POWERGLIDE TRANSMISSION

If there are any of you out there that have a Corvette that has a powerglide transmission and doesn't have some kind of oil leak, then you have one of the rarest old Corvettes in existence. The problem I wish to discuss is the problem where you may drive your Vette and then park it and once in a while it will dump one or more quarts of transmission oil over a period of say two days or more. NOW — little leaks like drips or while driving is not caused by what I am going to discuss. I'm going to try and put this in simple laymen terms. First, 1953 to 1954 Corvette six cylinders use 8 quarts w/o transmission cooler (car 6 cylinders uses 10 quarts — it has a transmission cooler. 1955 Corvette 6 cylinders uses 10 quarts. 1955 to 1961 8 cylinders uses 10 quarts.

Now the thing to remember first is that of the 10 quarts, 8 are held in the torque converter, and if you drain the main case at the back you only drain 2 quarts. Their is also a drain plug in the torque converter, see Fig. 18, but then there are those that don't have them. NOTE — a car torque converter will have 18 bolts around its edge holding it together. CORVETTE will have 33 bolts around its edge (figure 3). This is a simple way to tell a car from a Vette if you were looking at a complete unit or just a converter only. Also in Volume 3, Number 1, page 16, I showed a drawing of the converter drive lugs which is reprinted here to show you how to tell the difference between years (converter only), you can also read the date codes on the main case, front and center. OK, back to the article! What holds the remaining 8 quarts in the converter is the key to the problem. Figure 40 photo taken from a parts book, it shows installing TWO oil rings on to the valve body hub, and between these rings a hole is present where oil from the converter under pressure forces the clutch piston to compress the clutchs and move the Vette forward. This is the thing to remember, the two cast iron rings act like the rings on a piston and the clutch drum case acts like the piston hole in an engine block. With the drum turning as you drive, the area where the rings ride wear a groove in the case causing the rings to loosen there tight fit, and if the thrust washers wear, this will also cause the inner assembly to move forward or backward inside the main case (thrust washer wear can cause the hard jerk or bang in the shifting from low to drive) this can also increase the leak. My own 1955 does just what were talking about and the only way to correct it is to R&R the transmission, replace the rings which usually don't come with a gasket kit and if need be the clutch drum too. 1953 to 1955 drums are all the same, but 1956 to 1961 is a second design. Either will work in any other year. What happens is that if the rings don't seal tight, then the weight of the 8 quarts of oil push past the rings filling up the main case, which is designed to hold only two quarts and leaks or dumps oil. One thing to remember is that "most" all 6 or 8 engine cast iron transmissions will interchange with each other, inner or outer parts all years. Oh! one more thing, the "oil pick-up" where the filter is, is on the right side of the transmission, that's why a transmission will slip on right hand turns and not on left, like the carb article I wrote about flooding on hard left hand turns. Seems these darn Vettes don't like hard turning. 1962 saw the all new aluminum powerglide, and to find or determine the year: the date code was under the oil pan. Right side up front early and right side middle later. Read in this issue Gas leaking on hard right turns.

—Editor

Fig. 40 Installing oil seal rings. 1953-1961

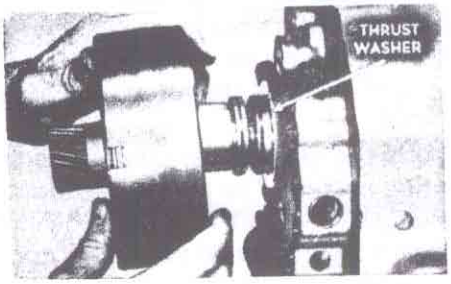
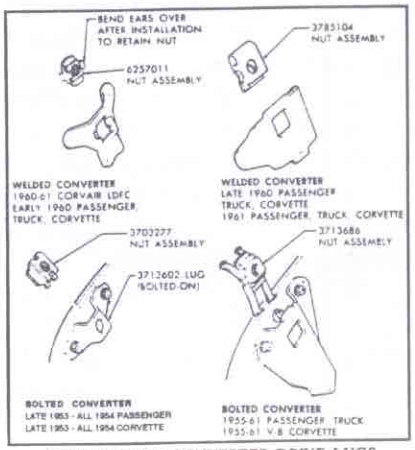


