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## Cooling System

A SUDDEN SPURT of steam from the radiator often is one of the few reminders to the average motorist that his engine has a cooling system; then it's too late. Severe damage to the valves, rings or cylinder walls may have been caused by this time.

A cross section of a typical passenger-car cooling system is shown at the top of this page. It consists of a radiator, its hoses, a water pump and fan, a thermostat and the water jacket around the engine. Water is circulated through the system when the engine is running and, as it passes through the water jacket, absorbs heat which it carries to the radiator where it is dispersed into the air flowing through the radiator.

Although water has excellent heat-trans-

fer properties and is available almost everywhere, it has definite drawbacks. It has a comparatively low boiling point, a fairly high freezing temperature and a natural corrosive action on metals. A radiator completely filled with water will overflow when the water heats and expands.

Antifreeze must be added to the water in cold weather to prevent freezing. Rust-inhibitor should be kept in the water when no antifreeze is used. Standard antifreeze solutions contain a rust-inhibitor of their own which is efficient.

When checking an automobile for overheating, be sure that the brakes are not dragging and that there is plenty of oil in the crankcase. Bad ignition timing also will cause overheating. Examine the engine for external leaks in the hoses, radiator and heat gasket. Be sure the fan belt has only about 1 in. of play. If it is frayed or oily, it should be replaced. Test the thermostat by suspending it in water and heating it to the specified temperature, as shown on page 8. If the thermostat opens at a temperature more than 10 deg. F. below specified temperature or fails to open at a temperature of 10 deg. F. above the specified temperature, it should be replaced with a new one.

Check for internal leaks of combustion gas into the water caused by a leaking head gasket or cracks in the cylinder head or block. To make this test, remove the upper hose and thermostat, drain the water down to the level of the engine block and disconnect the fan belt. Then pour water into the radiator until the water outlet on

The fit of a piston pin is just one of many examples of close tolerances required in an automobile engine

