CHEVROLET

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TURBO-AIR SPECIAL

A high performance engine, called the Turbo-Air Special (fig. 1), rated 95 horsepower at 4800 rpm, is now available for Corvairs equipped with three speed transmissions. The maximum torque remains the same as the standard Corvair engine at 125 lb. ft. However, the speed at which the maximum torque is produced is increased from 2400 rpm to 2800 rpm.

The basic engine is the same as the regular production engine with the increase in horsepower derived from increasing the volumetric efficiency and modifications in the carburetors. The following paragraphs explain how these changes increase the engine horsepower.

Volumetric Efficiency

Volumetric efficiency is the ease with which an engine breathes. As the piston moves down for an intake stroke, it creates a partial vacuum, causing air to flow into the combustion chamber. As the piston moves up on an exhaust stroke, it displaces this air and causes the combustion chamber to be emptied. Theoretically an engine should be able to take in and discharge an amount of air equal to its cubic inch displacement, every two revolutions of the crankshaft. But, when con-

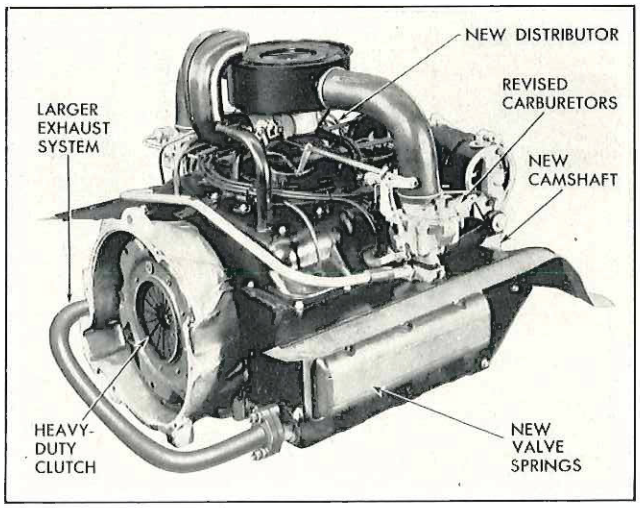

Fig. 1—Turbo-Air Special Engine

sidering the inertia of the air, the time interval the valves are open, the restriction to air flow caused by the intake air flowing through the carburetor, intake manifold and the valves, the amount of air coming into the engine is restricted or partially "choked off". The discharge of the exhaust gases is restricted by the exhaust valves, exhaust manifold, muffler and tail pipe, causing back pressures which also contribute to the inability of an engine to breathe with 100% efficiency.

To improve the engine breathing means more air-fuel mixture must be taken in and more exhaust gases discharged in a given length of time. By permitting more air-fuel mixture to fill the combustion chamber, a more powerful push is generated on the top of the pistons, resulting in higher horsepower output.

This was accomplished on the Turbo-Air Special engine by installing a camshaft which causes the intake and exhaust valves to open sooner, stay open longer, and lifts the valves to a higher point. This permits a greater flow of incoming air-fuel mixture and outgoing exhaust gases, which results in better engine breathing.

To go along with the valves opening farther are new type valve springs, valve spring caps and valve spring shims. The cylinder heads are machined differently than the standard cylinder head to facilitate the installation of the larger type valve springs.

The discharge of the gases is aided by increasing the size of the muffler and tailpipe passages. The tube diameters of the muffler and tailpipe have been increased from 1½ inches to 2 inches.

Carburetor Modifications

With the greater air flow it was necessary to change the amount of fuel being discharged into the throat of the carburetor. This was accomplished by increasing the size of the idle tube (13) .001" larger than the regular 3 speed transmission model carburetors. The restriction in the idle channel (26) has also been increased .001". When a vehicle is to be used for extended high speed operation, the main metering jet (12) should be replaced with one that is .001" larger (fig. 2).

