexible hose routing.



Fig. 94—Front Wheel Bearing Adjustment

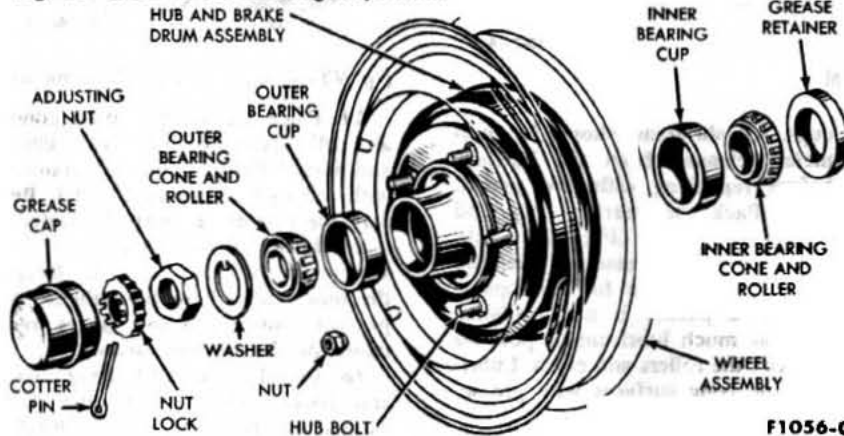


Fig. 95—Front Hub, Bearings and Grease Retainer

23. Install the wheel and tire on the hub.

24. Install the wheel cover.

CLEAN AND PACK FRONT WHEEL BEARINGS—

DRUM BRAKES

1. Raise the car until the wheel and tire clear the floor.

2. Remove the wheel cover or hub cap. Remove the grease cap from the hub (Fig. 95). Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.

3. Pull the wheel, hub, and drum assembly off the wheel spindle.

If the wheel does not come off easily, insert a narrow screwdriver through the brake adjusting hole at the inner side of the brake backing plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the screw, back off the adjusting screw with the brake adjusting tool (Fig. 96). Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise the self adjusting mechanism will not function properly.

4. Remove the grease retainer and the inner bearing cone and roller assembly from the hub with a drift.

5. Clean the lubricant off the inner and outer bearing cups with solvent and inspect the cups for scratches, pits, excessive wear, and other damage. If the cups are worn or damaged, remove them with a drift.

6. Soak a new grease retainer in light engine oil at least 30 minutes before installation. Thoroughly clean the inner and outer bearing cones

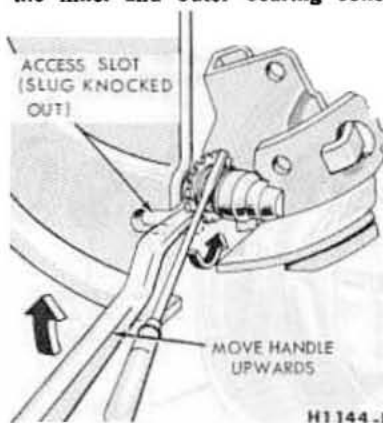


Fig. 96—Backing Off Brake Adjustment

and rollers with solvent, and dry them thoroughly. Do not spin the bearings dry with compressed air.

7. Inspect the cone and roller assemblies for wear or damage, and replace them if necessary. The cone and roller assemblies and the bearing cups should be replaced as a unit if damage to either is encountered.

8. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean cloth, and brush all loose dust and dirt from the brake assembly. To prevent getting dirt on the spindle, carefully remove the cloth from the spindle.

9. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tool shown in Fig. 97. Be sure to seat the cups properly in the hub.

10. Pack the inside of the hub with specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups.

11. All old grease should be completely cleaned from the bearings before repacking them with new grease. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

12. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer as shown in Fig. 98. The opposite end of the tool T60K-1217-A shown

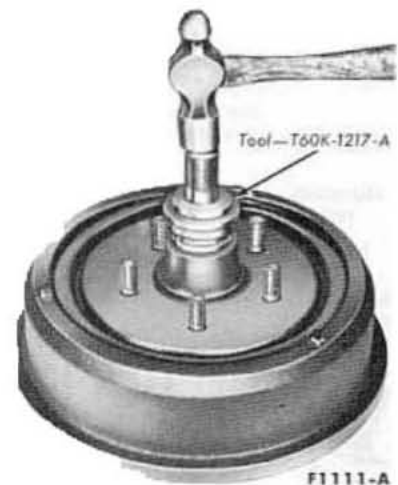


Fig. 97—Installing Front Wheel Bearing Cup



Fig. 98—Installing Front Wheel Grease Retainer

in Fig. 97 can also be used to install the retainer. **Be sure that the retainer is properly seated.**

13. Adjust the brake shoes as outlined in Group 2 of the appropriate Shop Manual.

14. Install the wheel, hub, and drum assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**

15. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut (Fig. 95).

16. While rotating the wheel, hub, and drum assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 94).

17. Locate the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle.

18. Back off both the adjusting nut and the nut lock together until the next castellation on the nut lock aligns with the cotter pin hole in the spindle.

19. Measure the bearing end play. It should be between .0005 and .0065 inch. If beyond these limits, back off the nut and nut lock, disengage the nut from the nut lock, and insert the nut one notch forward (if end play is more than .0065 in), or one notch back (if end play is less than .0005 in). Repeat steps 16, 17 and 18. If adjustment is still not correct, repeat steps 16, 17, 18 and 19 until the end play is within the specified limits.

20. Install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio

static collector in the grease cap. Install the grease cap.

21. Install the wheel cover.

CHECK BRAKE LINES AND LINING

DRUM BRAKES

1. Raise all four wheels

Hoisting Instructions

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2-post hoists prior to lifting the car.

If a 2-post hoist is used to lift the car, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

2. Remove one of the front brake drums. (Refer to Clean and Pack Front Wheel Bearings, Drum Brakes, steps 2 and 3.)

3. Inspect the drum and the linings (the wheel bearings should be inspected at this time and repacked if necessary). **Do not let oil or grease touch the drum or the linings.** If the linings are worn to within $\frac{1}{32}$ inch of the rivet heads, replace or reline both sets (primary and secondary) on the front or rear wheels. **Under no circumstances replace one lining only, or one wheel set. Both front wheel sets or both rear wheel sets should be replaced whenever a respective lining or shoe is worn or damaged.** If the drum braking surface is excessively scored, refinish it. The condition of the remaining front linings is usually about the same as that of the one inspected. The rear brake linings may also need replacement at the same time.

FRONT WHEEL DISC BRAKES

1. Raise all four wheels. (If a 2-post hoist is used, be sure to observe hoisting instructions, above.)

2. Remove one front hub assembly. (Refer to Clean and Pack Front Wheel Bearings, Disc Brakes, steps 2 through 6.)

3. Carefully inspect the rotor, caliper, and linings (the wheel bearings should be inspected at this time and repacked if necessary). **Do not let oil or grease touch the drum or the linings.**

4. Make three thickness measurements with a micrometer across the middle section of the shoe and lining. Take one reading at each side

and one in the center. If the assembly has worn to a thickness of 0.195 inch (shoe and lining together) or 0.030 inch (lining material only) at any one of the three measuring locations, replace all four shoe and lining assemblies on both front wheels.

5. With the shoe and lining assemblies installed, insert a feeler gauge between the lining and rotor. If the clearance is not within 0.002-0.010 inch, check for shoe and lining assemblies not being properly seated on the caliper bridges, for a piston pushed back in the cylinder bore, for a seized piston, or for malfunction of a piston seal.

Ordinarily, the clearance should be 0.002-0.010 inch. However, if the vehicle was stopped by a brake application just prior to checking the clearance, the brakes may drag slightly.

6. To check rotor runout, first eliminate the wheel bearing end play by tightening the adjusting nut. After tightening the nut check to see that the rotor can still be rotated.

7. Clamp a dial indicator to the caliper housing so that the stylus contacts the rotor at a point approximately 1 inch from the outer edge. Rotate the rotor and take an indicator reading. If the reading exceeds 0.002 inch total indicator runout, replace the rotor. **Do not attempt to refinish a rotor that indicates runout in excess of specification.**

When the runout check is finished be sure to adjust the bearings as outlined in Clean and Pack Front Wheel Bearings—Disc Brakes, step 17, above, in order to prevent bearing failure.

8. Check the rotor for scoring. Minor scores can be removed with a fine emery cloth. If the rotor braking surface is excessively scored, distorted, warped, worn, or shows runout over .0013 inch, it should be replaced.

9. Visually check the caliper. If it is cracked or if excess leakage is evident, it should be replaced. Slight leakage or seized pistons indicate removal and disassembly.

10. If upon disassembly the caliper is found to be distorted or damaged, or if the cylinder bores are scored or excessively worn, replace the assembly.

The two halves of the caliper assembly should never be separated. Damage or failure of one requires replacement of both as a unit.

11. Reassemble the brakes, observing all specified tolerances and

clearances. Refer to Group 2 of the appropriate Shop Manual for specifications.

12. Check all brake lines for leakage or physical damage and replace or repair as required.

13. Install the wheel and hub assembly.

LUBRICATE STEERING ARM STOPS

Clean all friction points and lubricate with CIAZ-19590B, Rotunda Ball Joint and Chassis Lube.

LUBRICATE PARKING BRAKE LINKAGE, PIVOTS, AND CLEVIS—ECONOLINE AND BRONCO

Lubricate the parking brake clevises with the type specified in the Lubrication Chart. Apply lubricant at the pulley clevis and at the lever clevis which is attached at the frame cross member.

LUBRICATE BRAKE LINKAGE PIVOTS—ECONOLINE

Lubricate the brake pivot points with a pressure gun, using the specified lubricant. Lubricate clevises with 10W motor oil, applied sparingly. Wipe off any excess oil.

Apply lubricant to the clutch pedal pivot with a pressure gun.

LUBRICATE ACCELERATOR LINKAGE—ECONOLINE AND BRONCO

Lubricate the accelerator pedal shaft on all engines. When equipped with automatic transmission, lubricate all friction points in the accelerator to carburetor linkage.

CHECK PARKING BRAKE LINKAGE AND ADJUST IF REQUIRED

The procedure for checking the parking brake linkage is different for each model group. It is important to follow the exact procedure as outlined in the following paragraphs for each model group.

LINCOLN

Check the parking brake cables when the brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal by pushing down on the manual release lever.
2. Raise the car.
3. Loosen the adjusting nut on the equalizer rod, then turn the lock

nut in front of the equalizer several turns forward.

4. Depress the parking brake pedal $1\frac{1}{4}$ inch from its normal released position.

5. Turn the adjusting nut forward against the equalizer until a moderate drag is felt when turning the rear wheels (approximately 100 lbs. of force at the outside diameter of the tire is required to turn the rear wheels).

6. When the cables are properly adjusted, tighten the lock nut against the equalizer.

7. Release the parking brake, and check to make sure that the brake shoes return to the fully released position.

Check the brake cables. The cable adjustment should be just tight enough to remove the slack. Excessive tightening may pull the brake shoes off their anchors.

8. Depress the parking brake pedal $1\frac{1}{2}$ inches. Under normal conditions, this will satisfactorily hold the car.

9. Release the parking brake again, and check as in step 7.

10. Depress the pedal $\frac{1}{2}$ inch. The brakes should not drag.

11. If the rear brakes do not fully release, check the cables for kinks or binds. Free the cables as required.

FORD, MERCURY, COMET, FAIRLANE AND FALCON

With the parking brakes in the fully released position, check the brake cables. The cable adjustment should be just tight enough to remove the slack. Excessive tightening may pull the brake shoes off their anchors. If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal.