Fig. 41—Step A. Install low drum to valve body thrust washer and clutch assembly on oil delivery sleeve



POWER GLIDE CONVERTER DRIVE LUGS

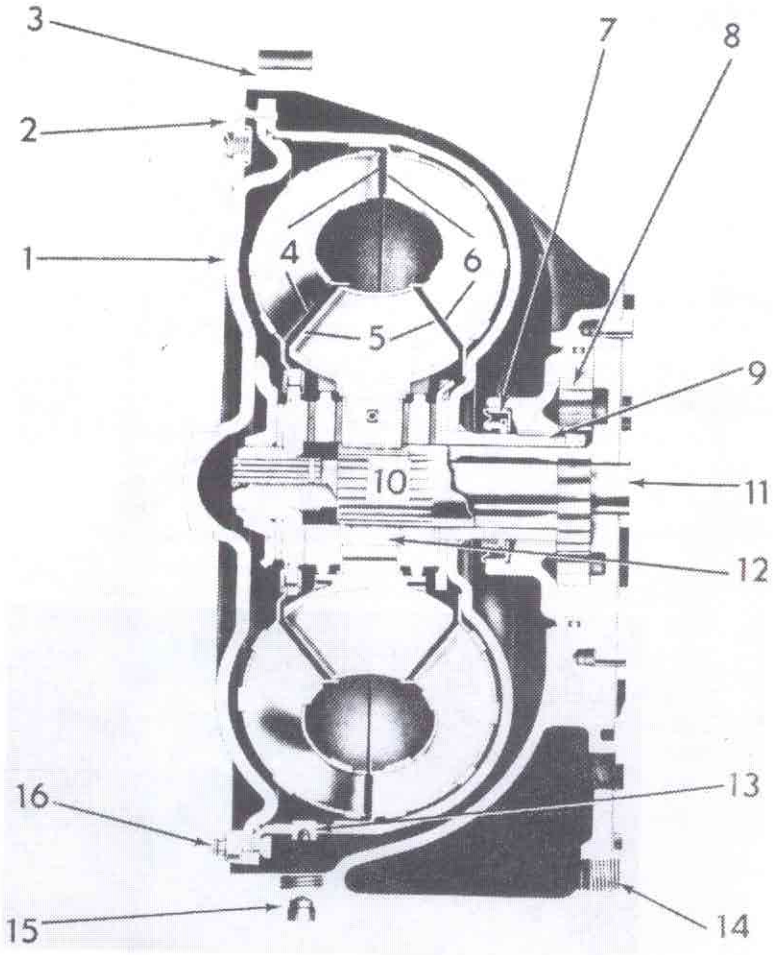


Fig. 18—Cross sectional view—torque converter—starting with 1953 production

1. Primary pump cover
2. Converter drive lug
3. Bell housing
4. Turbine assembly
5. Stator assembly
6. Primary pump assembly
7. Oil seal
8. Transmission front oil pump
9. Primary pump hub
10. Reactor shaft
11. Input shaft
12. Stator freewheel clutch assembly
13. Transmission drain plug
14. Converter drain plug
15. Plug of access hole to drain plug
16. Primary pump to cover bolt