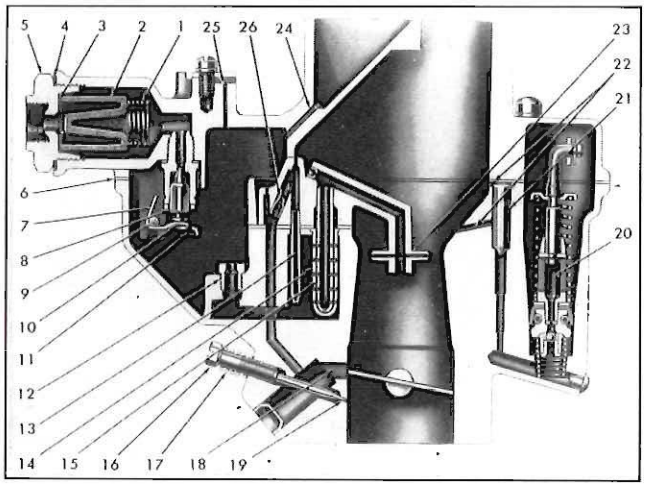

Fig. 2—Type "H" Carburetor—Cross Section

1. Filter Spring
2. Filter
3. Filter Gasket
4. Inlet Nut Gasket
5. Inlet Nut
6. Float Seal Gasket
7. Float Drop Adjusting Tang
8. Float Needle
9. Float Hinge Pin
10. Float Level Adjusting Tang
11. Float Hanger Arm
12. Main Metering Jet
13. Idle Tube
14. Main Well Insert
15. Main Well Tube
16. Idle Mixture Adjusting Screw
17. Idle Mixture Adjusting Spring
18. Secondary Idle Port
19. Primary Idle Port
20. Accelerator Pump
21. Pump Discharge Valve
22. Pump Discharge Port
23. Venturi Cluster
24. Bowl Internal Vent
25. Bowl External Vent
26. Idle Channel Restriction

Distributor Changes

A distributor with a copper colored oiler is used with the Turbo-Air Special engine and has incorporated the following changes compared with the regular standard transmission distributor. The ignition timing at idle is 16° BTDC. The centrifugal advance curve is 0° at 700 rpm, 6.5° at 1200 rpm, 24° at 4800 RPM. The vacuum advance curve is 0° at 8" hg. and 15° at 15.5" hg. The increase in the ignition timing and centrifugal advance improves the break away feel during periods of low speed acceleration. The idle speed has been increased to 800 rpm for this engine. The spark plugs recommended for use with this engine are AC-46 FF. When the vehicle is used for extended periods of high speed driving use spark plugs numbered AC-44 FF.

Heavy Duty Clutch

A heavy duty clutch driven disc is used with the Turbo-Air Special engine. The clutch facing is made of a woven type asbestos composition material which increases the clutch holding power 25 percent.

Corvair Service

COMPLETE ADJUSTMENT PROCEDURE FOR CORVAIR CARBURETORS

To insure proper operation of the Corvair engine, it is very important that the carburetors be properly synchronized and adjusted. Conditions such as surging, stalling, rough idle and overall engine operation will be improved by following the step by step procedure listed below. This procedure supersedes the information presented in the Corvair Shop Manual and should be performed only after the Carburetor Heat Control and Thermostat Unit, Part No. 3781235, has been installed. The engine should be in good running condition.

CAUTION: *When making the following adjustments, accelerate engine by moving accelerator rod only. Do not open the throttle valves by grasping other portions of the linkage as this may upset the relationship of the component parts of the linkage.*

Synchronizing Carburetors

1. Remove air cleaner and hoses as an assembly.
2. Connect tachometer and timing light.
3. Start engine and normalize with transmission control in Neutral.
4. Disconnect vacuum spark advance hose from right carburetor and remove spark advance plastic cover from left carburetor.
5. Rotate fast idle cam to produce 1200 engine RPM.
6. Connect vacuum gauge with 5/32" I.D. hose to right carburetor and note vacuum reading.
7. Connect vacuum gauge to left carburetor and note vacuum reading. If vacuum reading at each carburetor is not equal, disconnect cross shaft from left carburetor rod at the swivel. Adjust swivel up or down as necessary to obtain equal vacuum readings within 1".

   NOTE: *Adjusting swivel upward will increase left carburetor vacuum; lowering swivel decreases left carburetor vacuum.*
8. Replace spark hose on right carburetor and plastic cover on left carburetor.

Choke Unloading

9. Adjust swivel on fast idle link to obtain 1/4" clearance between the top of the choke valve and upper wall of air horn with wide open throttle (Thru detent on automatic transmission models).

Fast Idle Speed

10. Rotate fast idle cam counter-clockwise to the high position and adjust fast idle screw to obtain 2200 engine RPM.

    NOTE: *If unable to obtain adequate fast idle, adjust swivel toward the end on fast idle link, until specified fast idle is reached.*

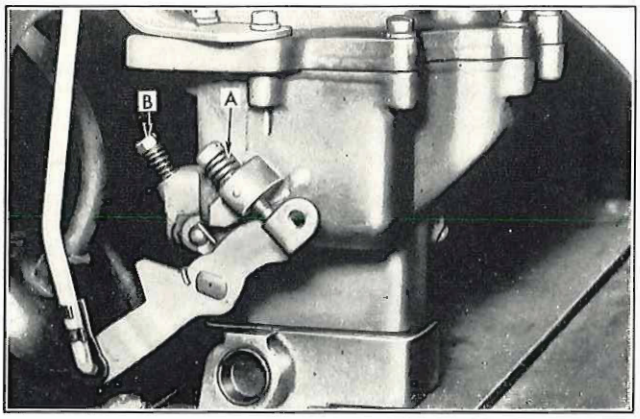

Fig. 3—Idle Mixture (B) and Idle Speed (A) Adjusting Screws

Slow Idle Adjustment

11. With the engine turned off and the choke in the full "off" position, back off both idle speed adjusting screws (A) until they clear the throttle shaft lever on each carburetor (fig. 3).
12. First adjust the right carburetor idle screw until it *just touches* the throttle shaft lever; then continue to turn the screw in an additional 1/2 turn. Repeat this procedure on the left carburetor.