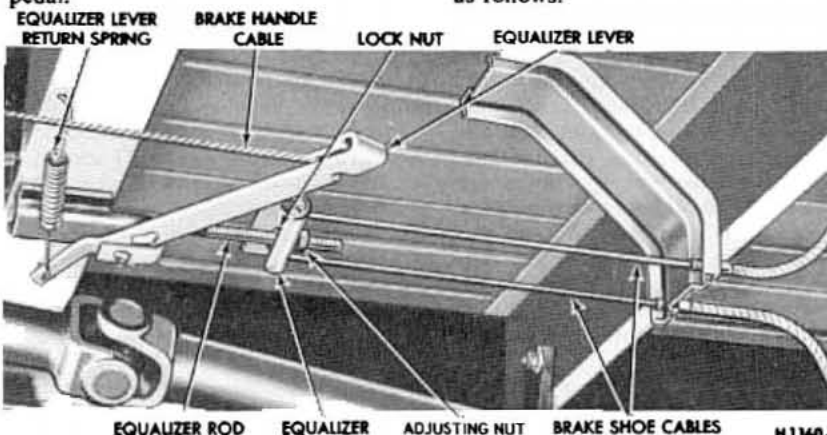


Fig. 100—Parking Brake Linkage Adjustment—Econoline

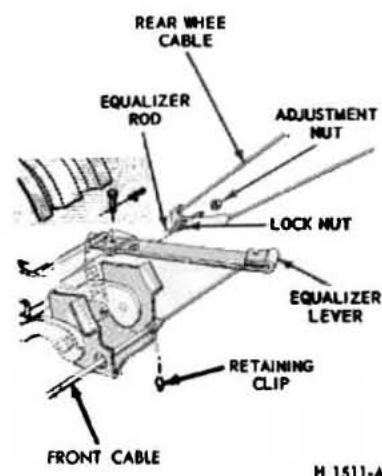


Fig. 99—Parking Brake Linkage Adjustment—Mustang and Cougar

2. Depress the parking brake pedal one notch from its normal released position.

3. Raise the car.

4. Loosen the equalizer locknut and turn the adjusting nut forward against the equalizer until a moderate drag is felt when turning the rear wheels. Tighten the locknut.

On a Comet, turn the adjusting nut forward against the equalizer until a pull of 22-27 lbs is exerted on the cable. Tighten the locknut.

5. Release the parking brake, and make sure that the brake shoes return to the fully released position.

COUGAR AND MUSTANG

With the parking brakes in the fully released position, check the brake cables. The cable adjustment should be just tight enough to remove the slack. Excessive tightening may pull the brake shoes off their anchors.

If the cables are loose, adjust them as follows:

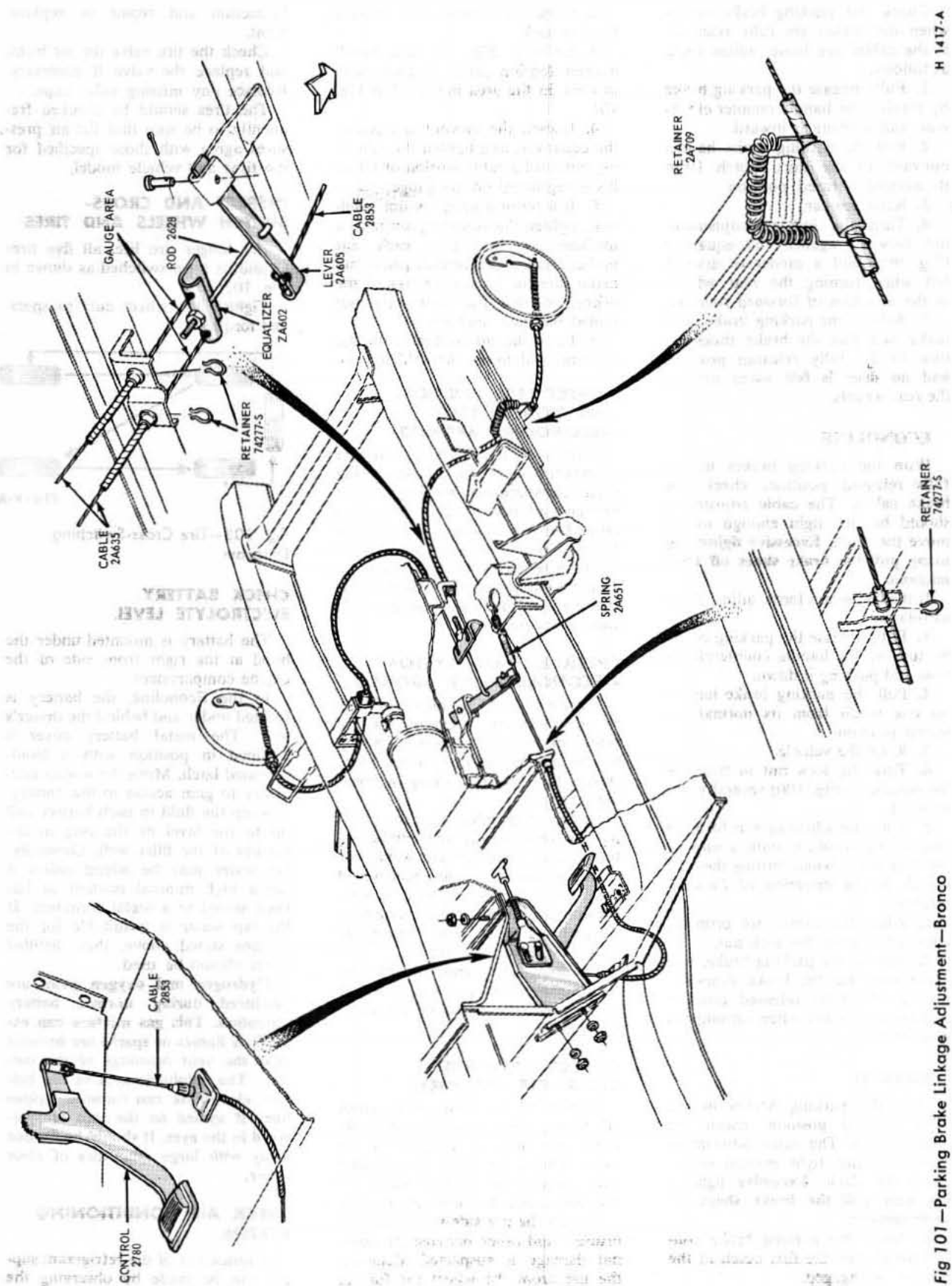


Fig 101 — Parking Brake Linkage Adjustment—Bronco

H 1417-A

Check the parking brake cables when the brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake by turning the handle counter clockwise and pushing it inward.
2. Pull the parking brake handle outward to the third notch from its normal released position.
3. Raise the car.
4. Turn the locking adjustment nut forward against the equalizer (Fig. 99) until a moderate drag is felt when turning the rear wheels in the direction of forward rotation.
5. Release the parking brake, and make sure that the brake shoes return to the fully released position and no drag is felt when turning the rear wheels.

ECONOLINE

With the parking brakes in the fully released position, check the brake cables. The cable adjustment should be just tight enough to remove the slack. **Excessive tightening may pull the brake shoes off their anchors.**

If the cables are loose, adjust them as follows:

1. Fully release the parking brake by turning the handle counterclockwise and pushing it down.
2. Pull the parking brake handle up one notch from its normal released position.
3. Raise the vehicle.
4. Turn the lock nut in front of the equalizer (Fig. 100) several turns forward.
5. Turn the adjusting nut forward against the equalizer until a moderate drag is felt when turning the rear wheels in the direction of forward rotation.
6. When the cables are properly adjusted, tighten the lock nut.
7. Release the parking brake, and make sure that the brake shoes return to the fully released position and no drag is felt when turning the rear wheels.

BRONCO

With the parking brakes in the fully released position, check the brake cables. The cable adjustment should be just tight enough to remove the slack. **Excessive tightening may pull the brake shoes off their anchors.**

1. Apply the parking brake control pedal until the first notch of the ratchet is engaged.

2. Raise the vehicle on a suitable hoist or jack.

3. Refer to Fig. 101 and install a cable tension gauge to each cable in turn, in the area indicated in Fig. 101.

4. Loosen the locknut in front of the equalizer, and tighten the adjusting nut until a cable tension of 80-90 lbs is registered on the gauge.

5. If a tension gauge is not available, tighten the adjusting nut until a medium drag is felt on each rear brake. Release the control pedal and make sure the brakes are free of the drum, so that the shoes are not pulled off their anchors.

6. Lock the adjustment with the locknut, and lower the vehicle.

INSPECT LEAF SPRINGS AND TIGHTEN CLIPS —ECONOLINE, BRONCO

Place vehicle on hoist and inspect springs for sag or rust. Inspect spring leaves to determine that they are not broken and that all clamps are secure. Determine that front clips or U-bolts are capable of being torqued to 50 to 60 ft-lbs and rear to 30 to 40 ft-lbs. Road test the vehicle to determine that pulling or side-to-side sway is not present.

CHECK EXHAUST SYSTEM —ECONOLINE AND BRONCO

Torque the exhaust manifold bolts to specifications, beginning at the center of the manifold and working toward either end. Inspect the entire system for signs of leaking or burning through.

Inspect the inlet pipe(s), outlet pipe(s), resonator(s) and muffler(s) for cracked joints, broken welds and corrosion damage (holes) that would result in a leaking exhaust system. Inspect the clamps, brackets and insulators for cracks and stripped or badly corroded bolt heads.

Eliminate all points of interference between the pipes and chassis or body that would cause rattles or vibration.

INSPECT TIRES AND CHECK AIR PRESSURES

Inspect the tire treads, and remove all stones, nails, glass, or other objects that may be wedged in the tread. Check for holes or cuts that may permit air leakage from the tire, and make the necessary repairs.

Inspect the tire side walls for cuts, bruises, and other damage. If internal damage is suspected, demount the tire from the wheel for further

inspection and repair or replacement.

Check the tire valve for air leaks, and replace the valve if necessary. Replace any missing valve caps.

The tires should be checked frequently to be sure that the air pressures agree with those specified for the tires and vehicle model.

INSPECT AND CROSS-SWITCH WHEELS AND TIRES

For longer tire life, all five tires should be cross-switched as shown in Fig. 102.

Tighten the wheel nuts to specified torque.

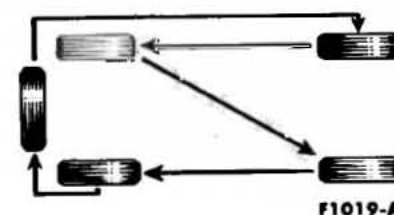


Fig. 102—Tire Cross-Switching Diagram

CHECK BATTERY ELECTROLYTE LEVEL

The battery is mounted under the hood at the right front side of the engine compartment.

In the Econoline, the battery is located under and behind the driver's seat. The metal battery cover is retained in position with a hand-operated latch. Move the seat as necessary to gain access to the battery.

Keep the fluid in each battery cell up to the level of the ring in the bottom of the filler well. Generally, tap water may be added unless it has a high mineral content or has been stored in a metal container. If the tap water is unsuitable for the reasons stated above, then distilled water should be used.

Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames or sparks are brought near the vent openings of the battery. The sulphuric acid in the battery electrolyte can cause a serious burn if spilled on the skin or splattered in the eyes. It should be flushed away with large quantities of clear water.

CHECK AIR CONDITIONING SYSTEM

A quick test of the refrigerant supply can be made by observing the

flow of refrigerant through the sight glass (Fig. 103 or 104).

