

# SERVICE Counselor

PACKARD DIVISION

OF

STUDEBAKER-PACKARD CORPORATION



# Counselor

VOL. 30, NO. 4

APRIL, 1956

## Twin Traction Safety Differential

The Packard Division of the Studebaker-Packard Corporation recently introduced a new concept in automotive driving mechanisms termed the "Twin Traction Safety Differential."

This innovation is another Packard "FIRST" in the automotive industry and is being highly acclaimed especially by those owners in areas where snow and ice are abundant during winter months.

The new differential incorporates a very desirable feature whereby rear wheel driving torque is proportionately divided to meet the requirements of each wheel under various conditions of driving.

The details of the differential unit are:

1. A two-piece case with each piece having two V-shaped ramps or cam surfaces opposite each other. See "C," figure 1.

2. Two cross pins "B" with cammed ends which ride on the case ramps.

3. Two internally splined clutch rings "D" having tapered surfaces which mate with tapered surfaces in the case halves.

4. Two internally splined differential gears. Both the differential gear and the clutch ring are splined to the axle shaft at each side.

5. Four pinions "A" carried by the cross pins and in mesh with the differential gears. The pinions incorporate a shoulder which contacts the clutch ring at "F."

In straight-ahead driving, the driving force moves the cross pins "B," figure 1, up the ramp of the cam

surfaces applying a load to the clutch rings "D" at point "F" and restricts turning of the differential through the friction clutches. This provides a torque ratio between the axle shafts which is based on the amount of friction in the differential and the amount of load that is being applied to the differential.

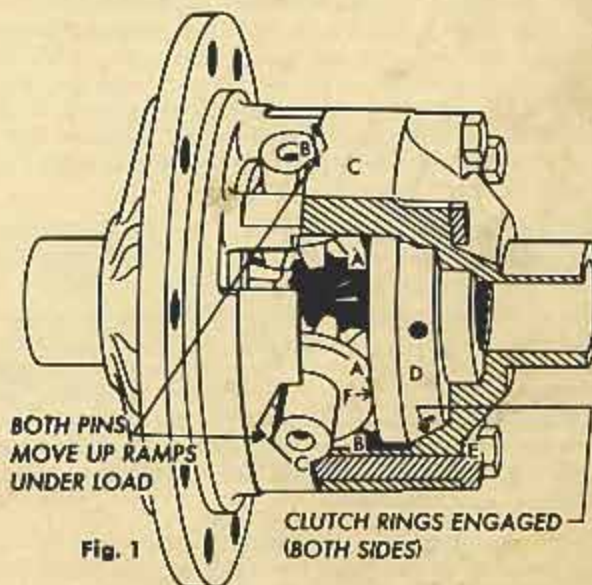


Fig. 1

When turning a corner, this process in effect is partially reversed. The differential gears become a planetary gear set with the gear on the inside of the curve becoming the fixed gear of the planetary. The outer gear of the planetary over-runs as the outside

wheel has a greater distance to travel. With the outer gear over-running and the inner gear fixed, the pinions "A," figure 2, are caused to rotate, but inasmuch as they are restricted by the fixed gear, they first must move the pinion cross pins "B" back down the cam surface relieving the thrust loads on the cone clutches. Thus, when turning a corner, the Twin-Traction differential, for all practical purposes, is similar to a conventional differential and the wheels are free to rotate at different speeds.

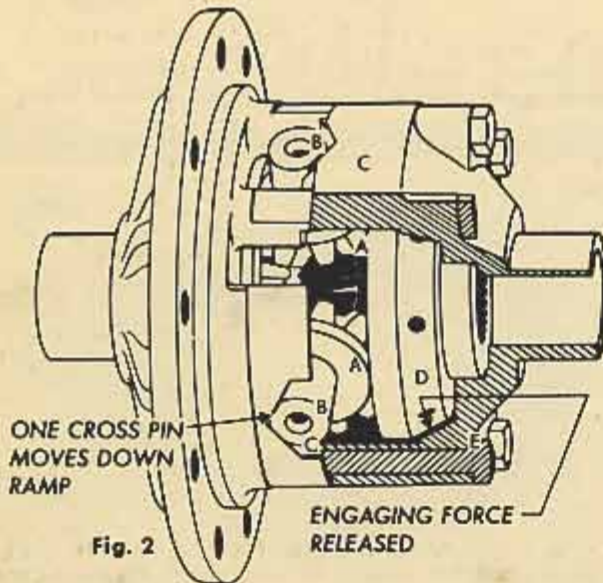


Fig. 2

When traction conditions under the rear wheels are unequal, such as one wheel being on ice and the other wheel on dry pavement the driving force in a conventional differential is limited by the wheel with the poorer traction. In this situation, planetary action is taking place and the wheel with the poorer traction spins but the car does not move. However, with the Twin-Traction differential, the friction clutches prevent this planetary action and the driving force being applied to the wheel on dry pavement is many times greater than the force being applied to the wheel on ice and the car moves normally.