Idle Mixture Adjustment

13. Connect vacuum gauge to engine as follows:
    a. Vehicles equipped with automatic transmissions, remove modulator line at "Tee" fitting, then attach vacuum gauge hose (fig. 4).

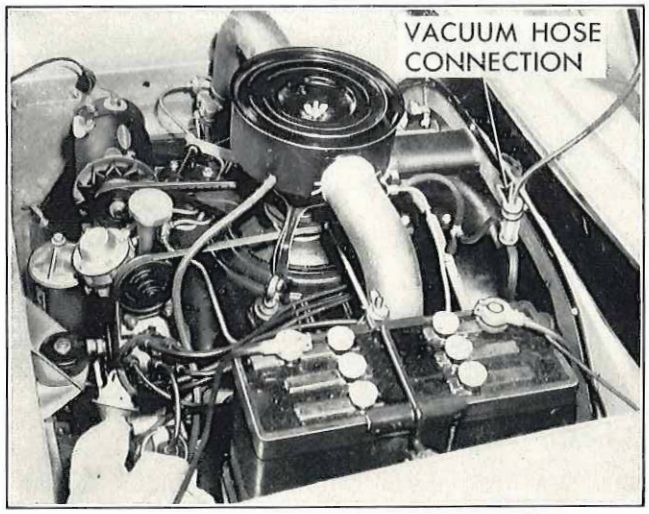

Fig. 4—Vacuum Hose Connection—Powerglide

    b. Vehicles equipped with 3-speed transmissions install an adapter "Tee" connector and short piece of hose into the choke vacuum hose line, then attach vacuum gauge to the "Tee".
14. Turn the idle mixture screws (B) on both carburetors in until they are lightly seated, then back off each screw 1 1/2 turns (fig. 3).
15. Adjust idle mixture screws to obtain peak vacuum and RPM readings on each carburetor.
16. Adjust both idle speed screws in equal amounts to obtain the idle speeds specified below:
    a. Powerglide—500 RPM—Drive Range
    b. Standard Transmission—500 RPM—Neutral.
17. Remove vacuum gauge and re-connect choke heat tube or transmission modulator tube.
18. Re-install air cleaner and hose assembly.

Adjust Ignition Timing

19. When setting the ignition timing, check the color of the oiler. Set distributors with cadmium or bright colored oilers to 4° BTDC. Distributors with the

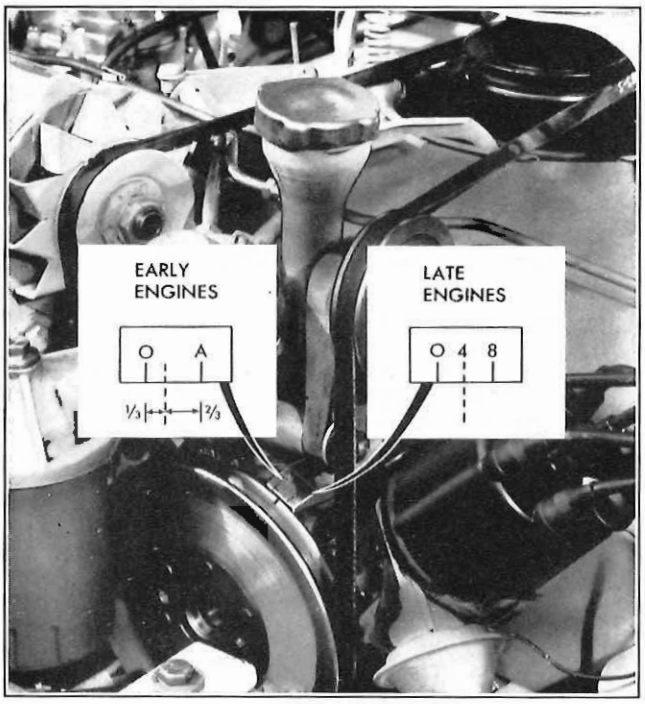

Fig. 5—Ignition Timing Marks

oiler painted black or copper should have the ignition timing set to 16° BTDC.

If setting the spark advance to 16° BTDC causes pre-ignition or detonation, reset the spark advance to 14° BTDC.

Choke Adjustment

20. With the choke in the full "Off" position, set choke pointer to the index mark scribed on the choke housing. Choke modifier lever must be in the position shown in (fig. 6).

