What is Claimed is:

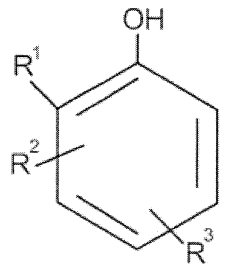
1. A sulfur-free metal or ammonium salt ~~compound comprising~~detergent additive that is a reaction product of:

(a) a phenolic compound reacted with an aldehyde and an amine,

(b) a compound selected from the group consisting of an acylating agent, an electrophilic compound, and mixtures thereof, and

(c) a metal or ammonium compound~~.~~.

2. The sulfur-free ~~compound~~detergent additive of claim 1, wherein the phenolic compound comprises a compound of the ~~fomula~~formula:



wherein R^1, R^2, and R^3 are independently selected from the group consisting of hydrogen, an alkyl group, an alkenyl group, an alkoxy group, an aminic group having from 1 to 24 carbon atoms, and an aryl group having from 6 to 24 carbon atoms.

3. The sulfur-free ~~compound~~detergent additive of claim 1, wherein the aldehyde comprises formaldehyde.

4. The sulfur-free ~~compound~~detergent additive of claim 1, wherein the amine comprises a mono- or polyamine.

5. The sulfur-free ~~compound~~detergent additive of claim 1, wherein component (b) is selected from the group consisting of maleic acid or anhydride, succinic acid or anhydride, alkenyl succinic acid or anhydride, and halo-carboxylic acid.

6. The sulfur-free ~~compound~~detergent additive of claim 1, wherein the metal is selected from alkali and alkaline earth metals.

7. The sulfur-free ~~compound~~detergent additive of claim 6, wherein the reaction product is overbased to provide calcium or magnesium salt of the reaction product.

8. The sulfur-free ~~compound~~detergent additive of claim 1, wherein the reaction product is neutralized with a basic nitrogen-containing compound to form an ammonium salt of the reaction product.

9. A lubricant composition comprising a base oil and from about 1 to about 5 wt.% of the sulfur-free ~~compound~~detergent additive of claim 1.

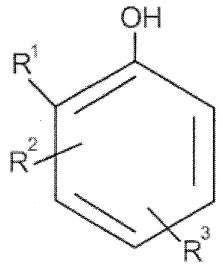
10. A method for making a sulfur-free, metal or ammonium salt compound for use as a ~~lubricant~~detergent additive component of a lubricant composition comprising:

reacting (a) a phenolic compound with (b) an aldehyde, (c) an amine to provide an intermediate product,

reacting the intermediate product with (d) a compound selected from the group consisting of an acylating agent, an electrophilic compound, and mixtures thereof to provide a reaction product, and

neutralizing or overbasing the reaction product with a metal or ammonium compound to provide the ~~lubricant~~detergent additive component.

11. The method of claim 10, wherein the phenolic compound comprises a compound of the ~~fomula~~formula:



wherein R^1, R^2, and R^3 are independently selected from the group consisting of hydrogen, an alkyl group, an alkenyl group, an alkoxy group, an aminic group having from 1 to 24 carbon atoms, and an aryl group having from 6 to 24 carbon atoms.

12. The method of claim 10, further comprising overbasing the reaction product to provide an overbased alkali or alkaline earth metal salt.

13. The method of claim 10, wherein component (d) is selected from the group consisting of maleic acid or anhydride, succinic acid or anhydride, and halo-carboxylic acid.

14. The method of claim 10, wherein the amine comprises a mono- or polyamine.

15. A lubricant composition comprising the ~~lubricant~~sulfur-free metal or ammonium salt detergent additive ~~component~~ of claim ~~10~~1 and one or more additional additives selected from the group consisting of a polymeric viscosity modifier, a detergent, an antioxidant, a dispersant, a rust inhibitor, an antiwear agent, a boron-containing compound, a friction modifier, a pour-point depressant, and an antifoaming agent.

16. A method for lubricating an internal combustion engine comprising adding the lubricant composition of claim 15 to a crankcase of said engine.

17. The method of claim 16, wherein the engine comprises a heavy duty diesel engine.

18. A lubricating oil concentrate comprising the ~~lubricant~~sulfur-free metal or ammonium salt detergent additive ~~component~~ of claim ~~10~~1 and one or more additional additives selected from the group consisting of a polymeric viscosity modifier, a detergent, an antioxidant, a dispersant, a rust inhibitor, an antiwear agent, a boron-containing compound, a friction modifier, a pour-point depressant, and an antifoaming agent.