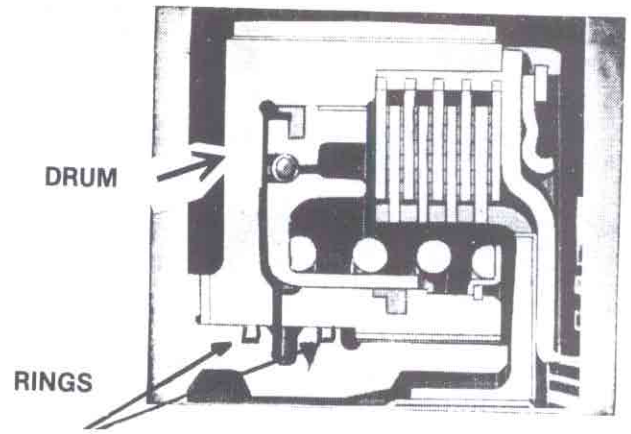
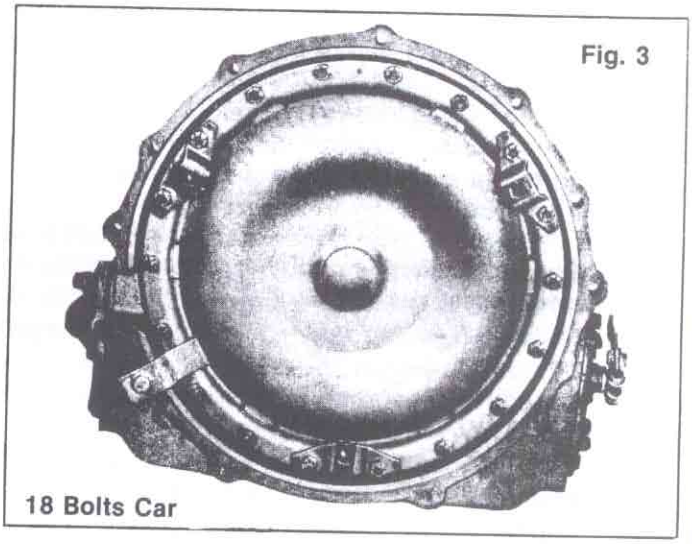
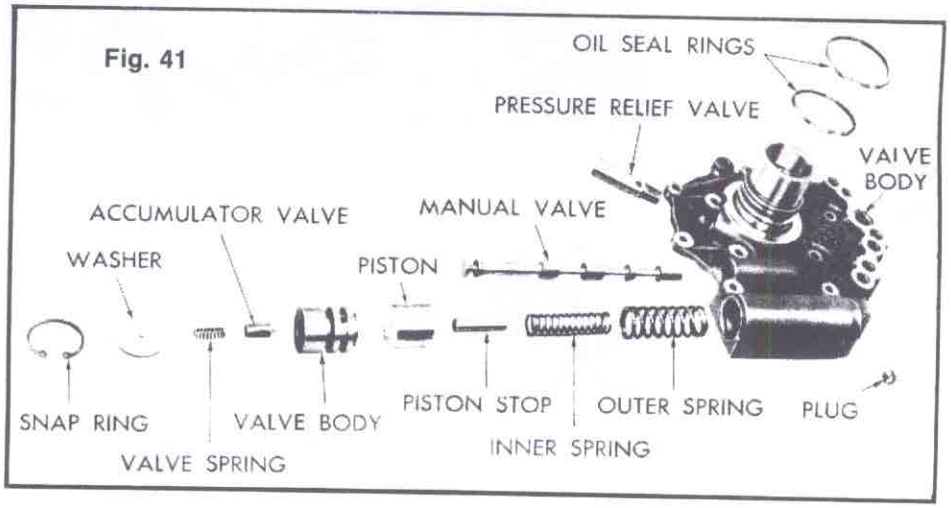


Fig. 129 — Cutaway view of clutch drum showing rings.





THEORY AND OPERATION OF THE POWERGLIDE TRANSMISSION

All models through 1961

The Powerglide transmission employs a torque converter together with a multiple disc clutch, and a planetary gear set. The torque converter provides a smooth, shockless, multiplication of engine power suitable to all normal driving requirements. The planetary gear set is used in conjunction with the multiple disc clutch to provide extra power for rough going and the necessary means for operation in reverse.

The torque converter is a fluid driven device which multiples the power output of the engine by a varying amount depending on the requirements. The maximum output of the converter is 2.2 times that of the engine. When the hand lever is in the Low position the planetary gear set adds an additional power multiplication of 1.82 resulting in a maximum overall multiplication by the transmission of 4.09-1. This is more than is normally available from a standard three speed transmission.

The fluid drive torque converter multiplies the available power of the engine by changing the direction of flow of a large volume of fluid. The fluid is started to flowing by means of the primary pump. The primary pump is the largest portion of the converter and together with its cover it forms a housing for the rest of the converter parts.

Being fastened directly to the flywheel of the engine the primary pump turns whenever the engine turns. As the primary pump turns so does the fluid with which it is filled.

