3. Position the fan, hub and adjusting bracket against the support bracket and install the bolts finger tight in the support.

   The new bolts differ from the former in that their effective lengths in inches are indicated in 1/4" high raised numbers on the bolt heads. This makes them easier to identify than the former bolts which had to be measured. Some of the new bolts are also longer than the bolts they replace.

4. Adjust the bracket to provide the proper tension on the fan belts (refer to Section 15.1). Tighten the bracket and bracket adjusting bolts.

# THERMO-MODULATED FAN

A thermo–modulated suction fan assembly has been provided on some engines (Fig. 5).

This fan assembly is designed to regulate the fan speed and maintain an efficient engine coolant temperature regardless of the variations in the engine load or outside air temperature.

The entire fan drive assembly is a compact integral unit which requires no external piping or controls and operates on a simple principle (Fig. 6). This principle consists of transmitting torque from the input shaft to the fan by the shearing of a silicone fluid film between the input and output plates in a sealed multiplate, fluid–filled clutch housing.

The thermostatic control element, which is an integral part of the fan drive, reacts to changes in engine temperature and varies the fluid film thickness between the plates and thereby changes the fan speed. Proper selection of the control element setting is determined by the vehicle manufacturer to maintain optimum cooling and no further adjustment should be necessary.

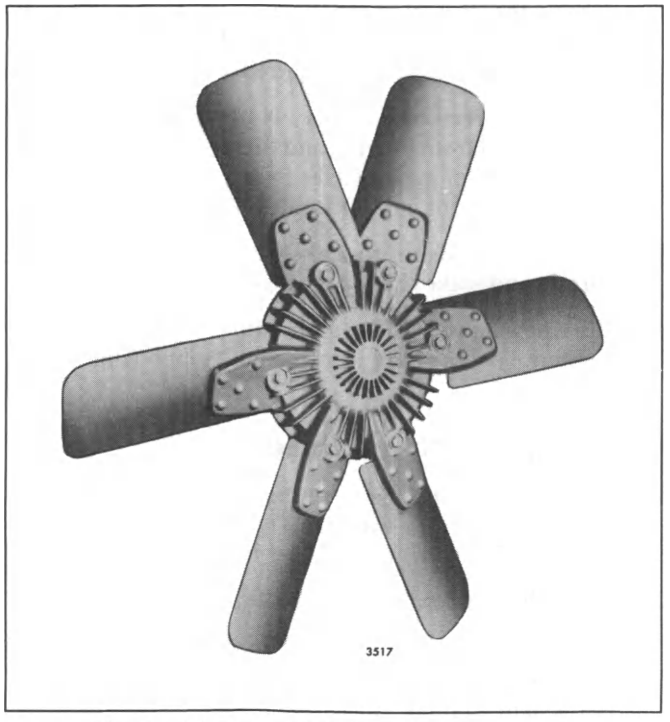


Fig. 5 – Thermo–Modulated Fan Assembly

The thermo–modulated fan is mounted and driven by the engine in the same manner as the conventional fan.

## Lubrication

The fan drive assembly is prelubricated by the manufacturer. However, the drive fluid level and the roller bearing should be checked periodically (see Section 15.1).

## Adjust Fan Belt

The adjustment of the fan belt tension is the same as on the conventional type fans.

## Remove and Install Fan and Drive Assembly

The fan blades and fan drive may be taken off by removing the four shaft to pulley mounting bolts, and installed by reversing this procedure.

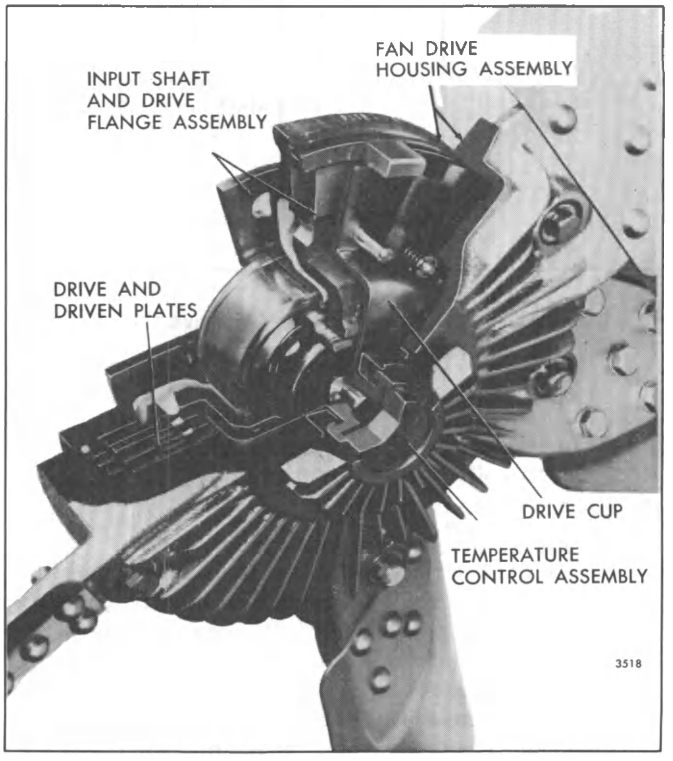


Fig. 6 – Thermo–Modulated Fan Drive Assembly

 