To check the refrigerant supply, place a large fan in front of the radiator to aid in cooling the engine. Set the servo control for maximum cooling and the blower on high. Operate the engine at 1300 rpm and observe the sight glass while the compressor is operating. There should be no bubbles in the sight glass after the start of the compressor. Bubbles will appear when the compressor starts but should clear after a few moments. Foam in the sight glass indicates an undercharge of refrigerant. No foam in the sight glass will indicate either a full charge or a complete loss of refrigerant. Clean the sight glass. If the system is fully

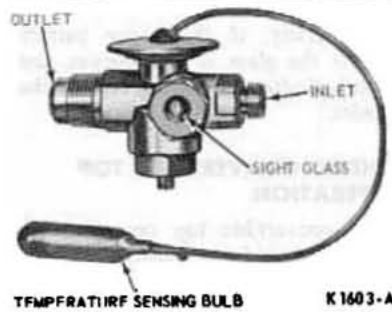


Fig. 103—Air Conditioning Sight Glass—All Vehicles Except Lincoln

charged, the sight glass will be perfectly clear. If the system is completely empty of refrigerant, the sight glass will look oily and will not

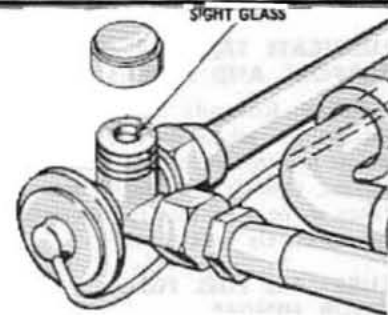


Fig. 104—Expansion Valve and Liquid Sight Glass—Lincoln

be as clear as when refrigerant is flowing through it.

4 BODY

LUBRICATE HOOD LATCH

Spray Rotunda Polyethylene Grease (C4AZ-19584-B) (Fig. 105) on all pivot points and on the striker plate as required to eliminate any binding condition. Operate the latch mechanism several times to be sure that the lubricant has effectively worked in.

LUBRICATE HOOD HINGE PIVOTS

Spray Rotunda Polyethylene Grease on the hinge pivot points as required. Open and close the hood several times to be sure that the hinge pivots do not bind.

LUBRICATE HOOD AUXILIARY CATCH

Spray Rotunda Polyethylene Grease on all pivot points as required to eliminate any binding conditions. Operate the catch several times to be sure that the lubricant has effectively worked in.

LUBRICATE LOCK CYLINDERS

Apply Rotunda Lock Lubricant (B4A-19587-A) sparingly through the key slot. Insert the key and operate the lock several times to be sure that the lubricant has effectively worked in.

LUBRICATE DOOR HINGE AND HINGE CHECK

Spray Rotunda Polyethylene Grease on the hinge pivot points as required to eliminate any binding condition. Open and close the door several times to be sure that the lubricant has effectively worked in.

LUBRICATE LUGGAGE COMPARTMENT HINGE PIVOTS

Spray Rotunda Polyethylene Grease on the hinge pivot points as required. Open and close the luggage compartment several times to be sure that the hinge pivots do not bind.

LUBRICATE TAILGATE LOCK CYLINDER

Use Rotunda Lock Lubricant (B4A-19587-A) sparingly through the key slot. Insert the key and operate the lock several times to be sure that the lubricant has effectively worked in.



- USE TO LUBRICATE**
- HOOD LATCH AND HINGE PIVOTS
 - HOOD AUXILIARY CATCH
 - DOOR PUSH BUTTONS AND STRIKER PLATES
 - DOOR LOCK CYLINDERS
 - DOOR HINGE AND HINGE CHECK
 - LUGGAGE COMPARTMENT LOCK CYLINDER
 - LUGGAGE COMPARTMENT HINGE PIVOTS
 - TAILGATE LOCK CYLINDER
 - TAILGATE SUPPORT AND HINGES
 - FUEL FILLER DOOR HINGES
 - SEAT TRACKS
 - MANUAL VENT WINDOW GEAR BOX
 - MANUAL WINDOW REGULATOR ASSEMBLY

Fig. 105—Polyethylene Grease Dispenser for Body Lubrication

LUBRICATE TAILGATE SUPPORT AND HINGES

Spray Rotunda Polyethylene Grease on all pivot and friction points to eliminate any binding conditions. Operate the tailgate several times to be sure that the lubricant has effectively worked in.

LUBRICATE FUEL FILLER DOOR HINGES

Spray Rotunda Polyethylene Grease on the hinge pivot points as required to eliminate any binding condition. Open and close the door several times to be sure that the lubricant has effectively worked in.

LUBRICATE SEAT TRACK—ECONOLINE ONLY

Using the plastic spray extension, spray Rotunda Polyethylene Grease (C4AZ-19584-B) on the seat track slides, as required, for ease of operation.

CLEAN BODY DRAIN HOLES OR EXAMINE DUST VALVES FOR PROPER OPERATION

Make sure the drain holes in the doors, rocker panels, and quarter panels are free from obstruction. Visually check the dust valves for proper sealing and draining operation.

REPLACE WINDSHIELD WIPER BLADES

Wiper blade replacement intervals will vary with the amount of use, type of weather, chemical reaction from road tars or salts and the age of the blades. Be sure that the windshield glass surface is not contaminated with oil, tree sap or other foreign substance which cannot be easily rubbed off.

Generally, if the wiper pattern across the glass is still uneven and streaked after these tests, replace the blades.

CHECK CONVERTIBLE TOP OPERATION

If convertible top operation becomes sluggish or slow, check the hydraulic reservoir fluid level.

CHECK CONVERTIBLE TOP FLUID LEVEL

ALL CARS EXCEPT LINCOLN AND THUNDERBIRD

1. Remove the rear seat and raise the top.
2. Place absorbent cloths below the filler plug.
3. Remove the filler plug, and check the fluid level. It should be level with the bottom edge of the hole.
4. If the level is low, check the system for leaks, adding automatic transmission fluid C1AZ-19582-A, or Type A, Suffix A, as necessary.
5. Re-install the filler plug, remove the cloths and wipe up any spilled fluid.
6. Re-install the rear seat.

LINCOLN

1. Open the deck lid and raise the top.
2. Remove the right side luggage compartment liner.
3. Place absorbent cloths below the filler plug.
4. Remove the filler plug, and check the fluid level. It should be level with the bottom edge of the hole.
5. If the level is low, check the system for leaks, adding automatic

transmission fluid C1AZ-19582-A or Type A, Suffix A, as necessary.

6. Re-install the filler plug, remove the cloths and wipe up any spilled fluid.

7. Re-install the luggage compartment liner.

THUNDERBIRD

1. Raise the luggage compartment lid and remove the spare tire.
2. Place absorbent cloths below the filler plug.
3. Remove the filler plug, and check the fluid level. It should be level with the bottom edge of the hole.
4. If the level is low, check the system for leaks, adding automatic transmission fluid C1AZ-19582-A, or Type A, Suffix A, as necessary.
5. Re-install the filler plug, remove the cloths and wipe up any spilled fluid.
6. Re-install the spare tire.

LUBRICATE ENGINE COMPARTMENT COVER—ECONOLINE

Apply Rotunda Polyethylene Grease (C4AZ-19584-B) to the hinge pivot points and other friction points as required. Open and close the engine compartment a few times to be sure the lubricant has effectively worked in.

LUBRICATE SIDE DOOR STEP SLIDE MECHANISM—ECONOLINE

Apply Rotunda Polyethylene Grease (C4AZ-19584-B) liberally to the hinges and other friction points. Operate the step several times to be sure the lubricant has effectively worked in. If binding is excessive, straighten any bent parts, or replace damaged parts.

5 ELECTRICAL—ADDITIONAL ITEMS FOR ECONOLINE AND BRONCO ONLY

CLEAN DISTRIBUTOR CAP AND ROTOR

Clean the distributor cap with a soft bristle brush and mild cleaning solvent or mineral spirits. Dry the cap with compressed air. Inspect the cap for cracks, burned contacts, permanent carbon tracks or dirt or corrosion in the sockets. Replace the cap if it is defective.

Clean the rotor with a soft bristle brush and mild cleaning solvent or

mineral spirits. Dry the rotor with compressed air. Inspect the rotor for cracks or burning. Replace the rotor if it is defective.

LUBRICATE DISTRIBUTOR BUSHING (OIL CUP)

On all six-cylinder engines without a Thermactor crankcase ventilation system, apply 3 drops of SAE 10 or SAE 20 motor oil at the interval specified in Group 19.

CLEAN BATTERY CABLES, TERMINALS AND TOP OF BATTERY

Remove corrosion from the cables and terminals with a solution of baking soda or ammonia and water. After cleaning, flush the top of the battery with clean water, and saturate the felt washer on the positive terminal with engine oil to retard further corrosion.

REPLACE DISTRIBUTOR POINTS

The breaker point assembly can be replaced without removing the distributor from the engine.

1. Remove the distributor cap and rotor.
2. Disconnect the primary and condenser wires.
3. Remove the screws that secure the distributor point assembly to the breaker plate. Remove the distributor point assembly.
4. Place the primary and condenser leads on the point assembly primary terminal. Install the lock-washer and nut. Tighten the nut securely.
5. Position the point assembly on the breaker plate. Install the hold down screws. Make sure the ground wire terminal is on the screw nearest the adjustment slot.
6. Adjust the point gap or dwell.

CHECK AND ADJUST DISTRIBUTOR SPARK ADVANCE

The spark advance is checked to determine if the ignition timing advances in proper relation to engine speed and load.

SIX-CYLINDER ENGINES WITHOUT A THERMACTOR CRANKCASE VENTILATION SYSTEM

A six-cylinder engine without a Thermoactor ventilation system uses a Loadomatic distributor. Adjust the spark advance as follows:

1. Mount the distributor on a test set, and calibrate the test set following the instructions of its manufacturer.
2. Check the breaker point contact dwell. If the contact dwell is not between 37°-42°, or the breaker point gap is not within 0.024-0.026 inch, adjust the breaker points.
3. Check the breaker arm spring tension (17-20 ounces). Adjust it if necessary.
4. Adjust the test set to 0° advance, 0-inch vacuum, and the initial rpm setting listed in the specifications.
5. Check the operation of the vacuum advance at the lowest and highest vacuum and rpm settings given in the specifications.
6. If the spark advance is not within the limits under low vacuum, the primary spring adjustment is at fault. If the spark advance is not within the limits under high

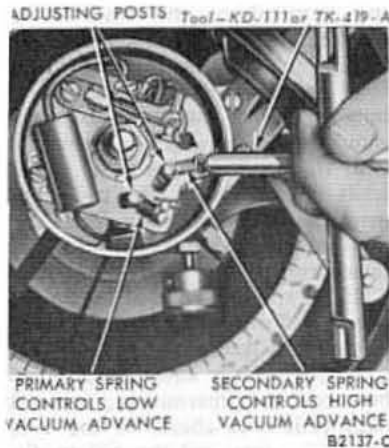


Fig. 106—Spark Advance Adjustment—Loadomatic

vacuum, the secondary spring adjustment is at fault.

To adjust the spark advance, release the tension on the retard springs by turning the adjusting posts as required (Fig. 106). Adjust the primary spring (spring farthest from the vacuum chamber) first, for the low vacuum settings. Adjust the secondary spring last, for the high vacuum settings. As a final check, check the advance throughout the entire range.

If it is impossible to adjust both springs to give the correct spark advance throughout the range, one or both springs should be replaced and the spark advance readjusted. If the advance characteristics still cannot be brought within specifications, replace the diaphragm assembly.