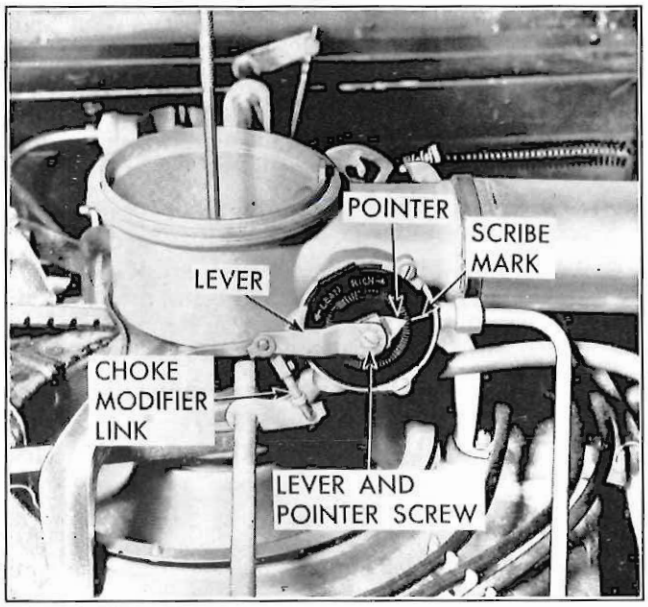

Fig. 6—Automatic Choke Adjustment

NOTE: *If, under certain climatic conditions, a lean condition is noted on acceleration after a cold start, the choke can be set 3 to 4 notches rich (clockwise from scribe mark).*

REAR BRAKE ANCHOR PIN TORQUE

The torque specification for the rear brake anchor pins on the Corvair has been increased from 60-85 ft. lbs. to 100-126 ft. lbs. The front brake anchor pin torque remains the same at 60-85 ft. lbs.

SEALING FLYWHEEL BOLTS

Proper sealing of Corvair flywheel to crankshaft gear bolts is necessary to prevent engine oil from leaking past the flywheel mounting bolts. This condition can exist on either standard or Powerglide transmission models. To correct this condition, apply G. M. "Perfect Seal" Sealing Compound or equivalent to the flywheel mounting bolts before installing bolts into the crankshaft gear.

DRIVE PINION BEARING PRELOADING PROCEDURE

A revised procedure for preloading the drive pinion bearings has been developed and supersedes information in Step 4, page 6C-20 of the 1960 Corvair Shop Manual. The procedure for adjusting the differential side bearings remains the same.

1. Adjust differential side bearings according to Steps 1, 2 and 3, page 6C-20, Corvair Shop Manual.
4. Tighten pinion bearing adjusting sleeve with tool No. J-972 (fig. 7) to just remove pinion bearing end play, then back off the adjusting sleeve ¼ turn.
5. Measure the turning torque at the drive pinion using J-8362 adapter and inch-pound torque wrench J-5853 (fig. 8).

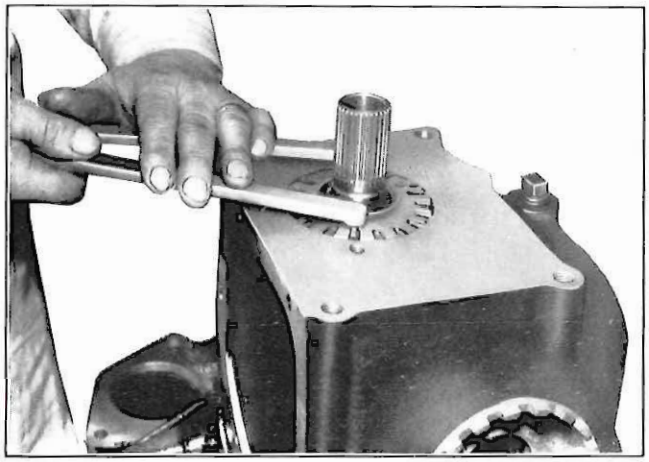

Fig. 7—Tightening Pinion Bearing Adjusting Sleeve with J-972

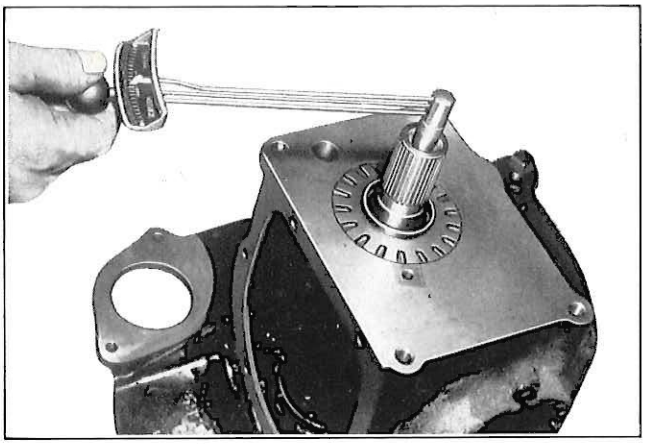

Fig. 8—Measuring Pinion Turning Torque Using J-8362 Adapter and Torque Wrench J-5853

NOTE: *The turning torque measured in this step is the preload on the differential side bearings.*

6. Tighten the drive pinion adjusting sleeve to obtain an additional 9-11 inch-lbs. pinion turning torque for new bearings or 4-6 inch-lbs. for used bearings.