Stability also is improved with the Twin-Traction differential. When a rear wheel is thrown into the air by a bump or obstruction and road contact is broken, the conventional differential spins the wheel which rapidly gains momentum. When this rapidly-spinning wheel hits the road surface, the sudden shock may cause the car to swerve and the tire to scuff. With the Twin-Traction differential, the free wheel does not spin and gain momentum. There is no sudden wheel stoppage to cause car swerve or tire scuffing and wheel hop is reduced.

The Twin-Traction differential is serviced in the same manner as the 56th Series conventional differential as described in the Service Manual with one exception. The exception is that the details which make up the differential case assembly such as the case, pinions and side gears, clutches, etc., are not available as replacement items. The differential must be replaced as an assembly; however, ring gear and pinion sets are available as replacement details.

**Important:** Twin-Traction Differential Replacement units will include two quarts of break-in lubricant. Do not attempt to break in a new unit with any fluid other than the recommended lubricant. The break-in period is considered to be 10,000 miles.

If it is necessary to add to or change the lubricant following the break-in period, a standard brand of Multi-Purpose type lubricant may be installed.

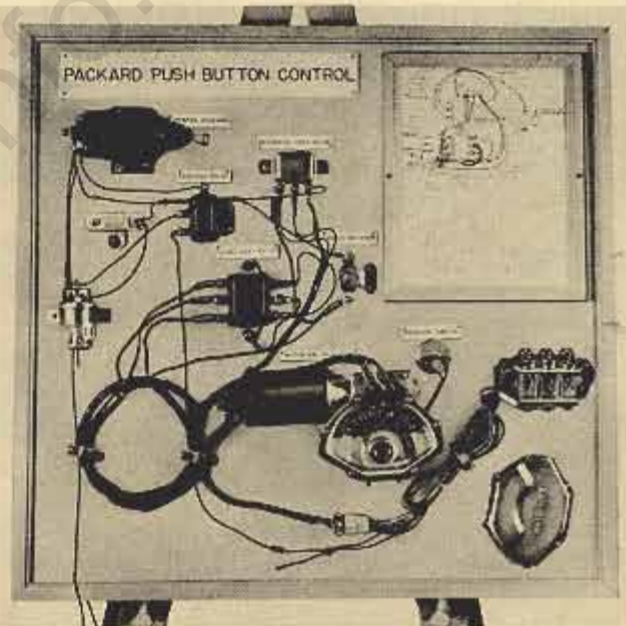
Additional information on servicing the Twin-Traction Differential is covered in Service Technical Bulletin 56T-8, Dealer 6, February 10, 1956.

## Push Button Training Aid

The Service Technical Department recently developed an excellent training aid in the form of an actual operating system of the Push Button Control.

All parts on the panel and most of the wiring are actual, it is laid out very similar to its location on the car. When connected to a battery, all units will function as it does on the car.

All the mystery is removed from the electrical system, tracing the circuits and trouble shooting is made quite simple. Most all troubles encountered on the car can be duplicated on the training aid.



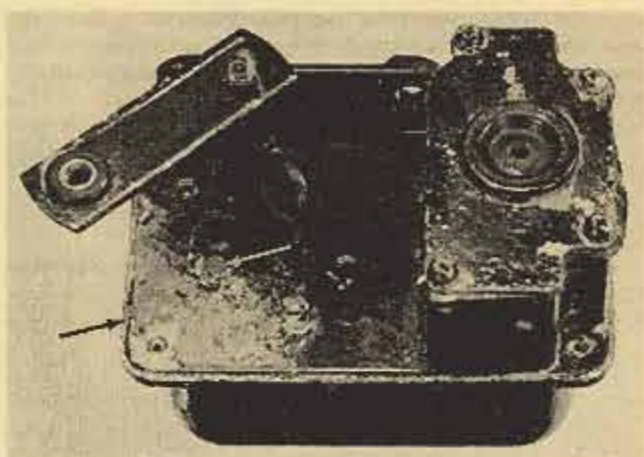
The training aids have been shipped to the Zones to furnish "on the spot" training for mechanics at Packard-Clipper Dealers.