V-8 ENGINES AND SIX-CYLINDER ENGINES WITH THERMACTOR CRANKCASE VENTILATION SYSTEMS

All V-8 engines, and six-cylinder engines equipped with a Thermoactor crankcase ventilation system use a dual advance distributor.

Remove the distributor from the vehicle and mount it in a test set. Calibrate the test set in accordance with the instructions of its manufacturer.

Preliminary Checks

1. Check the contact dwell. If the contact dwell is not within specifications, adjust the breaker points.
 2. Check the breaker arm spring tension and adjust it, if necessary.
- The dual advance distributor has two independently operated spark advance systems. Each system is ad-

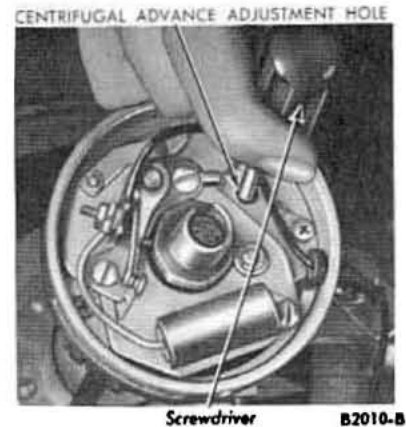


Fig. 107—Centrifugal Advance Adjustment—Dual Advance

justed separately. Adjust the centrifugal advance before adjusting the vacuum advance.

Centrifugal Advance

1. Operate the distributor in the direction of rotation and adjust the speed to the initial rpm setting listed in the specifications.

2. Slowly increase the rpm to the setting specified for the first advance reading listed in the specifications.

If the correct advance is not indicated at this rpm, stop the distributor and bend one spring adjustment bracket to change its tension (Fig. 107). Bend the adjustment bracket away from the distributor shaft to decrease advance (increase spring tension) and toward the shaft to increase advance (decrease spring tension). After the adjustment is made, identify the bracket.

3. After an adjustment has been made to one spring, check the minimum advance point again.

4. Operate the distributor at the specified rpm to give an advance just below the maximum. If this advance is not to specifications, stop the distributor and bend the other spring bracket to give the correct advance.

5. Check the advance at all rpm settings listed in the specifications. Operate the distributor both up and down the rpm range.

Vacuum Advance

1. Connect the test set vacuum line to the fitting on the diaphragm.
2. Set the test set at 0° advance, 0-inch vacuum, and at 1000 rpm.
3. Check the advance at the first vacuum setting given in the specifications.



Fig. 108—Vacuum Advance Adjustment—Dual Advance

4. If the advance is incorrect, change the calibration washers between the vacuum chamber spring and nut (Fig. 108). After installing or removing the washers, position the gasket in place and tighten the nut. The addition of a washer will decrease advance and the removal of a washer will increase advance.

5. After one vacuum setting has been adjusted, the others should be checked. Do not change the original rpm setting when going to a different vacuum setting. If the other settings are not within limits, there is incorrect spring tension, leakage in the vacuum chamber and/or line, or the wrong fibre stop has been installed in the vacuum chamber of the diaphragm housing.

To check the diaphragm for leakage:

Remove the vacuum line from the distributor. Adjust the vacuum pressure of a distributor tester to its maximum position. Hold your hand over the end of the tester's vacuum hose and note the maximum reading obtained. Do not exceed 25 inches vacuum reading.

If the maximum reading is 25 inches or less, connect the tester's vacuum line to the vacuum fitting on the diaphragm without changing any of the adjustments. The maximum gauge reading should not be less than it was above. If it is less, the diaphragm is leaking and should be replaced.

CHECK SPARK INTENSITY OF EACH SPARK PLUG WIRE

To check the spark intensity at the spark plugs, proceed as follows:

1. Disconnect all the spark plug wires. Check the spark intensity of one wire at a time.

When removing the wires from the spark plugs, grasp and twist the moulded cap, then pull the cap off the spark plug. Do not pull on the wire because the wire connection inside the cap may become separated or the insulator may be damaged.

2. Install a terminal adapter in

the terminal of the wire to be checked. Hold the adapter approximately $\frac{3}{16}$ inch from the cylinder head and crank the engine, using a remote starter switch. The spark should jump the gap regularly.

3. If the spark intensity of all leads is satisfactory, the coil, condenser, rotor, distributor cap, and the secondary wires are probably satisfactory.

If the spark is good at only some wires, perform a high resistance test of the faulty leads.

If the spark is equal at all wires, but weak or intermittent, make a high resistance check of the coil, distributor cap, and the coil to distributor high tension lead. Follow the instructions of the test set manufacturer when making the tests.

TEST ALTERNATOR OUTPUT —ON ENGINE

To test the output of the alternator on the vehicle, proceed as follows:

1. Place the transmission in neutral or park and apply the parking brake.

2. Make the connections as shown in Fig. 109. Be sure that the field resistance control is at the OFF position at the start of this test.

3. Close the battery adapter switch. Start the engine, then open the battery adapter switch.

4. Increase the engine speed to approximately 2000 rpm. Turn off all lights and electrical accessories.

5. Turn the field rheostat clockwise until 15 volts is indicated on the voltmeter. Turn the master control clockwise until the voltmeter indicates between 11 and 12 volts. Holding the master control in this position turn the field rheostat clockwise to its maximum rotation. Turn the master control counterclockwise until the voltmeter indicates 15 volts.

6. Observe the ammeter reading. Add 2 amperes to this reading when the vehicle is equipped with standard ignition or 6 amperes with the transistor ignition system, to obtain total alternator output. If rated output cannot be obtained, increase the engine speed to 2900 rpm and repeat this step.

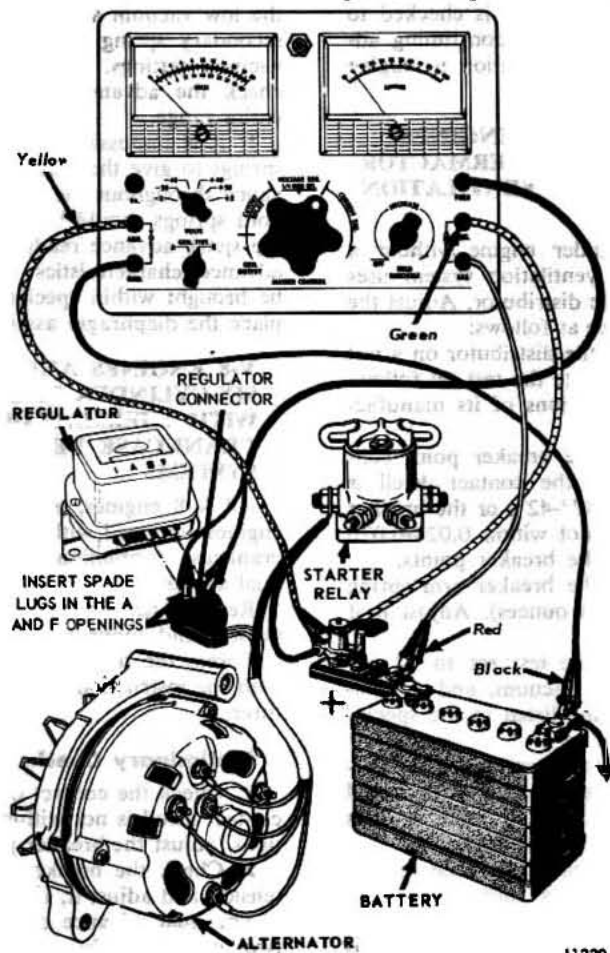


Fig. 109—Alternator Output Test

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7. Return the field resistance control to the maximum counterclockwise position, release the master control, and stop the engine. Disconnect the test equipment, if no further tests are to be made.

An output of 2 to 8 amperes below specifications usually indicates an open diode rectifier. An output of approximately 10 to 15 amperes below specifications usually indicates a shorted diode rectifier. An alternator with a shorted diode will usually whine, which will be most noticeable at idle speed.

CHECK ALTERNATOR REGULATOR

VOLTAGE LIMITER TEST

Voltage limiter calibration tests must be made with the regulator cover in place and the regulator at normal operating temperature (equivalent to the temperature after 20 minutes of operation on the car with the hood down).

For accurate voltage limiter testing, the battery specific gravity must

be at least 1.225. If the battery is low in charge, either charge it to 1.225 specific gravity or substitute a fully charged battery, before making a voltage limiter test.

To test the voltage regulator on the car, make the test connections to the battery as shown in Fig. 110. Turn all accessories off, including door operated dome lights. Close the battery adapter switch, start the engine, then open the adapter switch. Attach a voltage regulator thermometer to the regulator cover. Operate the engine at approximately 2000 rpm for 5 minutes.

When the battery is charged, and the voltage regulator has been temperature stabilized, the ammeter should indicate less than 10 amperes with the master control set at the 1/4-OHM position.

Cycle the regulator as follows: Turn the ignition key to OFF to stop the engine, close the adapter switch, start the engine, and open the adapter switch. Allow the battery to normalize for a few seconds, then read

the voltmeter. Read the thermometer, and compare the voltmeter reading with the voltage given in Table 2 for the ambient temperature indicated on the thermometer. If the regulated voltage is not within specifications, remove the regulator to an alternator/regulator test stand and make a voltage limiter adjustment. After each adjustment, be sure to cycle the regulator before each reading. The readings must be made with the cover in place.

TABLE 2—VOLTAGE LIMITER SETTING VERSUS AMBIENT AIR TEMPERATURE

Ambient Air Temperature °F	Voltage Limiter Setting (Volts)
50	14.3-15.1
75	14.1-14.9
100	13.9-14.7
125	13.8-14.6

