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(54) Title: THIOPHOSPHATE ESTERS AS ANTIWEAR ADDITIVES FOR LUBRICANTS

(57) Abstract: The present disclosure relates to the discovery of certain ashless antiwear additives in the form of dialkyl dithiophosphate triester compounds having specific oxygen ester moieties and a specific sulfur ester moiety that combine to provide an antiwear additive that achieves performance in lubricants without the need for (or with reduced levels of) metals provided by more traditional metal-based antiwear additives. Thus, the ashless antiwear additives of the present disclosure can supplement and/or replace traditional ZDDP additives used in lubricants and still achieve desired wear and durability performance targets in all types of automotive engines



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