NOTE: *For example, if the drive pinion turning torque, before the drive pinion bearings are preloaded, is 5 inch-lbs., the turning torque after the drive pinion bearings have been preloaded should be 14-16 inch-lbs. for new bearings and 9-11 inch-lbs. for used bearings. The following chart shows that the final drive pinion torque is the total of the preload on the differential side bearings plus the drive pinion bearings.*

TURNING TORQUE CHART

Differential Bearings	+	Drive Pinion Bearings	=	Total Drive Pinion Turning Torque
New Bearings 5 in. lbs.	+	9-11 in. lbs.	=	14-16 in. lbs. (For example)
Used Bearings 5 in. lbs.	+	4-6 in. lbs.	=	9-11 in. lbs. (For example)

7. Continue with steps 5 and 6 in the 1960 Corvair Shop Manual, which should be renumbered 7 and 8.

MINIMUM THROTTLE UPSHIFT POINT

The specified minimum throttle upshift point, with the throttle linkage properly adjusted for the Corvair Powerglide is 11 MPH. The Powerglide will shift at this speed if the operator removes his foot from the accelerator pedal at this speed. If the operator continues to lightly depress the accelerator pedal during a light throttle upshift, the transmission will normally shift at about 16 MPH.

IGNITION DISTRIBUTOR CHANGES

Recent changes have been made in the construction and application of the Corvair distributor identification marks, centrifugal advance, vacuum advance, and ignition timing specifications. The new centrifugal advance and ignition timing specification of 16° BTDC for the Powerglide and High Performance units give a better start up and break away feel during the first mile of driving after the choke comes off.

The following chart lists the distributors, identification marks, centrifugal, vacuum advance and ignition timing specifications:

CORVAIR-IGNITION DISTRIBUTOR IDENTIFICATION & SPECIFICATION CHART

Power Team	Distributor Part No.	Oiler Color Identification	Centrifugal Advance (RPM)	Vacuum Advance (Hg)	Degrees Dwell	Ignition Timing	Mounting Flange
Early Production (all)	1110252	Cadmium	0° at 400 32° at 3600	0° at 6″ 23° at 15.2″	33°	(Refer to Fig. 5)	2 Pads
Late Production Synchromesh	1110258	Zinc	0° at 400 32° at 3600	0° at 6″ 23° at 15.2″	33°	4° BTDC	Full Diameter
Intermediate Production RPO-360 Auto. Trans.	1110256	Black	0° at 1700 20° at 3600	0° at 7″ 23° at 16″	33°	16° BTDC	2 Pads
Late Production RPO-360 Auto. Trans.	1110259	Black	0° at 1700 20° at 3600	0° at 7″ 23° at 16″	33°	16° BTDC	Full Diameter
Early Production RPO-649 High Performance Engine	1110257	Copper	0° at 700 6.5° at 1200 24° at 4800	0° at 8″ 15° at 15.5″	33°	16° BTDC	2 Pads
Late Production RPO-649 High Performance Eng.	1110260	Copper	0° at 700 6.5° at 1200 24° at 4800	0° at 8″ 15° at 15.5″	33°	16° BTDC	Full Diameter

NOTE: *Advance specifications given in engine rpm and engine degrees.*

The ignition timing setting for late production Powerglide transmission models and high performance models is 16° BTDC. This means the spark advance at idle is 16°. For Powerglide models at 1700 RPM, the centrifugal advance mechanism rotates the breaker cam in the direction of rotation, causing the amount of spark advance to increase. At 3600 rpm the centrifugal advance is 20° which gives a total spark advance of 36°. Fig. 9 illustrates the total degrees of spark advance for the initial ignition timing and the centrifugal advance for all models except the Turbo-Air Special.

