TECHNICAL ADVISORS

65-68 Mustang Restoration	Mechanical Tips	Features & Accessories	69-73 Mustang Restoration	65-66 Mustang Restoration
Fred Glazier,Jr. RT. #1 Souderton,Pa. 18964 (215)723-9674	John Vermeersch Total Performance 40631 Irvin Mt.Clemens, Mi. 48045 (313)468-FORD	Alec Karacsonyi 44 Scrub Oak Rd. North Haven, Ct. 06472 (203) 239-4382	Bill Dillard 108 Jones Ave. Calhoun, Ga. 30701	Jack Cornely 504 Green Forest Severna Park,Md. 21146 (301) 647-0628

DETROIT LOCKER

DETROIT AUTOMOTIVE LOCKING DIFFERENTIAL ASSEMBLY

The Detroit Automotive Locking Differential is now available for the 1970 Mustang, Fairlane, Torino, Cougar and Montego equipped with a 4.30:1 axle ratio.

THE NON-SLIP DIFFERENTIAL

The conventional differential operates on the principle that one rear axle is driven by a ring and pinion gear and the other axle is freewheeling. If the driven axle leaves the road or encounters a patch of ice, forward movement of the car ceases.

The Detroit Automotive Locking Differential drives *both* rear axles. If one wheel slips or leaves the ground the other wheel maintains the forward power. When the vehicle makes a turn the outboard wheel travels faster and that axle disengages from the driving unit and runs free until both wheels are again running at the same speed. The design of the Detroit Automotive Locking Differential makes it impossible for either rear wheel to travel slower than the ring gear speed.

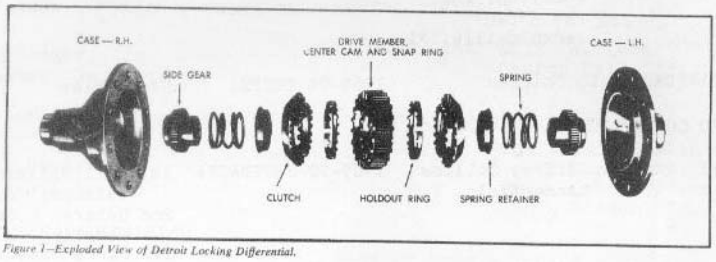

Figure 1—Exploded View of Detroit Locking Differential.

HOW THE DETROIT AUTOMOTIVE LOCKING DIFFERENTIAL WORKS

When a vehicle is being driven in a straightforward direction the clutch teeth, on both sides of the center drive member assembly, are fully engaged with the clutch teeth on each driven clutch member. Also, the fixed cams of the driven clutch member and the rotatable "hold-out" ring are fully meshed with the cam surfaces of the floating center cam member on the inside diameter of the center drive member.

Positive engagement of the driving and driven clutch members is assured by the pressure of the two springs which force the driven clutch members inwardly against the center drive member and also by the positive locking action developed by the mating undercuts on the driving faces of the clutch teeth.

In this condition both clutches remain fully engaged so that the assembly operates as a solid unit and each rear wheel is driven forward at ring gear speed.

When a vehicle is driven rearward, the center drive member shifts the driving force to the opposite set of driving faces on the mating clutch teeth. The assembly operates as a unit and the wheels are forced to rotate at ring gear speed.

When a vehicle makes a left-hand turn the right rear wheel must travel faster than the left rear wheel. The cams of the center cam located in the drive member are held to the rear of the driving clutch teeth (Figure 2). The right-hand driven clutch member must rotate faster to make the turn. The cams in the center drive member serve as ramps upon which the mating cams on the right-hand driven clutch member can rise enabling that driven clutch member to disengage from the center drive member. The center cam ramps are high enough to permit the clutch teeth on the driven clutch member to clear the teeth on the center drive member. The holdout ring keeps the center cam lifts and the driven clutch lifts from reengaging until the right wheel and the ring gear are running at the same speed. As the vehicle completes the turn and is again driven in a straightforward direction the right wheel slows to the same speed as the ring gear and the center drive member and the right driven clutch member reengage. A right-hand turn is accomplished in the same manner, the left side releasing and over-running ring gear speed.

CONT'D. ON PG. 35

CONT'D. FROM PG. 15

NON-SLIP FEATURE

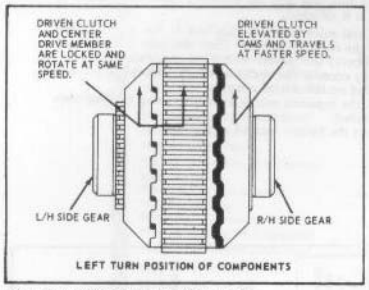

Figure 2–Left Turn Position of Components.