The curved blades of the pump throw the fluid against the turbine. Hitting the blades of the turbine the fluid curves down and around to exit in a direction opposed to the direction from which it entered. As the fluid comes out of the turbine it strikes a double set of blades known as the secondary and primary stators. These change the direction of flow of the fluid back into the direction of rotation of the primary pump.

The result of this U-turn enforced on the fluid is a kick-back force against the turbine which tends to increase its torque output. This kick-back force is the same as that felt by a fireman directing the flow of water from a hose against the side of a building.

When the turbine is stationary the fluid passes through it and the stators and so back to the pump with almost as much energy as when it started. This energy is added to the energy being given the fluid by the primary pump and provides the high initial torque necessary to start the car moving.

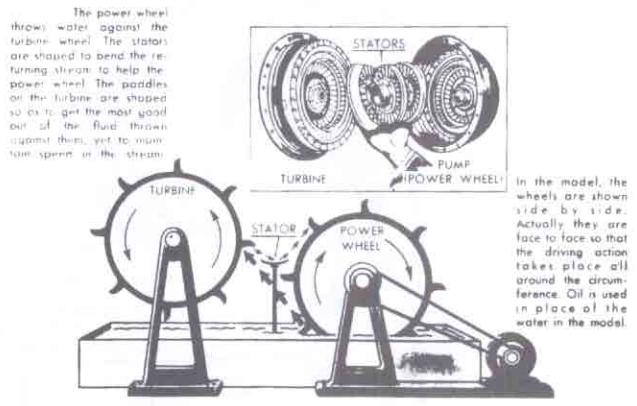
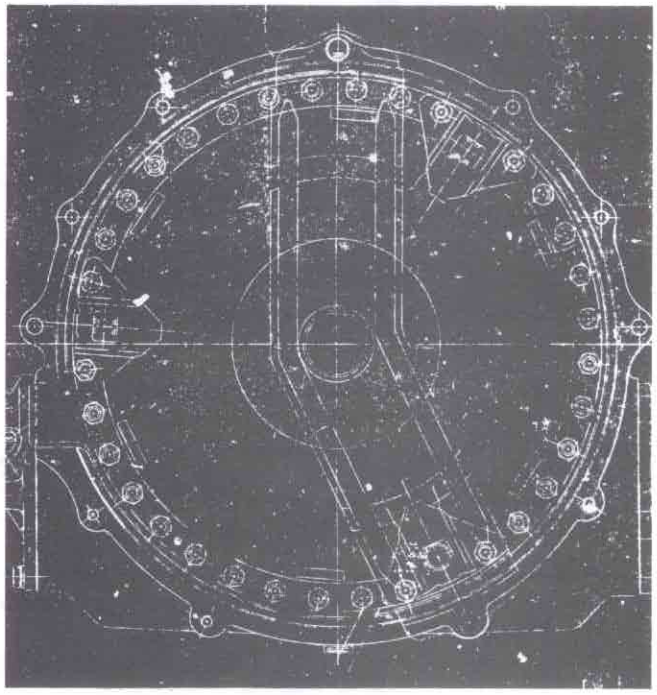


Fig. 12—Operational theory of a torque converter



33 Bolts Corvette
(A poor GM print)

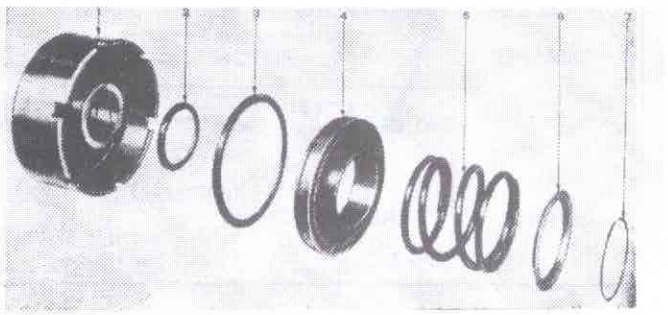


Fig. 39—Exploded view of low drum assembly all models

1. Low drum
2. Clutch piston inner seal
3. Clutch piston outer seal
4. Clutch piston
5. Clutch spring
6. Retainer (spring seat)
7. Snap retaining ring (locking snap ring)