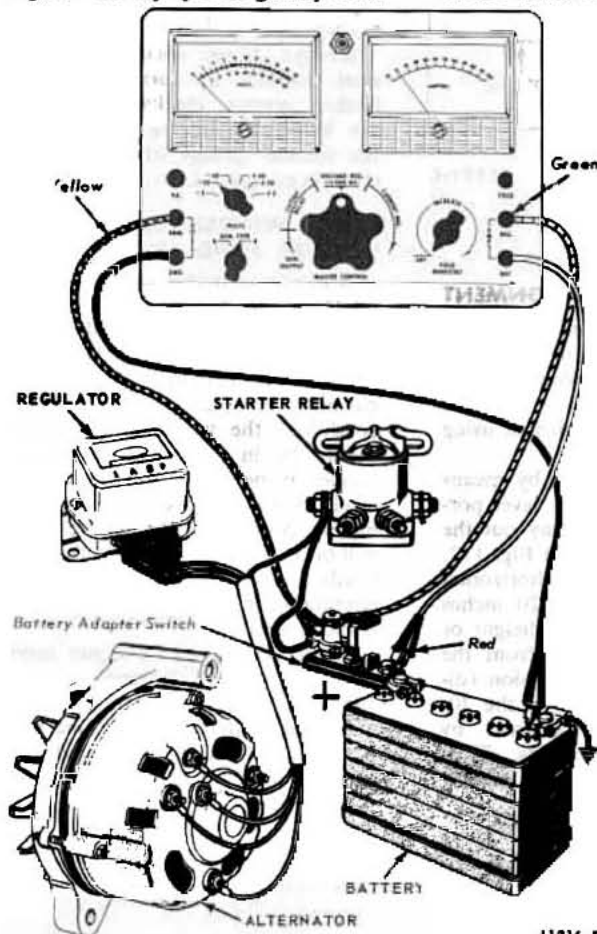


Fig. 110—Voltage Limiter Test

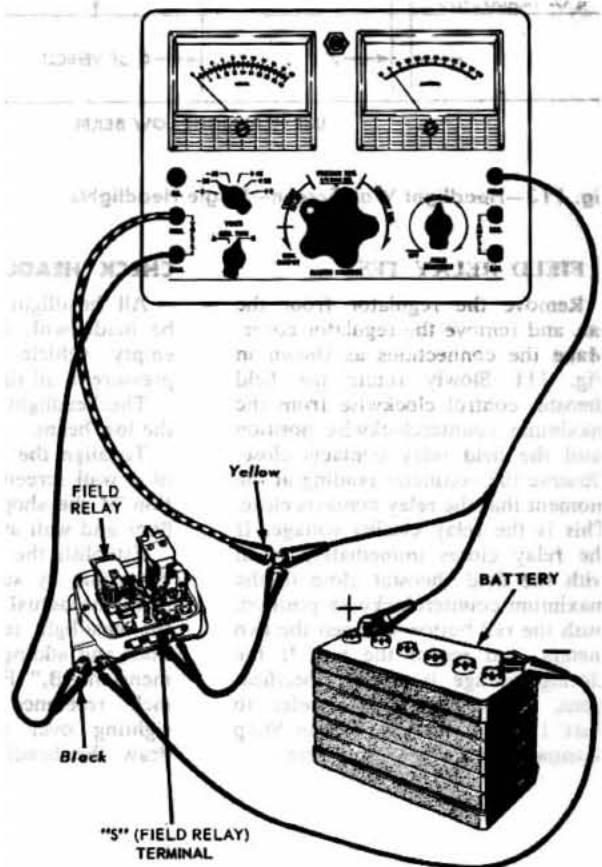


Fig. 111—Field Relay Test

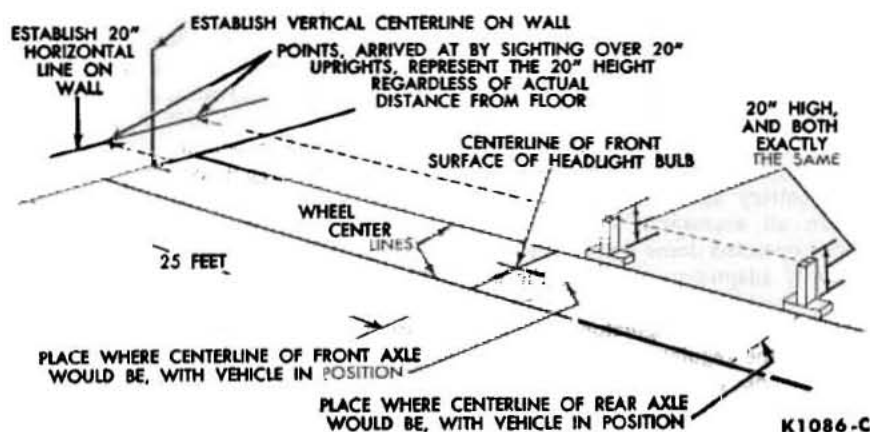


Fig. 112—Floor and Wall Layout for Headlight Alignment

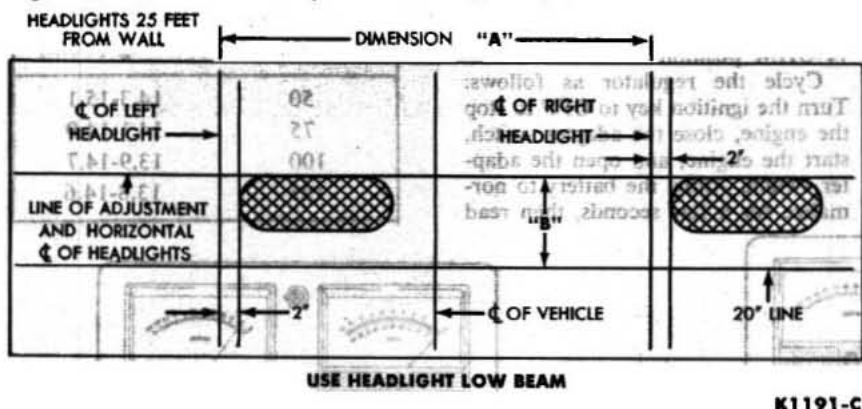


Fig. 113—Headlight Wall Screen—Single Headlights

FIELD RELAY TEST

Remove the regulator from the car, and remove the regulator cover. Make the connections as shown in Fig. 111. Slowly rotate the field rheostat control clockwise from the maximum counterclockwise position until the field relay contacts close. Observe the voltmeter reading at the moment that the relay contacts close. This is the relay closing voltage. If the relay closes immediately, even with the field rheostat close to the maximum counterclockwise position, push the red button between the two meters, and repeat the test. If the closing voltage is not to specifications, adjust the relay. (Refer to Part 13-3 of the appropriate Shop Manual for correct procedure.)

CHECK HEADLIGHT ALIGNMENT

All headlight adjustments are to be made with a full fuel tank, an empty vehicle and recommended pressure in all tires.

The headlights are adjusted using the low beam.

To align the headlights by means of a wall screen, select a level portion of the shop floor. Lay out the floor and wall as shown in Fig. 112.

Establish the headlight horizontal centerline by subtracting 20 inches from the actual measured height of the headlight lens center from the floor and adding this dimension (dimension "B," Fig. 113) to the 20-inch reference line obtained by sighting over the uprights. Then draw the headlight vertical center-

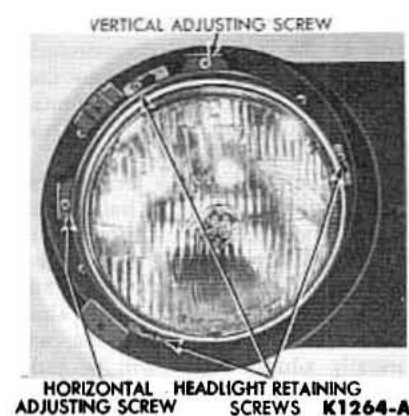


Fig. 114—Headlight Adjustment—Single Headlights

lines on the screen (dimension "A," Fig. 113). Draw two lines two inches to the right of each vertical centerline. Place the vehicle in position and turn the headlights on low beam.

Each headlight is adjusted by means of two screws located under the headlight trim ring as shown in Fig. 114. Adjust each headlight beam as shown in Fig. 113.

Always bring each beam into final position by turning the adjusting screws clockwise so that the headlight will be held against the tension springs when the operation is completed.

CHECK WINDSHIELD WASHER FLUID LEVEL

A plastic container attached at the fender apron is used as a reservoir for the windshield washer fluid. An all-weather solution, Rotunda C1AA-19550-A, is recommended for best cleaning results. During freezing conditions the windshield defroster should be in operation before the washer is operated. Keep the fluid level in the reservoir at approximately two-thirds full. Three pints will bring the reservoir up to the two-thirds full condition. For all-weather operation, the following procedure is recommended:

Winter Operation: Use not more than one part of Rotunda C1AA-19550-A with 2 parts water.

Summer Operation: Use one part Rotunda C1AA-19550-A with 10 parts of water.

Lubricant Charts and Specifications

PART 3

LUBRICANT SPECIFICATIONS

ITEM	FORD PART NO.	PART NAME	FORD SPECIFICATION
Body Hinges, Hood and Trunk Latches, Safety Catches	C4AZ-19584-B (R-138-C)	Rotunda Polyethylene Grease	ESB-M1C105-A
Brake Master Cylinder—Without Power Disc Brakes	B7AZ-19542-A (R-103-A)	Rotunda Hydraulic Brake and Hydraulic Clutch Fluid	SAE 70R3
Brake Master Cylinder—With Power Disc Brakes (See Note ①)	C6AZ-19542-A (R-103-D)	Rotunda Brake Fluid—Extra Heavy Duty	ESA-M6C25-A
Carburetor Oil Bath Air Cleaner—Bronco and Econoline	—	Engine Oil SAE 30, Above 32°F	ESE-M2C37
		Engine Oil SAE 20, Below 32°F	ESE-M2C36
Convertible Top Reservoir	C1AZ-19582-A (R-106-A)	Rotunda Automatic Transmission Fluid	M2C33-D
Distributor Bushing (Oil Cup)	—	Engine Oil SAE 20W	ESE-M2C35
Engine Crankcase Oil		Rotunda 6000-Mile Motor Oil:	ESE-M2C101-A
SAE 10W-20W-30	C5AZ-19579-A, B, or C (R-10-A, B, or C)	MS Sequence Tested —10°F to +90°F	
SAE 5W-10W-30	C5AZ-19579-D, E, or F (R-10-D, E, or F)	MS Sequence Tested for Sustained Temperatures Below —10°F	
SAE 20W-30-40	C5AZ-19579-G, H, or J (R-10-G, H, or J)	MS Sequence Tested for Sustained Temperatures Above +90°F	
Engine Oil Filter—All Engines	C1AZ-6731-A	Autolite Oil Filter—6000-mile Type	ES-COAE-6714-A
Exhaust Heat Control Valve	COAZ-19A501-A (R-149-A)	Rotunda Solvent and Penetrating Fluid	ESR-M99C56-A
Front Axle—Bronco	Above —25°F C2AZ-19580-A (R-154-E)	Rotunda Hypoid Gear Lube	ESW-M2C28-BA
	Below —25°F C2AZ-19580-B (R-154-D)	Rotunda Hypoid Gear Lube	ESW-M2C28-AA
Front Suspension Ball Joints and Steering Linkage	C1AZ-19590-B (R-156-A)	Rotunda Chassis and Ball Joint Lube	ESA-M1C75-A
Front Wheel Bearings—All Cars	C1AZ-19590-B (R-156-A)	Rotunda Chassis and Ball Joint Lube	ESA-M1C75-A
Lock Cylinders	B4A-19587-A (R-117-A)	Rotunda Lock Lubricant	ESB-M2C20-A
Rear Axle (Conventional)—Comet, Falcon, Fairlane, Mustang, Econoline (Except Hi Performance)	C1AZ-19580E or F (R-154-G)	Rotunda Hypoid Gear Lube	ESW-M2C50-A
Rear Axle (Conventional)—All 240, 289 Engines; or 390 engines with WDT-AT, AU and BS Axles; or Econoline with WCR Axles	C2AZ-19580-D (R-154-C)	Rotunda Hypoid Gear Lube	ESW-M2C57-A
Rear Axle (Conventional)—All 410, 427, 428, 462 Engines; or 390 Engines with WDT Axles	C6AZ-19580-B	Rotunda Hypoid Gear Lube	ESW-M2C105-A
Rear Axle (Conventional)—Bronco	C2AZ-19580-D	Rotunda Hypoid Gear Lube	ESW-M2C57-A
Rear Axle—Limited Slip Differential—All Models	C6AZ-19580-C	Rotunda Hypoid Gear Lube	ESW-M2C104-A
Slip Yoke Splines—Except Bronco	B8A-19589-A	Special Purpose Lubricant	ESW-M1C39-A
Slip Yoke Splines—Bronco	C1AZ-19586-B	Rotunda Universal Lube	ESA-M1C75-A
Speedometer Cable	B5A-19581-A (R-136-A)	Rotunda Speedometer Cable Lubricant	M1C18
Steering Gear Housing—Bronco	—	SAE 90 Oil with EP	M-568-C
Steering Gear Housing—Manual (Except Bronco)	C3AZ-19578-A (R-157-A)	Rotunda Lifetime Steering Gear Grease	ESW-M1C87-A
Steering—Power (Pump Reservoir)	C1AZ-19582-A (R-106-A)	Rotunda Automatic Transmission Fluid	M2C33-D
Transfer Case—4-Wheel Drive—Bronco	—	Above 10°F—Engine Oil SAE 50	ESE-M2C39
		Below 10°F—Engine Oil SAE 30	ESE-M2C37
Transmission (Automatic)	C1AZ-19582-A (R-106-A)	Rotunda Automatic Transmission Fluid	M2C33-D Type F
Transmission (Manual Shift)	C3RZ-19C547-B (R-139-B)	Rotunda Manual Transmission Lube	ESW-M2C83-B
Universal Joints	C1AZ-19586-B (R-153-B)	Rotunda Universal Joint Lube	ESA-M1C57-A
	C1AZ-19580-B (R-156-A)	Ball Joint Lube	ESA-M1C75-A
Universal Joints—Econoline	C1AZ-19590-B (R-156-A)	Rotunda Chassis and Ball Joint Lube	ESA-M1C75A
Windshield Wiper Motor—Hydraulic	C1AZ-19582-A (R-106-A)	Rotunda Automatic Transmission Fluid	ESW-M1C87-A

① Disc brakes function best with a fluid having a higher boiling point than previously available fluids. If C6AZ-19542-A fluid is not available, small quantities of a reputable brand of heavy duty fluid meeting SAE specification 70R3 may be added to maintain required fluid level.