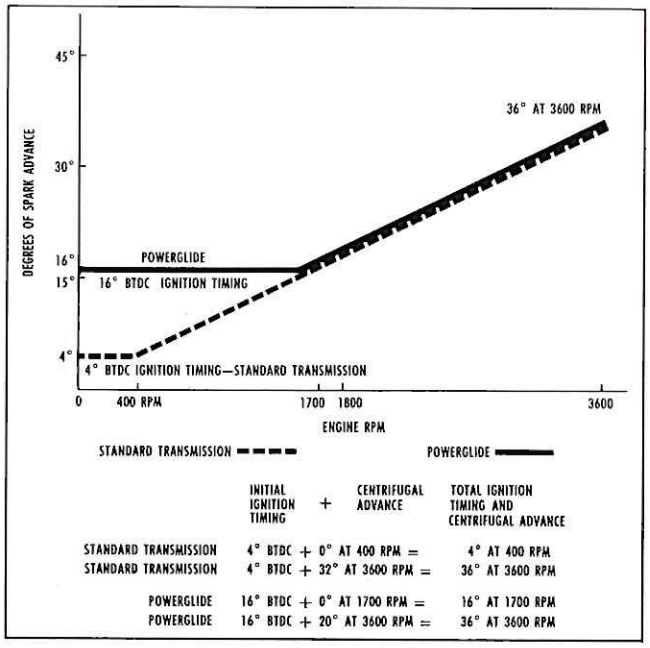

Fig. 9—Ignition Timing and Centrifugal Advance Curve

A modification package is available for early production Powerglide models to change the ignition timing setting from 4° BTDC to 16° BTDC. After the distributor has been modified, the oiler cap should be painted black. A timing tab should be installed to serve as a guide for setting the ignition timing at 16° BTDC.

When setting the ignition timing, check the color of the oiler. Set distributors with cadmium or zinc colored oilers to 4° BTDC. Distributors with the oiler painted black or copper should have the ignition timing set to 16° BTDC.

If setting the spark advance to 16° BTDC causes pre-ignition or detonation, reset the spark advance to 14° BTDC.

Passenger Car Service

2nd EDITION PASSENGER CAR SHOP MANUAL

The 2nd edition of the 1959-60 Passenger Car Shop Manual Supplement has been distributed and, in most cases, can be identified by "2nd Edition" being printed at the bottom of the title page.

However, not all "2nd Edition" manuals are so indicated. To determine if you have a "2nd Edition" manual refer to page 7-4. On page 7-4 refer to the 1959-60 Tune-up Specifications Chart, "Ignition Timing" column. The "2nd Edition" manual reads 4° See Note 1 for the Turbo-Fire 283 V-8, Super Turbo-Fire 283 V-8 and Ramjet Fuel Injection V-8. The "1st Edition" manual does not state 4° at each of these reference points.

TURN SIGNAL CONTROL UNIT SERVICE PROCEDURE

Cases have been reported stating that the turn signal fails to automatically cancel when the operator turns the steering wheel to a straight ahead position. It is seldom necessary to remove the control housing from the steering column mast packet. Only obvious defects such as stripped threads in pivot screw hole, or a bent or cracked casting make it necessary to remove the control housing.

The following step by step procedure is organized for your convenience with the most frequent and easily serviced problems covered first.

1. Remove the steering wheel and check the cancelling cam tangs attached to the bottom side of the steering wheel. They should be at right angles to the mounting surface. If not, bend accordingly (fig. 10).

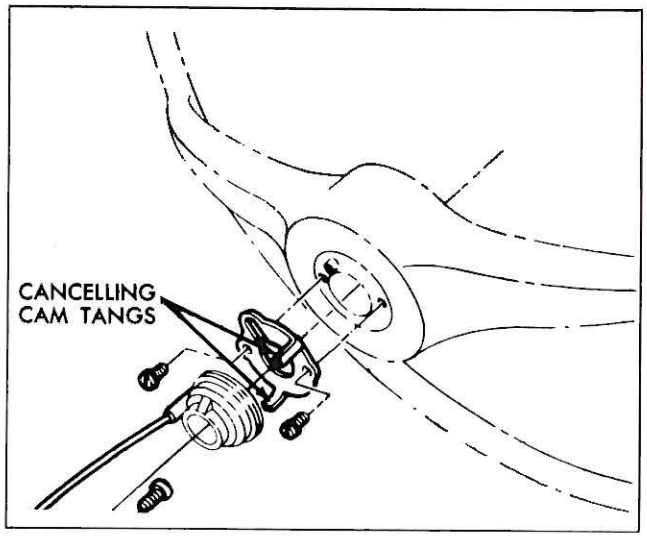

Fig. 10—Cancelling Cam Tangs

2. Check pivot screw for proper tightness.
3. Temporarily place the steering wheel on the steering shaft, position the turn signal in each of the turn positions, turning the steering wheel to check cancelling action in both positions. If unit still fails to cancel, proceed to step 4.
4. With the steering wheel removed, check for free movement of the electrical switch control cable by

moving the bell crank up and down. Also check for a damaged or kinked flexible tube.

5. If the control cable is binding, remove screws holding switch on steering post and screw holding flexible tube clamp at the top of the mast jacket.