# HEAT EXCHANGER

The heat exchanger core consists of a series of cells with a header at one end and a circular water outlet at the opposite end. The core is mounted inside of the expansion tank with the header or inlet end bolted to the tank and the opposite or outlet end is sealed inside a retainer. A gasket between the expansion tank and the flange of the core, another gasket between the flange of the core and the cover at the inlet side, and seals surrounding the circular outlet at the opposite end (Fig. 1) prevent the coolant from mixing with the raw cooling water on its horizontal course between the cells of the element.

In this system of engine cooling, the hot coolant leaving the thermostat housing passes through the expansion tank, then through the cells of the cooling core. After leaving the heat exchanger, the engine coolant is picked up by the fresh water pump and circulated through the cylinder block and cylinder heads. The raw water is forced horizontally between the cells of the core and serves to lower the temperature of the coolant as it passes through the cells.

To protect the heat exchanger core from electrolytic action of the raw water, a zinc electrode is located in both the heat exchanger inlet elbow and the raw water pump inlet elbow and extends into the raw water passage (Fig. 2).

The expansion tank provides a means of filling the engine cooling system, as well as space for expansion of the coolant as its temperature rises. An overflow pipe, near the top of the tank, provides a vent to the atmosphere.

When installing a new filler neck in the expansion tank, be sure to drill a 3/16" hole in the side of the new filler neck for the overflow pipe.

The length of time a heat exchanger will function satisfactorily before cleaning will be governed largely by the kind of coolant used in the engine, and the kind of raw water used.

Soft water, plus a good commercial rust inhibitor or antifreeze should be used as the engine coolant (refer to Section 13.3) to prevent lime deposits in the heat exchanger core as well as in the engine.

Enough coolant should be maintained in the engine to fill the cylinder block and head and to partially fill the water tank. Allow air space above the coolant in the tank for the increase in volume as the temperature of the coolant rises.

Whenever the heat exchanger fails to cool the engine properly, and the raw water pump is circulating a normal amount of cooling water around the heat exchanger core, the core should be examined for foreign deposits.

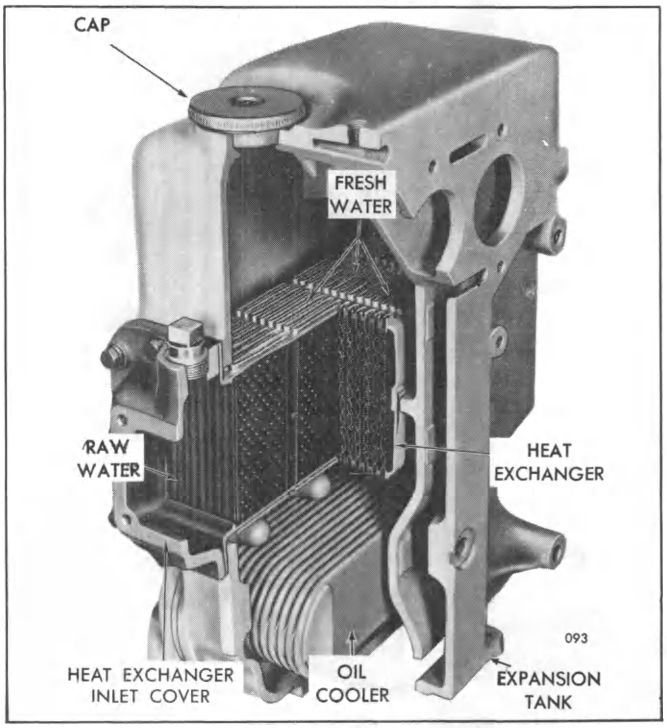

Fig. 1 – Heat Exchanger Assembly

## Clean Heat Exchanger Core

When foreign deposits accumulate in the heat exchanger to the extent that cooling efficiency is impaired, remove the heat exchanger core and clean it as follows:

Immerse the heat exchanger core in a scale solvent consisting of one–third (1/3) muriatic acid and two–thirds (2/3) water to which one–half (1/2) pound of oxalic acid has been added to each two and one–half (2–1/2) gallons of solution. Remove the core when foaming and bubbling stops. This usually takes from thirty to sixty seconds. Flush the core thoroughly with clean hot water under pressure.

To prevent drying and hardening of accumulated foreign substances, the heat exchanger core must be cleaned as soon as possible after removing it from service.

## Inspect Zinc Electrodes

Remove the zinc electrodes from the inlet side of the raw water pump and the heat exchanger. Clean the electrodes with a wire brush or, if worn excessively, replace with new electrodes. To determine the condition of a used electrode, strike it sharply against a hard surface; a weakened electrode will break.