ENGINE CRANKCASE OILS

Use of SAE 10W-30 oil will provide the proper viscosity for all normal ranges of outside temperatures. For operation at sustained outside temperatures below -10°F , a 5W-30 oil should be used.

OIL QUALITY

Use only oils which have been tested and certified by the maker as satisfying automobile manufacturers specifications for Engine Operating Sequence Tests for Service M.S. The Ford Motor Company specification covering these tests is ESE-M2C101-A. These tests are defined by ASTM committee D2 for Section G-IV of technical committee B and are published in the SAE Handbook.

These tests cover oil characteristics as follows:

Sequence I—Low Temperature Wear Prevention—(Cold Starts)

Sequence II—High-Speed—High Temperature Wear Prevention

Sequence III—High Temperature Deposit Formation—(Varnish)

Sequence IV—Corrosion and Rust Prevention

Sequence V—Sludge Formation

If engine oils are used which do not meet these requirements, it will be necessary to change oil more frequently than every 6,000 miles.

If it is necessary to use an "MS" oil which is not certified by the marketer as having passed the Engine Operating Sequence Tests, the addition of Rotunda Oil Conditioner to the oil will satisfy requirements.

OIL FILTER

Use of the right oil filter is also essential to good engine life and operation. For 6,000-mile filter change intervals, filters must meet Ford Specification ES-COAE-6714-A.

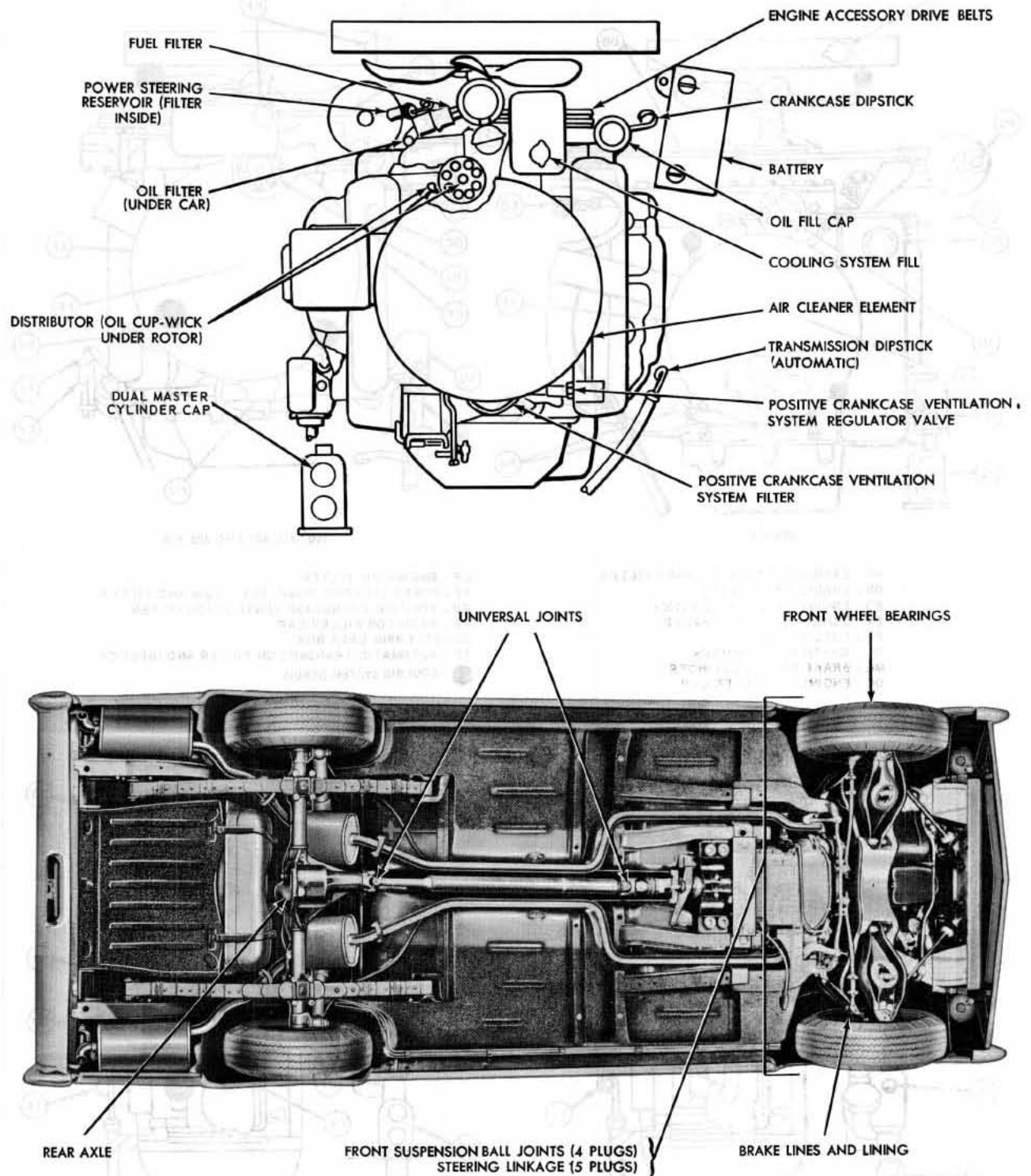
The genuine Autolite Oil Filter and 6,000-Mile Rotunda Motor Oil meet these requirements.

LUBRICATION CHARTS

Figs. 1 through 4 show typical lubrication points for current production vehicles. Lubrication points are illustrated for clarity. Vehicles with optional or special equipment will have slightly different, or additional lubrication points. Refer to the specific Shop Manual for that vehicle for complete maintenance information.

Engine Oil	Engine Oil	Engine Oil	Engine Oil
SAE 10W-30	SAE 10W-30	SAE 10W-30	SAE 10W-30
SAE 5W-30	SAE 5W-30	SAE 5W-30	SAE 5W-30
SAE 10W-40	SAE 10W-40	SAE 10W-40	SAE 10W-40
SAE 15W-40	SAE 15W-40	SAE 15W-40	SAE 15W-40
SAE 20W-50	SAE 20W-50	SAE 20W-50	SAE 20W-50
SAE 25W-50	SAE 25W-50	SAE 25W-50	SAE 25W-50
SAE 30W-60	SAE 30W-60	SAE 30W-60	SAE 30W-60
SAE 40W-60	SAE 40W-60	SAE 40W-60	SAE 40W-60
SAE 50W-70	SAE 50W-70	SAE 50W-70	SAE 50W-70
SAE 60W-80	SAE 60W-80	SAE 60W-80	SAE 60W-80
SAE 70W-90	SAE 70W-90	SAE 70W-90	SAE 70W-90
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SAE 90W-100	SAE 90W-100	SAE 90W-100	SAE 90W-100
SAE 100W-100	SAE 100W-100	SAE 100W-100	SAE 100W-100
SAE 110W-100	SAE 110W-100	SAE 110W-100	SAE 110W-100
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SAE 130W-100	SAE 130W-100	SAE 130W-100	SAE 130W-100
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SAE 150W-100	SAE 150W-100	SAE 150W-100	SAE 150W-100
SAE 160W-100	SAE 160W-100	SAE 160W-100	SAE 160W-100
SAE 170W-100	SAE 170W-100	SAE 170W-100	SAE 170W-100
SAE 180W-100	SAE 180W-100	SAE 180W-100	SAE 180W-100
SAE 190W-100	SAE 190W-100	SAE 190W-100	SAE 190W-100
SAE 200W-100	SAE 200W-100	SAE 200W-100	SAE 200W-100
SAE 210W-100	SAE 210W-100	SAE 210W-100	SAE 210W-100
SAE 220W-100	SAE 220W-100	SAE 220W-100	SAE 220W-100
SAE 230W-100	SAE 230W-100	SAE 230W-100	SAE 230W-100
SAE 240W-100	SAE 240W-100	SAE 240W-100	SAE 240W-100
SAE 250W-100	SAE 250W-100	SAE 250W-100	SAE 250W-100
SAE 260W-100	SAE 260W-100	SAE 260W-100	SAE 260W-100
SAE 270W-100	SAE 270W-100	SAE 270W-100	SAE 270W-100
SAE 280W-100	SAE 280W-100	SAE 280W-100	SAE 280W-100
SAE 290W-100	SAE 290W-100	SAE 290W-100	SAE 290W-100
SAE 300W-100	SAE 300W-100	SAE 300W-100	SAE 300W-100
SAE 310W-100	SAE 310W-100	SAE 310W-100	SAE 310W-100
SAE 320W-100	SAE 320W-100	SAE 320W-100	SAE 320W-100
SAE 330W-100	SAE 330W-100	SAE 330W-100	SAE 330W-100
SAE 340W-100	SAE 340W-100	SAE 340W-100	SAE 340W-100
SAE 350W-100	SAE 350W-100	SAE 350W-100	SAE 350W-100
SAE 360W-100	SAE 360W-100	SAE 360W-100	SAE 360W-100
SAE 370W-100	SAE 370W-100	SAE 370W-100	SAE 370W-100
SAE 380W-100	SAE 380W-100	SAE 380W-100	SAE 380W-100
SAE 390W-100	SAE 390W-100	SAE 390W-100	SAE 390W-100
SAE 400W-100	SAE 400W-100	SAE 400W-100	SAE 400W-100
SAE 410W-100	SAE 410W-100	SAE 410W-100	SAE 410W-100
SAE 420W-100	SAE 420W-100	SAE 420W-100	SAE 420W-100
SAE 430W-100	SAE 430W-100	SAE 430W-100	SAE 430W-100
SAE 440W-100	SAE 440W-100	SAE 440W-100	SAE 440W-100
SAE 450W-100	SAE 450W-100	SAE 450W-100	SAE 450W-100
SAE 460W-100	SAE 460W-100	SAE 460W-100	SAE 460W-100
SAE 470W-100	SAE 470W-100	SAE 470W-100	SAE 470W-100
SAE 480W-100	SAE 480W-100	SAE 480W-100	SAE 480W-100
SAE 490W-100	SAE 490W-100	SAE 490W-100	SAE 490W-100
SAE 500W-100	SAE 500W-100	SAE 500W-100	SAE 500W-100
SAE 510W-100	SAE 510W-100	SAE 510W-100	SAE 510W-100
SAE 520W-100	SAE 520W-100	SAE 520W-100	SAE 520W-100
SAE 530W-100	SAE 530W-100	SAE 530W-100	SAE 530W-100
SAE 540W-100	SAE 540W-100	SAE 540W-100	SAE 540W-100
SAE 550W-100	SAE 550W-100	SAE 550W-100	SAE 550W-100
SAE 560W-100	SAE 560W-100	SAE 560W-100	SAE 560W-100
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SAE 620W-100	SAE 620W-100	SAE 620W-100	SAE 620W-100
SAE 630W-100	SAE 630W-100	SAE 630W-100	SAE 630W-100
SAE 640W-100	SAE 640W-100	SAE 640W-100	SAE 640W-100
SAE 650W-100	SAE 650W-100	SAE 650W-100	SAE 650W-100
SAE 660W-100	SAE 660W-100	SAE 660W-100	SAE 660W-100
SAE 670W-100	SAE 670W-100	SAE 670W-100	SAE 670W-100
SAE 680W-100	SAE 680W-100	SAE 680W-100	SAE 680W-100
SAE 690W-100	SAE 690W-100	SAE 690W-100	SAE 690W-100
SAE 700W-100	SAE 700W-100	SAE 700W-100	SAE 700W-100
SAE 710W-100	SAE 710W-100	SAE 710W-100	SAE 710W-100
SAE 720W-100	SAE 720W-100	SAE 720W-100	SAE 720W-100
SAE 730W-100	SAE 730W-100	SAE 730W-100	SAE 730W-100
SAE 740W-100	SAE 740W-100	SAE 740W-100	SAE 740W-100
SAE 750W-100	SAE 750W-100	SAE 750W-100	SAE 750W-100
SAE 760W-100	SAE 760W-100	SAE 760W-100	SAE 760W-100
SAE 770W-100	SAE 770W-100	SAE 770W-100	SAE 770W-100
SAE 780W-100	SAE 780W-100	SAE 780W-100	SAE 780W-100
SAE 790W-100	SAE 790W-100	SAE 790W-100	SAE 790W-100
SAE 800W-100	SAE 800W-100	SAE 800W-100	SAE 800W-100
SAE 810W-100	SAE 810W-100	SAE 810W-100	SAE 810W-100
SAE 820W-100	SAE 820W-100	SAE 820W-100	SAE 820W-100
SAE 830W-100	SAE 830W-100	SAE 830W-100	SAE 830W-100
SAE 840W-100	SAE 840W-100	SAE 840W-100	SAE 840W-100
SAE 850W-100	SAE 850W-100	SAE 850W-100	SAE 850W-100
SAE 860W-100	SAE 860W-100	SAE 860W-100	SAE 860W-100
SAE 870W-100	SAE 870W-100	SAE 870W-100	SAE 870W-100
SAE 880W-100	SAE 880W-100	SAE 880W-100	SAE 880W-100
SAE 890W-100	SAE 890W-100	SAE 890W-100	SAE 890W-100
SAE 900W-100	SAE 900W-100	SAE 900W-100	SAE 900W-100
SAE 910W-100	SAE 910W-100	SAE 910W-100	SAE 910W-100
SAE 920W-100	SAE 920W-100	SAE 920W-100	SAE 920W-100
SAE 930W-100	SAE 930W-100	SAE 930W-100	SAE 930W-100
SAE 940W-100	SAE 940W-100	SAE 940W-100	SAE 940W-100
SAE 950W-100	SAE 950W-100	SAE 950W-100	SAE 950W-100
SAE 960W-100	SAE 960W-100	SAE 960W-100	SAE 960W-100
SAE 970W-100	SAE 970W-100	SAE 970W-100	SAE 970W-100
SAE 980W-100	SAE 980W-100	SAE 980W-100	SAE 980W-100
SAE 990W-100	SAE 990W-100	SAE 990W-100	SAE 990W-100
SAE 1000W-100	SAE 1000W-100	SAE 1000W-100	SAE 1000W-100