6. Pull cable and tube assembly up and reform clamp according to (fig. 11).

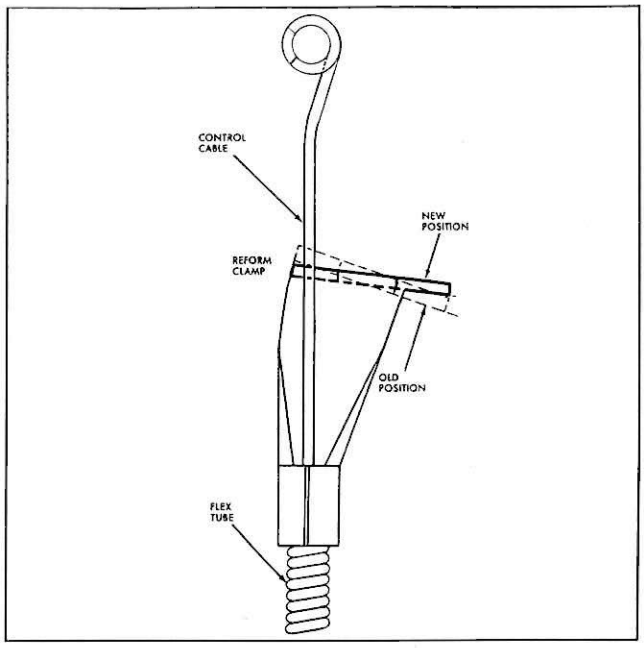

Fig. 11—Reforming Control Cable Support

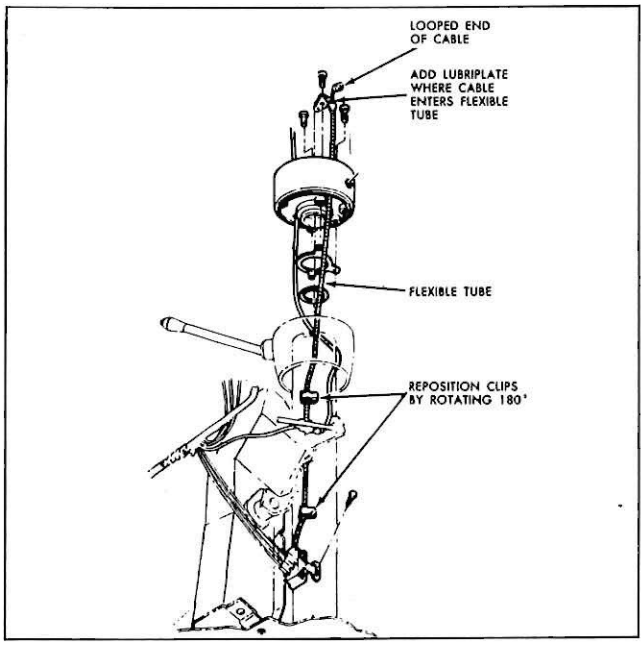

Fig. 12—Repositioning Clips 180°

NOTE: *Reforming the cable tube support provides more clearance for the free entry of the cable into the tube.*

7. Add Lubriplate or equivalent to cable at point of entry into tube.

8. Remove and discard retainer holding looped end of cable onto the crank rod.

9. Remove two (2) clips holding cable on steering post, rotate clips 180°, then reinstall the clamps (fig. 12).

10. Disconnect the control cable from the switch (fig. 13).

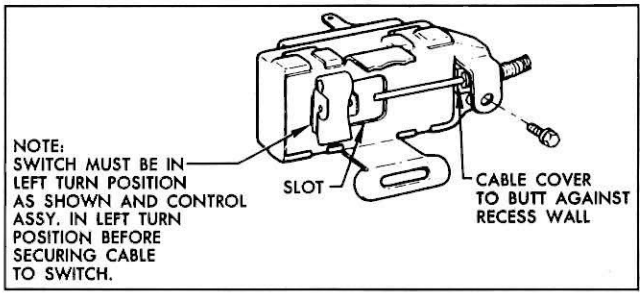

Fig. 13—Disconnect Control Cable from Switch

11. Check for excessive drag or bind by moving the switch lever to both the right and left turn positions. If the switch is defective, replace the switch.

12. Install parts in the reverse sequence as they were removed. If the turn signal still fails to cancel, proceed to step 13.