## Torsion Level Control Switch

56th Series

A few reports have been received of an external electrical short on the torsion level control switch on 56th Series cars. This generally occurs in areas where ice, snow and salt spray conditions are encountered.

Illustrated is a typical case where rust and corrosion has accumulated on the lower side of the switch



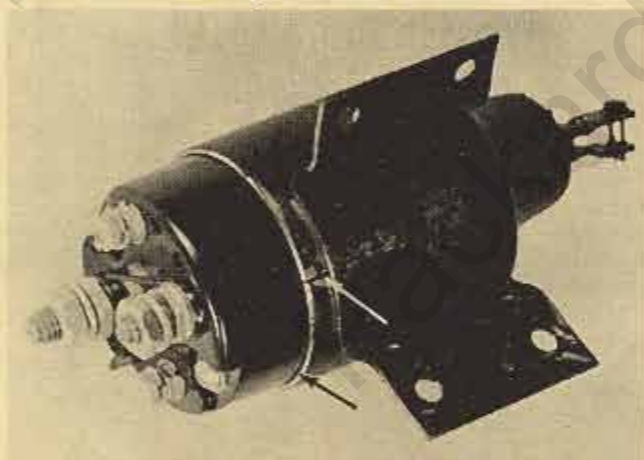
which provides an electrical path from the rivet to the switch cover, as indicated by the arrows.

In most cases the control assembly should be replaced, however in an emergency, switches may be repaired by cleaning off the rust and corrosion with a wire brush or sand paper and coating the area with a water proof sealer such as "Glyptol" varnish, SP-50045 weatherstrip cement or undercoating.

## Delco Starter Solenoids

### 56th Series

We have been informed that water is getting into a few Delco Starter Solenoids which prevents the solenoid from making contact in the switch.



The arrows on the illustration indicate the points where water can enter; at the cover gasket and the open seam on the lower side of the solenoid body.

This condition can generally be corrected by removing the solenoid cover and drying out the water, sealing the cover gasket and sealing the open seam with rubber cement or dum-dum. However, if the switch is rusted and corroded, the solenoid should be replaced.

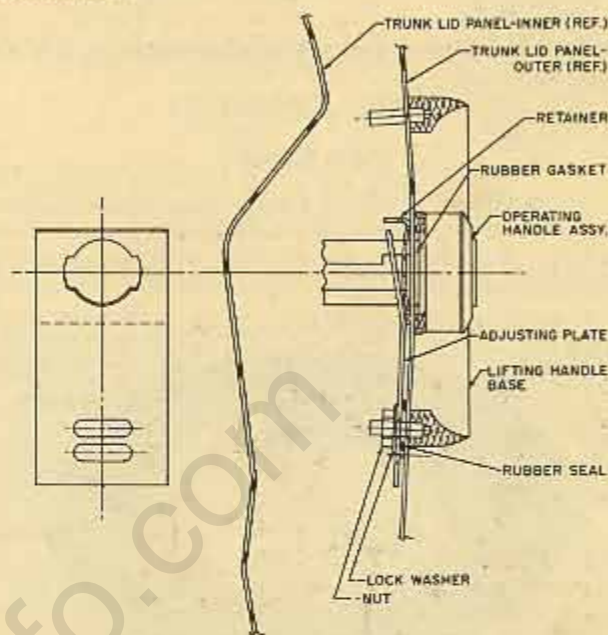
## Trunk Lock Plate

### 56th Series

Production recently added an adjusting plate to the rear side of the trunk lock. The plate prevents the

lock from turning in the trunk lid which in some instances has allowed the trunk lock to unlatch while driving.

The adjusting plate and attaching parts are available for service and are easily installed as shown in the illustration.



Adjust the plate to the right or left to center the lock in the trunk lid before tightening the adjusting plate nut.

The necessary material can be ordered as follows:

Part No. 6485245 Adjusting Plate.....	1
Part No. 444214 Rubber Seal.....	1
Part No. G-178378 Lockwasher.....	1
Part No. G-120361 Nut.....	1

## Windshield Wipers

### 56th Series

A few reports have been received of unsatisfactory windshield wiper operation at vehicle speeds above 60 M.P.H.