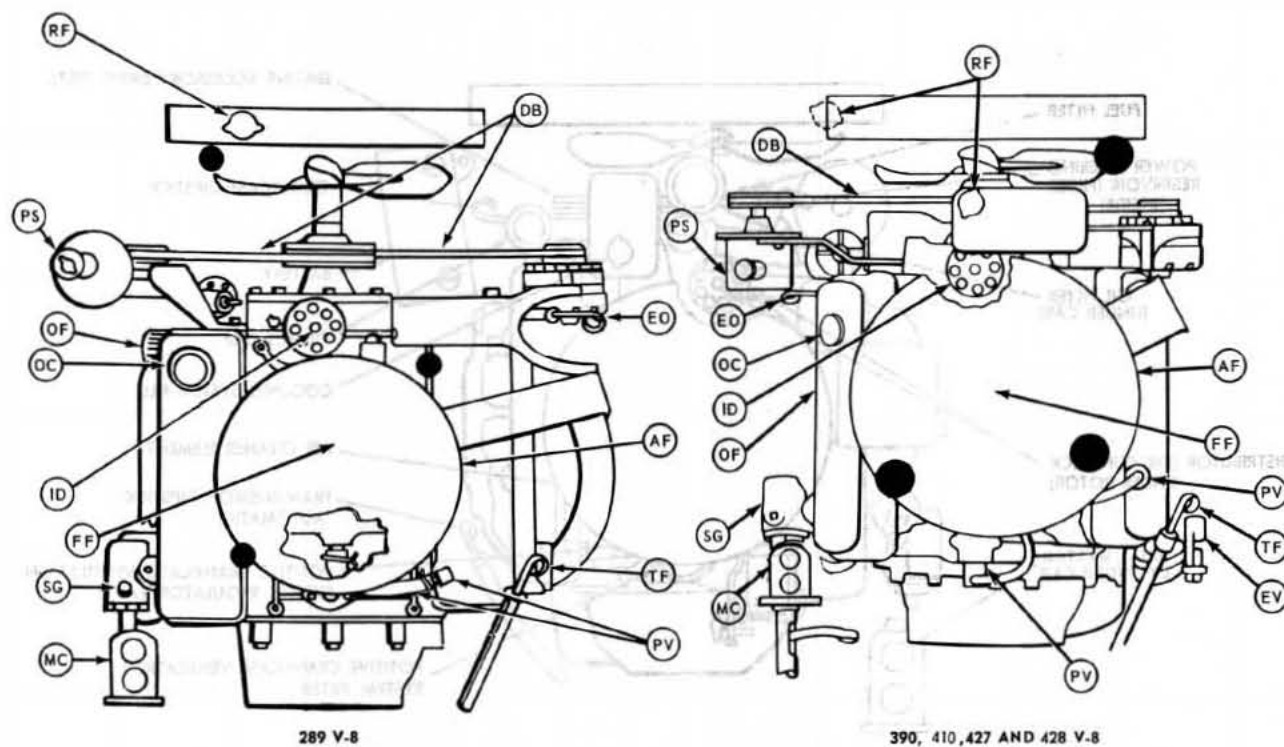
SAE 10W-30 oil will provide the proper viscosity for all normal ranges of outside temperatures. For operation at sustained outside temperatures below -10°F , a 5W-30 oil should be used.



Y 1006-B

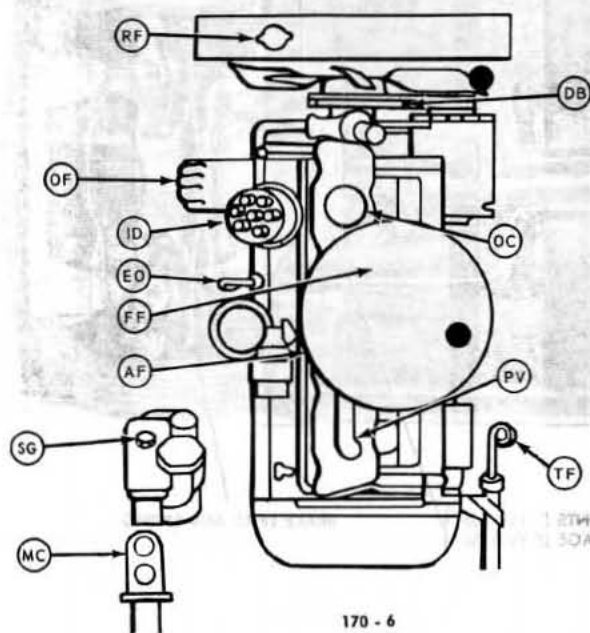
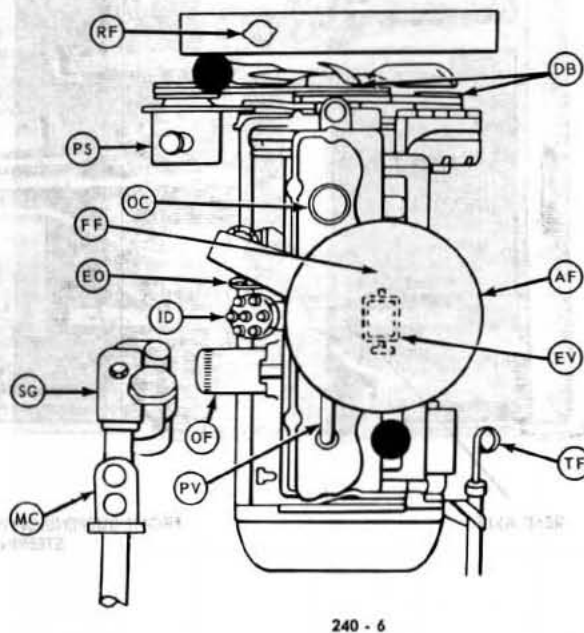
Fig. 1—Lubrication Chart—Lincoln

(n Chart—engines (All Car lines except Lincoln)



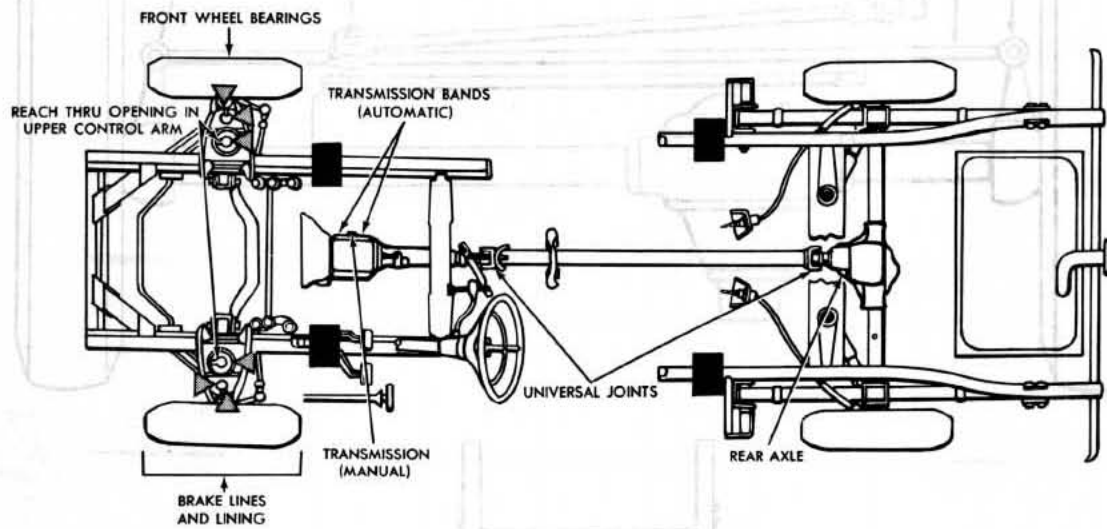
AF - CARBURETOR AIR CLEANER FILTER
 DB - ENGINE DRIVE BELTS
 EO - ENGINE OIL LEVEL DIPSTICK
 EV - EXHAUST CONTROL VALVE
 FF - FUEL FILTER
 ID - IGNITION DISTRIBUTOR
 MC - BRAKE MASTER CYLINDER
 OC - ENGINE OIL FILLER CAP