13. Move cancelling lever to the right turn position.

14. Move the flexible control cable loop off the end of the bell crank (fig. 14).

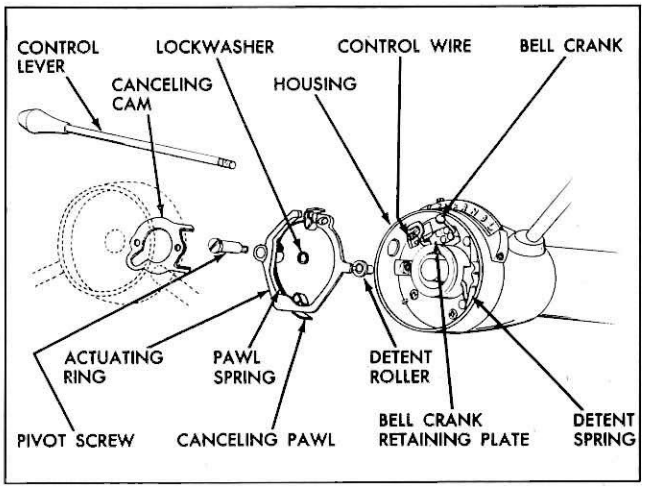

Fig. 14—Exploded View Turn Signal Parts

15. Remove cancelling ring assembly and check the following turn signal control components:

CONDITION	CORRECTION
a. Loose bell crank retaining plate	Stake the four pins with a punch
b. Bent or broken detent spring	Replace
c. Bent cancelling pawl	Replace
d. Broken detent roller	Replace
e. Broken detent roller pin	Replace actuating ring
f. Bent cancelling ring which does not set square in the housing	Replace the ring
g. Bent pivot screw	Replace

16. Connect control wire to the bell crank.
17. Install cancelling ring assembly.

    NOTE: *Make sure lockwasher is in place between ring and housing and that the bell crank is in the provided slot (fig. 14).*
18. Tighten pivot screw to 30-45 in. lbs. torque.
19. Install operating lever, move it to the right turn position, left turn position and then to the neutral position.

    NOTE: *This automatically aligns the electrical switch with the control assembly.*
20. Install steering wheel.

PAINTING COOL PACK COMPONENTS

When it is necessary, due to customer request, for servicemen to paint "Cool-Pack" Air Conditioning unit components to match the car interior, it is important to follow a specific procedure. Failure to follow this procedure can result in the paint remaining tacky for several days or chipping and peeling conditions can develop which result in a poor appearance of the painted areas.

The procedure is as follows:

1. Thoroughly clean the surfaces to be repainted, using lacquer thinner.
2. Sand or scuff the area to be painted.
3. Spray the entire area with a synthetic primer.

   NOTE: *Primer applied to a plastic surface usually requires twice as long to dry as primer applied to a metal surface.*
4. Apply color coat.

This procedure must be used on the plastic evaporator case, duct and side outlets. Before refinishing the case, remove six nozzle and grille assembly retaining screws, then remove the nozzle and grille assemhly. The two side outlets should be removed from the case and painted separately. The time required for painting these components is not included in the Suggested Flat Rate Schedule time for installing the unit.

Truck Service

DIFFERENTIAL SIDE GEAR MACHINING MARKS

Cases have been reported of concern on the part of servicemen with regard to machining marks on the outside diameter of the differential side gear hub, Part No. 3703724, used in 1954 Truck 2 speed axle assemblies (fig. 15). They have noticed these marks on new parts when replacing side gears, and are hesitant about using the new parts.

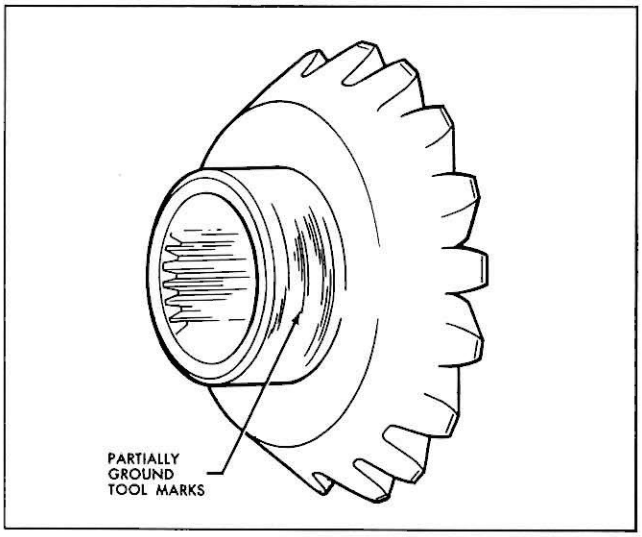

Fig. 15—Differential Side Gear Machining Marks

The diameter of the hub is not a bearing surface, but is designed to give oil clearance between the hub and the case bore diameter. Therefore, a completely smooth ground finish is not necessary.

HESITATION ON ACCELERATION 1960 348 CU. IN. TRUCK ENGINES

Cases have been reported of hesitation on part or full throttle acceleration on some 1960 348 cu. in. Truck engines. The hesitation may he caused by the inlet manifold gaskets having a restriction in the carburetor heat passage.

1960 348 Truck engines prior to number T212 had factory installed inlet manifold gaskets with a restricted carburetor heat passage. This gasket is satisfactory for 1958-59 engines, but not for 1960 348 Truck engines.

If hesitation on acceleration is experienced on 1960 348 Truck engines before number T212, remove the inlet manifold gaskets with the restricted carburetor heat passage and install inlet manifold gaskets with the unrestricted carburetor heat passage included in Manifold Gasket Kit, Part No. 3750620.