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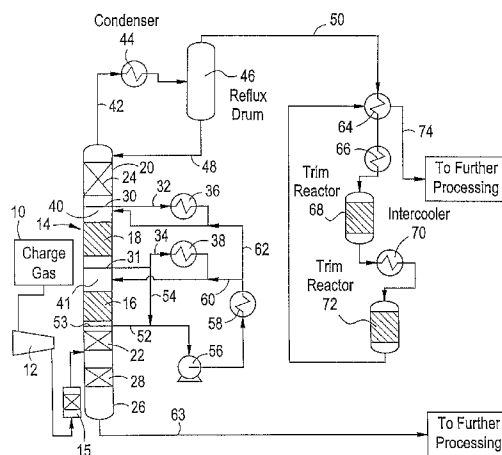
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(54) Title: IMPROVED OLEFIN PLANT RECOVERY SYSTEM EMPLOYING A COMBINATION OF CATALYTIC DISTIL-
LATION AND FIXED BED CATALYTIC STEPS



(57) Abstract: Presented is an improvement to a previous invention involving the catalytic hydrogenation of the C₂ to C₅ and heavier acetylenes and dienes in a thermally cracked feed stream without significantly hydrogenating the C₂ and C₃ olefins. The improvement involves the use of a fixed bed hydrogenation reactor system in combination with a modified version of the catalytic distillation unit used in the prior art. The modification to the catalytic distillation unit involves improvement of the liquid recycle scheme. The fixed bed reactors combined with the modified catalytic distillation allows for 100% conversion of acetylene and helps to maintain high conversion of the other dienes and acetylenes with no ethylene or propylene conversion under a variety of conditions. These condition variations include but are not limited to the feed diene and acetylene composition, the mol% carbon monoxide in the feed, and catalyst deactivation. With catalytic distillation alone, complete conversion of the acetylene as stated above can not be achieved without ethylene loss, nor would satisfactory operation and control be possible under the variety of conditions experienced during a commercial operation.

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