To correct this condition, engineering has released wiper arms with greater tension and redesigned wiper blades.

The new wiper arms can be identified by the black nylon cam follower instead of white and the new blades are curved when free from the glass instead of straight.

The new wiper arms and blades are available and may be ordered as follows:

Part No. 6485276 Windshield Wiper Arm Assembly—Right or Left

Models: 5622-42-62-47-67

Part No. 6485278 Windshield Wiper Arm Assembly—Right or Left

Models: 5682-87-97-99

Part No. 6485275 Windshield Wiper Blade

All Models

These new arms and blades may also be used on 55th Series cars.

## Horn Ring Contact Plate Retainer

56th Series

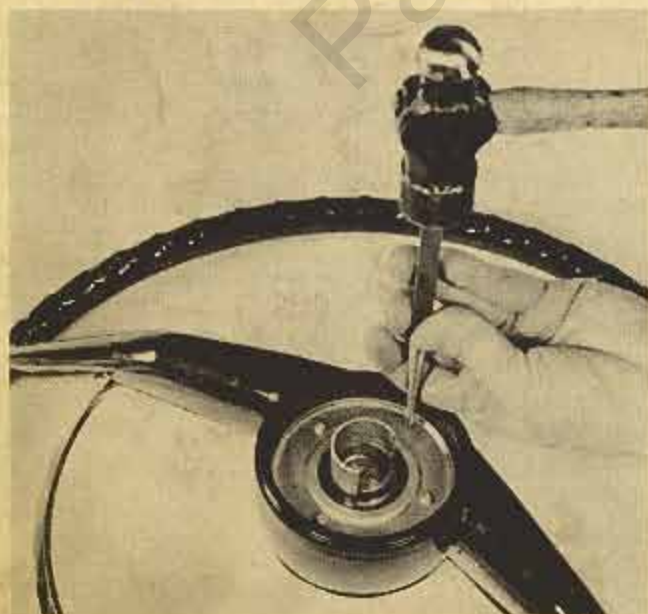
Production is now using horn ring contact plates with a locating pin to prevent the horn ring from turning, thus getting out of line with the steering wheel spokes.



The new retaining plate can be installed as follows:

1. Remove the steering wheel assembly. Remove the contact plate from the steering wheel.
2. Install the new contact plate leaving the three screws quite loose.

Align the horn ring with the wheel spokes and tap the retainer pin to mark its location in the hub of the wheel. "See illustration."



3. Remove the contact plate and drill a  $\frac{1}{4}$ " hole,  $\frac{3}{8}$ " deep in the wheel hub at the location marked. Be careful and drill the hole straight and in the exact center of the mark.
4. Reinstall the contact plate, check the horn ring operation to make sure that the pin does not bind in the wheel.

Reinstall the steering wheel lining it up properly for straight ahead position.

The new contact plate can be ordered under Part No. 6480929.

## Ultramatic High Range Clutch

High range clutch failures occur mostly in cold weather which in general is due to cold oil and abuse.

In starting the engine in neutral or park, the "H" position must be passed through to select "D, L or R" position, therefore, the high range clutch is partially applied and does not release quickly in cold oil.

If the engine is immediately speeded up in low or reverse such as might be the case on slippery pavements in cold weather, slight burning of the high range clutch plates may occur.

We recommend that engine speed be held to a minimum after cold starts, and rocking the car be done only between "L and R" especially with winter conditions and cold oil. Kick-downs at 40 M.P.H. or above should also be avoided until the transmission is warmed up.

## Windshield Moulding Upper Joint Cover

56th Series

The 56th Series Windshield Moulding Upper Joint Cover has been redesigned to prevent the stud from breaking loose from the cover. The stud is now welded to a retainer plate which in turn is attached to the joint cover.

The new joint cover carries the same part number (Part No. 469252) as the original type, however, Central Warehouse will ship only the new type for service replacement.

## Trunk Compartment Light

56th Series

Trunk compartment lights that do not turn off with the trunk lid closed can easily run the battery down in a short time.

Switch contact in the light is made by a ball rolling back and forth in the socket. The light should go out when the trunk lid is within six to ten inches of being closed.

Adjustment can be made by removing the lamp from the lid and bending the attaching bracket upward slightly toward the wire end of the socket.

Remove some of the trunk lid insulation so that the light bulb does not rest on the insulation when the light is reinstalled.