OF - ENGINE OIL FILTER
 PS - POWER STEERING PUMP, RESERVOIR AND FILTER
 PV - POSITIVE CRANKCASE VENTILATION SYSTEM
 RF - RADIATOR FILLER CAP
 SG - STEERING GEAR BOX
 TF - AUTOMATIC TRANSMISSION FILLER AND DIPSTICK
 ● COOLING SYSTEM DRAINS

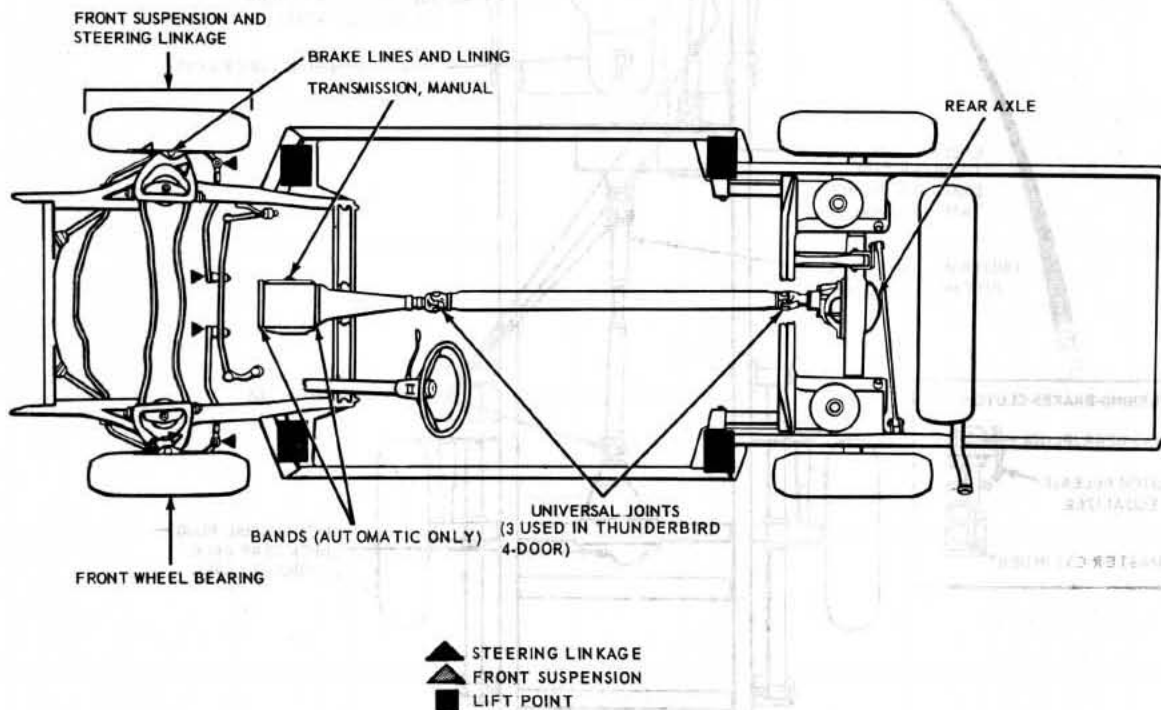


Y 1089-A

Fig. 2—Lubrication Chart—Engines (All Car Lines except Lincoln)



CHASSIS TYPICAL OF COMET, COUGAR, FAIRLANE, FALCON AND MUSTANG



CHASSIS TYPICAL OF THUNDERBIRD, MERCURY AND FORD

Y 1090-A

Fig. 3—Lubrication Chart—Chassis (All Passenger Car Lines except Lincoln)

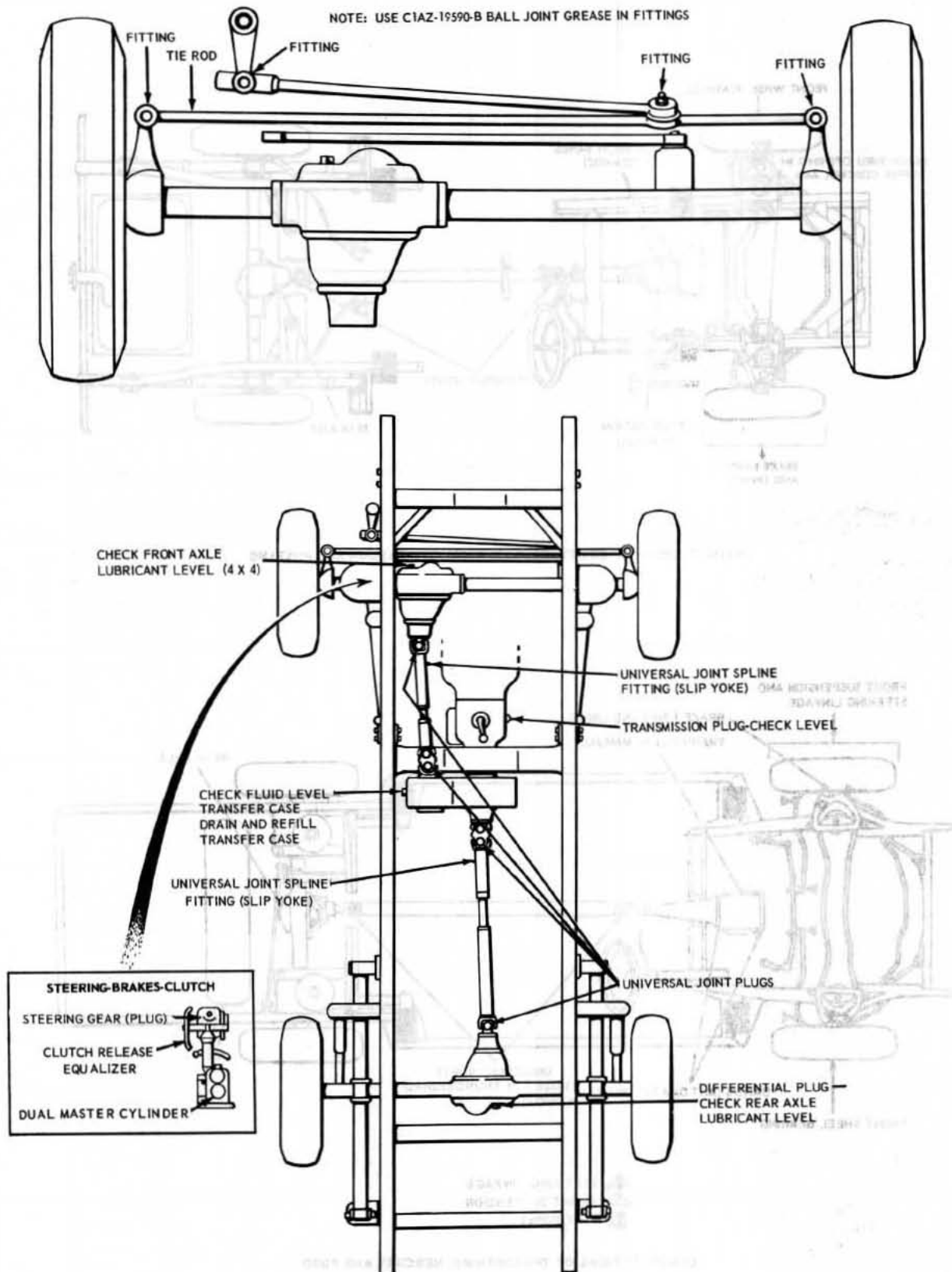


Fig. 4—Lubrication Chart—Bronco Chassis

Fig. 3—Lubrication Chart—Chassis (All P

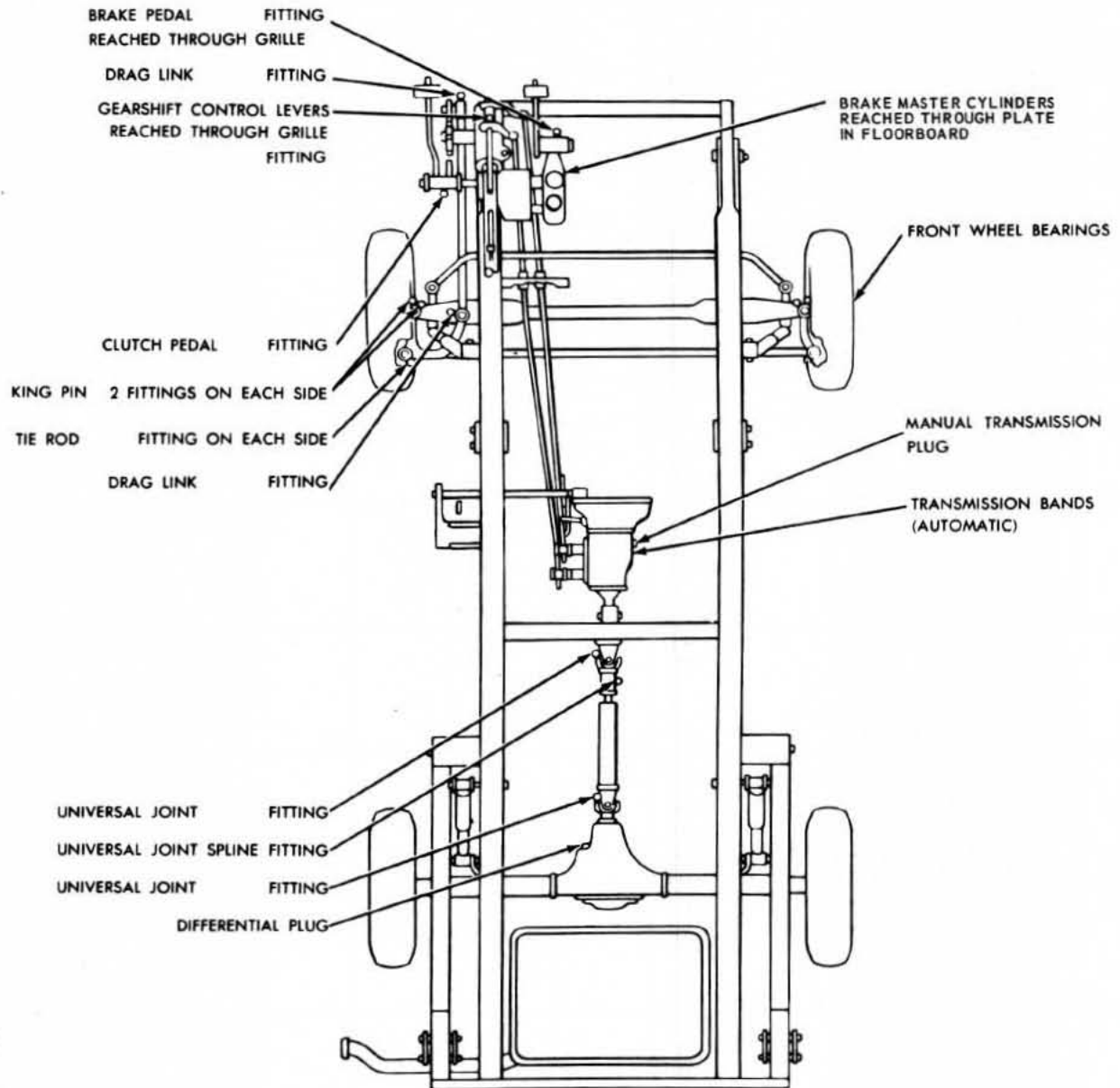


Fig. 5—Lubrication Chart—Econoline Chassis