layer of air along the inside wall of the liner. This layer of air also tends to control the flame pattern by keeping it centered in the liner, thereby preventing burning of the liner walls. *Figure 1-55* illustrates the annular combustion chamber liner.

Some provision is always made in the combustion chamber case for installation of a fuel nozzle. The fuel nozzle delivers the fuel into the liner in a finely atomized spray. The more the spray is atomized, the more rapid and efficient the burning process is.

Two types of fuel nozzle currently being used in the various types of combustion chambers are the simplex nozzle and the duplex nozzle. The construction features of these nozzles are covered in greater detail in Chapter 2, Engine Fuel and Fuel Metering Systems.

The spark igniter plugs of the annular combustion chamber are the same basic type used in the can-type combustion chambers, although construction details may vary. There are usually two igniters mounted on the boss provided on each of the chamber housings. The igniters must be long enough to protrude from the housing into the combustion chamber.

The burners are interconnected by projecting flame tubes which facilitate the engine-starting process as mentioned previously in the can-type combustion chamber familiarization. The flame tubes function identically to those previously discussed, differing only in construction details.

The can-annular combustion chamber is not used in modern engines. The forward face of each chamber presents six apertures, which align with the six fuel nozzles of the corresponding fuel nozzle cluster. *[Figure 1-56]* These nozzles are the dual-orifice (duplex) type requiring the use of a flow-divider (pressurizing valve), as mentioned in the can-type combustion chamber discussion. Around each nozzle are preswirl vanes for imparting a swirling motion to the fuel spray, which results in better atomization of the fuel, better burning, and efficiency. The swirl vanes function to provide two effects imperative to proper flame propagation:

1 High flame speed—better mixing of air and fuel, ensuring spontaneous burning.

2 Low air velocity axially—swirling eliminates overly rapid flame movement axially.

The swirl vanes greatly aid flame propagation, since a high degree of turbulence in the early combustion and cooling stages is desirable. The vigorous mechanical mixing of the fuel vapor with the primary air is necessary, since mixing by diffusion alone is too slow. This same mechanical mixing is also established by other means, such as placing coarse screens in the diffuser outlet, as is the case in most axial-flow engines.

The can-annular combustion chambers also must have the required fuel drain valves located in two or more of the bottom chambers, assuring proper drainage and elimination of residual fuel burning at the next start.

The flow of air through the holes and louvers of the can-annular chambers, is almost identical with the flow through other types of burners. *[Figure 1-56]* Special baffling is used to swirl the combustion airflow and to give it turbulence. *Figure 1-57* shows the flow of combustion air, metal cooling air, and the diluent or gas cooling air. The air flow direction is indicated by the arrows.

Figure 1-55. *Annular combustion chamber liner.*

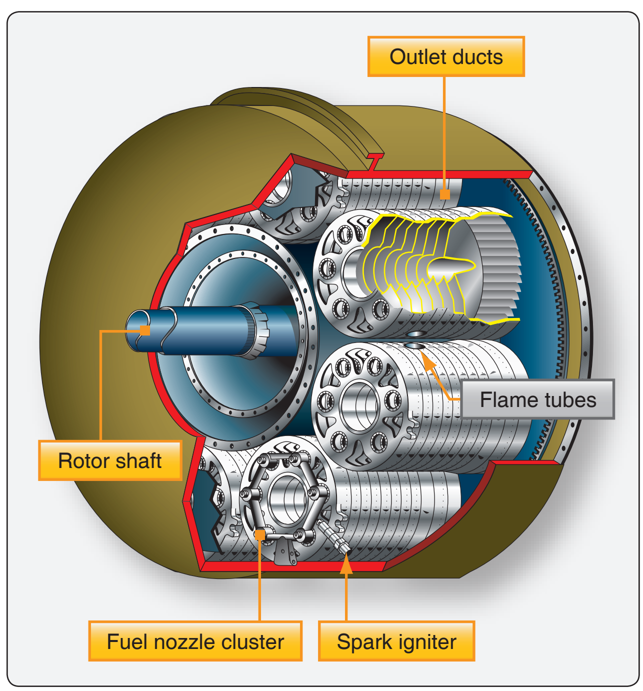

Figure 1-56. *Can-annular combustion chamber components and arrangement.*