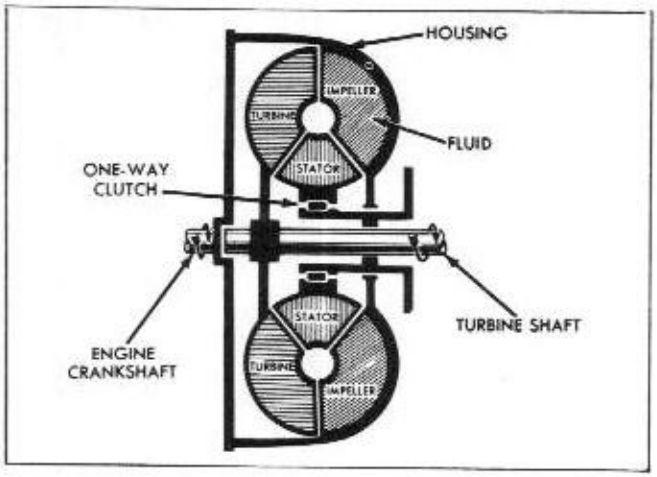
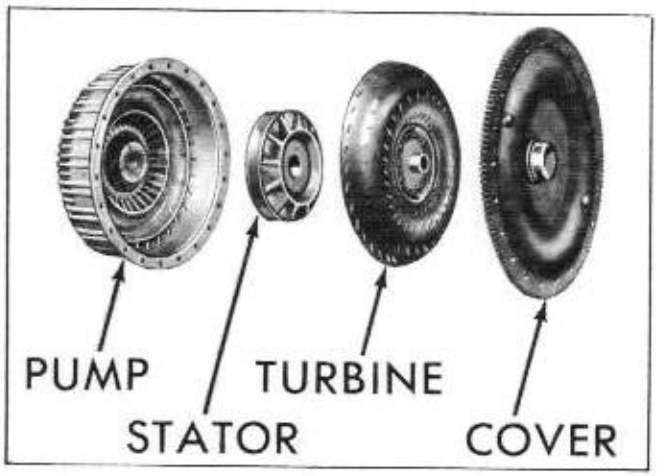
SECTION TWO—TORQUE CONVERTOR



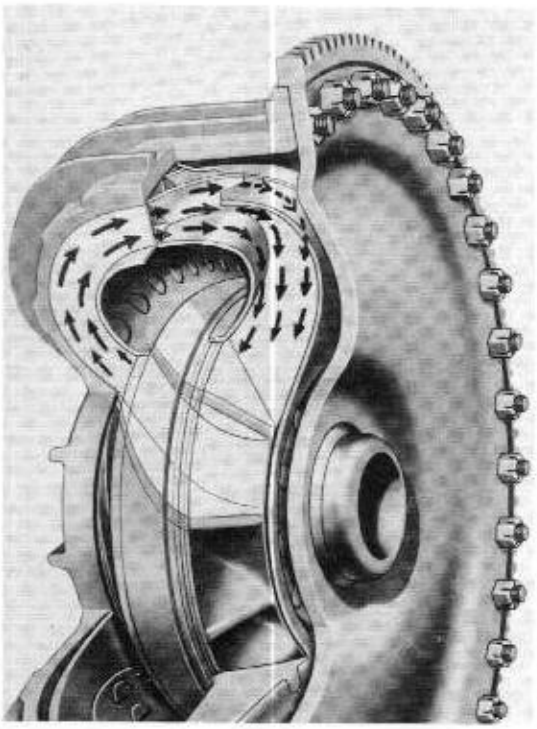
The torque converter is a fluid driven device which replaces the conventional clutch. It consists of:

(a) An impeller (or pump) driven by the engine.
(b) A turbine driven by the impeller.
(c) A stator mounted on a one-way clutch.



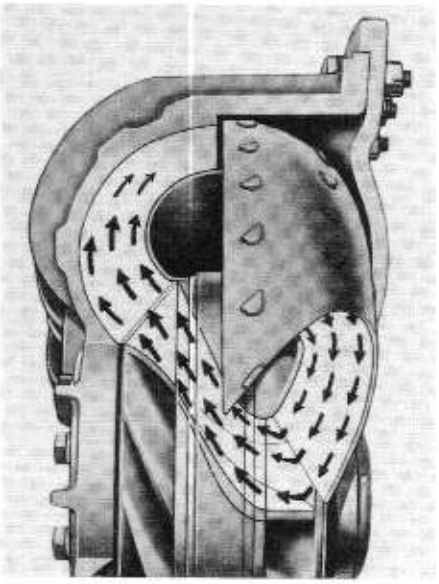
These three elements are enclosed in a housing completely filled with fluid. The impeller, or driving member, has curved blades placed inside the housing. The turbine, or driven member, has blades curved oppositely those of the impeller. The stator is attached to the transmission by a one-way clutch which allows the stator to rotate only in the same direction that the impeller rotates. The clutch locks the stator to the case, and prevents backward rotation.