DISASSEMBLY OF THE DETROIT AUTOMOTIVE LOCKING DIFFERENTIAL AND CASE

The procedure for the removal of differential case, bearings and ring gear is the same for all Ford axles as outlined in the appropriate shop manuals.

1. After the ring gear and the differential bearings are removed, place the differential case assembly (cover down) in a press and apply pressure to contain the preload springs between the differential case and cover. Remove the three screws retaining the case halves.
2. Release the press ram and remove the differential case cover.
3. Remove the side gear, spring, spring retainer, holdout ring and driven clutch assembly, center drive member, driven clutch assembly, spring retainer, spring and side gear.

ASSEMBLY OF THE DETROIT AUTOMOTIVE LOCKING DIFFERENTIAL AND CASE

1. Place tool in vise (similar to Ford Tool Number T66L-4204-A2), and insert the right-hand case over the tool.
2. Install the side gear in position (polished surface toward case). Place the preload spring and spring retainer on the side gear. Position the holdout ring and driven clutch asasembly over the spring retainer. Place the center drive member over the driven clutch assembly (be sure the key or slot in the center cam of the drive member is placed between the opening of the holdout ring). Place the driven clutch assembly over the center drive member (again, be sure the opening in the holdout ring is between the key or slot of the center drive member).
3. Place the spring retainer, spring and side gear in position.
4. Place the cover in position, matching the cover to case retaining screw holes. With hand pressure force the cover down, rotating left and right until the splines index properly and both cover and case halves are mated. When both halves are completely together, retain this pressure by holding with both hands.
5. Remove the differential case assembly from tool, turn it over so the differential case assembly rests on the cover side (still retaining hand pressures).
6. Install the three case-to-cover screws and tighten.

BENCH CHECK

Prior to installation into the vehicle, a bench check should be performed to assure proper operation.

1. Install the differential case assembly in a vise so it is held stationary.
2. Insert axle shafts in both R/H and L/H gear splines.
3. With an assistant, rotate both axle shafts in the same direction (normally, both axle shafts will be stopped after rotating only a few inches).
4. Hold the left-hand axle shaft firmly against the stop, and rotate the right-hand axle in the opposite direction; a faint clicking or indexing noise may be heard. By holding the left-hand axle shaft firmly against the stop, the right-hand axle shaft will disengage freely, which simulates an overriding wheel during a turn.
5. Now rotate both axle shafts in the opposite direction as far as possible. Both axle shafts will be stopped after rotating only a few inches.
6. Firmly hold the left-hand axle shaft against the stop. Rotate the right-hand axle shaft in the opposite direction; again, a faint clicking or indexing noise may be heard.
7. Repeat steps 3 through 6 starting with the right-hand axle shaft.

IN-VEHICLE TEST FOR PROPER INSTALLATION AND OPERATION

1. Raise rear axle so that wheels are free to turn.
2. Place transmission in gear.
3. With an assistant on the other side, start test by rotating both wheels in a forward direction as far as possible. Normally, both wheels will be stopped after rotating only a few inches.
4. With one person firmly holding the left wheel forward (against the stop), rotate the right wheel rearward; a faint clicking or indexing noise may be heard. The left wheel must be held firmly against the stop or the right wheel will not disengage freely.
5. Now rotate both wheels rearward as far as possible. Again, both wheels will be stopped after rotating only a few inches.
6. With an assistant on the other side, firmly holding the left wheel in the rearward position, against the stop, rotate the right wheel forward again. Listen for a faint clicking or indexing sound. Again, the left wheel must be held firmly against the stop or the right wheel will not disengage freely.
7. Repeat steps 3 through 6, starting with the left wheel.

OPERATING CHARACTERISTICS OF THE DETROIT AUTOMOTIVE LOCKING DIFFERENTIAL

1. A pull may be experienced during acceleration if tire pressures are unequal, and/or different size tires are installed on the rear.
2. During heavy to full throttle acceleration the rear end tends to yaw slightly and may or may not require corrective steering, depending on road conditions.
3. During turning maneuvers, a clicking or ratcheting noise will be heard due to the outside wheel turning faster than the inside wheel. This clicking or ratcheting is caused by the driven clutch assembly overrunning the drive member, which is turning at ring gear speed. The frequency of the clicking or ratcheting will vary depending on the radius of the turn and vehicle speed.
4. When traveling at cruise speeds, moderate acceleration may make the vehicle veer to the right; upon deceleration, the vehicle will then veer to the left. This condition may be more pronounced on crowned roads.