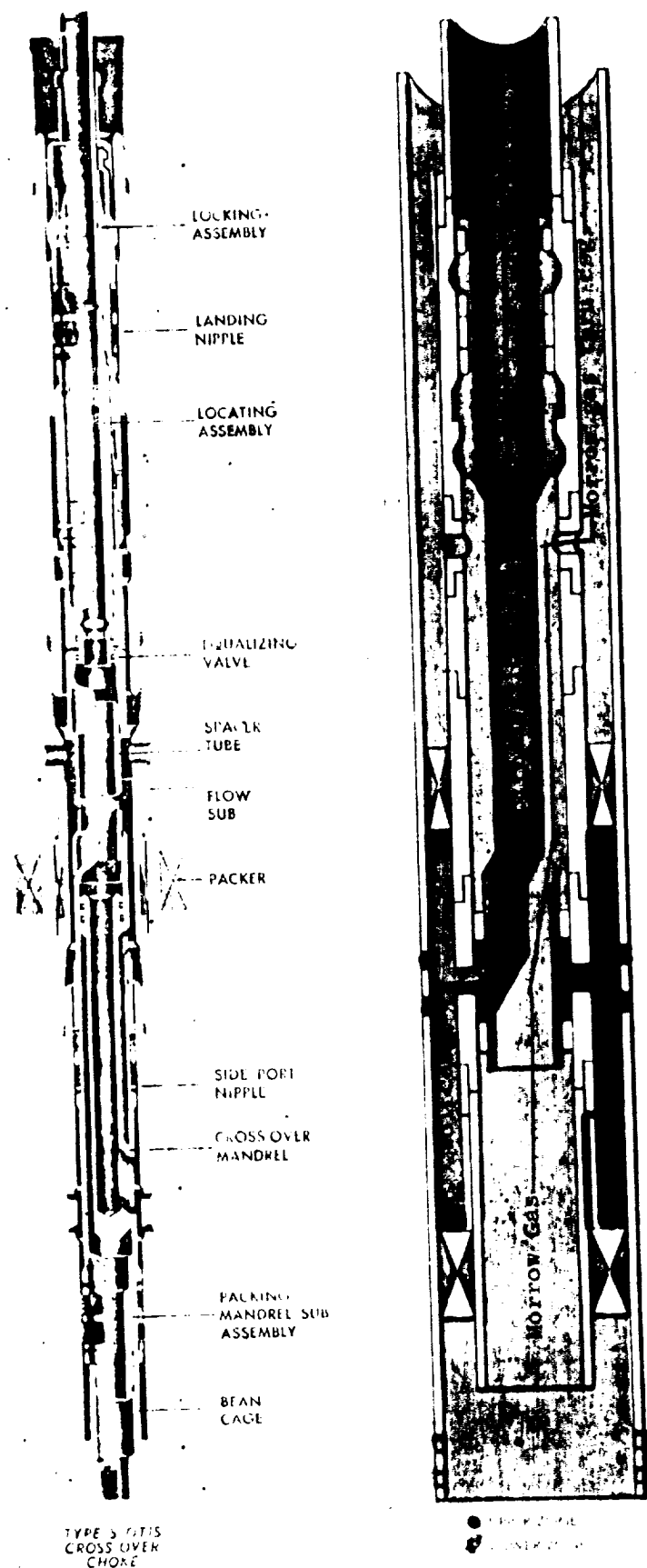


OTIS ENGINEERING CORPORATION

COMPLETION EQUIPMENT



TYPE S OTIS CROSS-OVER CHOKE

A Type S Otis Cross Over Choke consists of a locking mandrel assembly, equalizing valve assembly (combination type), concentric cross-over mandrel assembly, and a bean cage. The tool is designed to land in a Type S Otis Landing Nipple with a side-door nipple sub-assembly and a side port nipple assembly.

With the cross over choke assembly properly installed in the dual completion landing nipple assembly, production from both zones of a dual completion may be produced over, i.e., the upper zone produced through the tubing and the lower zone through the casing. Because this selection of flow courses is available by wire line methods, there is no need to disturb the packers by pulling the tubing string. The tools are designed to pack off above the upper ports and below and above the lower port in the nipple assembly and to allow the two flow courses to be interchanged within the choke assembly. With the dual cross over choke in the tubing string and two Safety Valves above and below, the backup, storm choke protection is afforded the annulus.

A Type S Upper or Lower Equalizing Tool is available for use with the Type S Landing Nipple with side door nipple assembly and side port mandrel assembly. These tools are used to equalize the upper or lower zone or kill either zone.