A. Torque Multiplication



To understand how the torque converter multiplies torque, it is necessary to trace the flow of fluid between the impeller and turbine blades from the time the engine is started until the converter no longer increases torque.

Fluid from the impeller is hurled at high speed into the turbine blades - exerting a force on them. The fluid flows through the turbine, and is thrown from it at a high speed and in a direction opposite impeller rotation.



The fluid then enters the stator, and tries to turn the stator counter to impeller rotation - an action prevented by the one-way clutch. Since the stator cannot move, the fluid, after striking the curved stator blades, is redirected to flow from the stator in the same direction the impeller is turning.

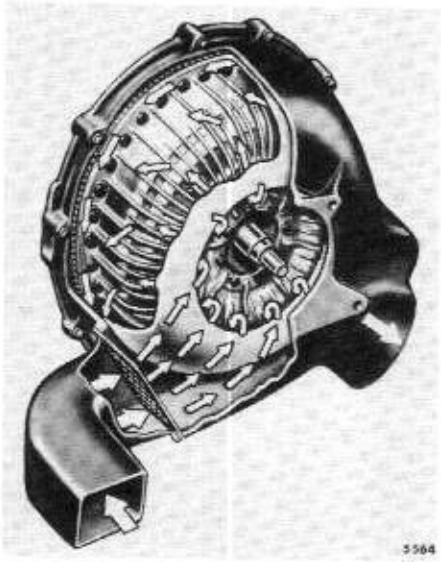
The fluid, still traveling at high speed, re-enters the impeller. The energy from the circulating fluid is added to engine power, and the fluid is hurled from the impeller to the turbine with increased velocity and energy -- thus multiplying torque.

The torque converter is designed to produce a maximum torque increase of slightly over 2 to 1 when the impeller is turning and the turbine is not. When enough torque is developed by the engine and converter, the turbine begins to rotate turning the turbine shaft. Torque increase gradually tapers off as turbine speed approaches impeller speed, and becomes 1 to 1 when the turbine is rotating at approximately 9/10ths impeller speed. At this point, the converter no longer increases torque, and functions as a fluid coupling.

When the turbine rotates faster than 9/10ths impeller speed and the converter no longer multiplies torque, the fluid leaving the turbine is directed against the back face of the stator blades. Since the one-way clutch permits the stator to rotate only in the direction of impeller rotation, the stator begins to turn with the impeller and turbine. The converter now acts as an efficient fluid coupling as long as turbine speed remains greater than 9/10ths impeller speed.

From the foregoing it can be seen that, from the time the turbine is not rotating to the point where the converter becomes a fluid coupling, the converter acts as an infinitely variable fluid-operated transmission. And that, above the "coupling point", it acts as an efficient fluid coupling.

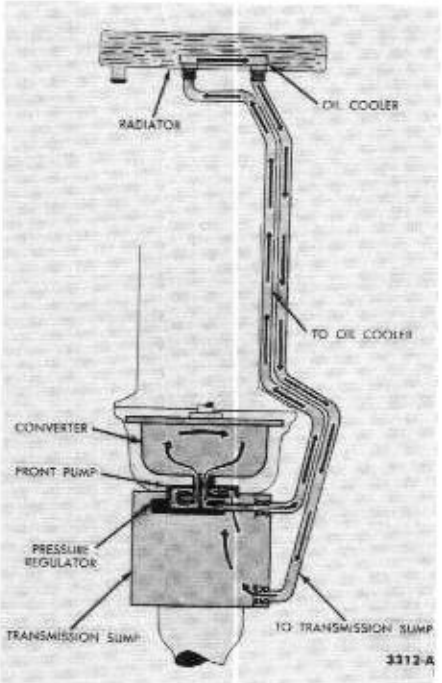
B. Torque Converter Cooling System



1. Torque converters for some Fordomatic, Merc-O-Matic and Turbo-Drive transmissions are air-cooled. Air is drawn into the converter housing by fins on the impeller, entering through a duct which is part of the housing.

A baffle, fixed to the housing, directs the incoming air over the entire converter surface after which it is exhausted through an outlet. A screen, provided in the inlet duct, filters out gravel and road dirt. The duct may be removed for inspection and cleaning of the inlet screen.

NOTE The air flow illustrated is for Fordomatic and Merc-O-Matic. The air flow through the converter of the Turbo-Drive transmission is similar, except that the air intake duct is located in the bottom of the converter housing instead of at the side.



2. On late 1956 Ford 8's, on all 1957 Ford 8's, and on all 1957 Mercurys and Lincolns a steel torque converter is used. Cooling of this unit is done by circulating transmission fluid through an oil-to-water tight cooler located in the radiator lower tank as shown. On trucks (except 6-cylinder models) both air cooling and water cooling are provided.