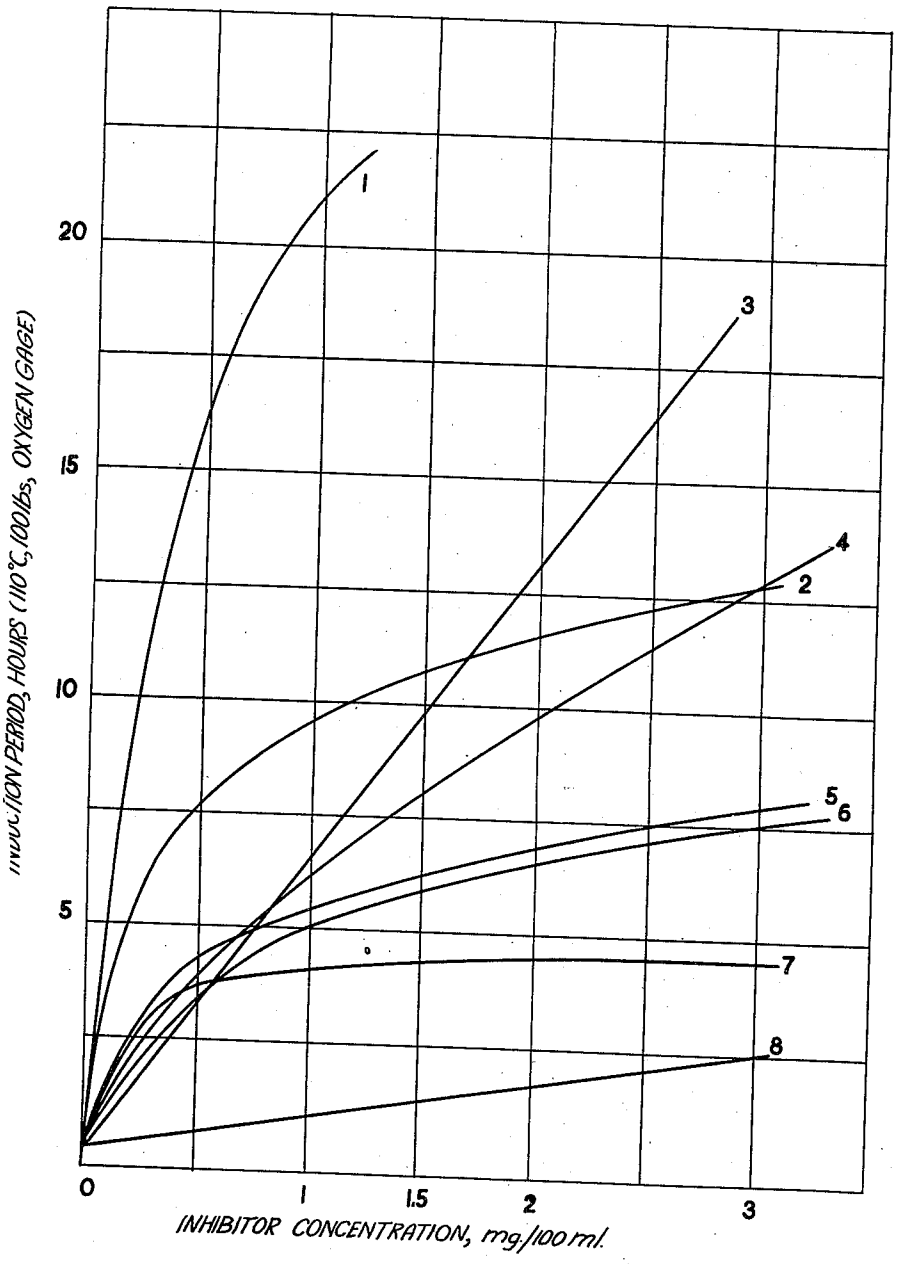
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STABILIZED AVIATION GASOLINE CONTAINING LEAD ALKYL

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Inventor: Ernest L. Walters,

By His Attorney: [signature]

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STABILIZED AVIATION GASOLINE CONTAINING LEAD ALKYL

Ernest L. Walters, San Francisco, Calif., assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware

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3 Claims. (Cl. 44—78)

This invention deals with improving the storage stability of leaded aviation gasolines consisting essentially of relatively stable gasoline-type fuels containing added alkyl lead in sufficient quantity materially to reduce their storage stability. More particularly, it deals with the use of pentamethylphenol for stabilizing aviation gasolines containing tetraethyl lead.

The main purpose of this invention is to produce aviation gasolines having long time storage stabilities.

It is already known that the addition of tetraethyl lead to cracked gasolines reduces the storage stability of the latter. It is also known that tetraethyl lead may have an unfavorable effect on the storage stability of gasolines which are normally stable, such as straight-run gasolines, alkylate gasolines, substantially saturated gasolines obtained by catalytic cracking or hydroforming blends of such gasolines with isopentane, cyclopentane, toluene, xylenes, cumene, branched chain ethers, etc.

It has in the past been recommended to add various anti-oxidants or gum inhibitors to unstable gasolines to improve their storage stabilities. Among the active inhibitors are particularly alkylated phenols, aromatic amines and hydroxy amines, etc. While many of these inhibitors are highly effective in the matter of increasing the storage stability of gasolines which are unstable in the absence of tetraethyl lead, I have found that these same inhibitors are relatively ineffective in preventing the instability brought about by the addition of tetraethyl lead to fuels which are stable in the absence of tetraethyl lead. Practically all oxidation inhibitors are somewhat effective in relatively low concentrations, but when added in larger quantities, successive increments have less and less effect. This property of tapering off in effectiveness of the inhibitor when added in larger amounts has heretofore put a definite ceiling on the stability of leaded aviation gasolines.

Now I have discovered that there is an inhibitor which has outstanding effectiveness in stabilizing normally relatively stable gasolines containing tetraethyl lead. Its effectiveness is particularly great when used in concentrations not above about .005%. This inhibitor is pentamethylphenol. Peculiarly, this inhibitor is not outstanding in the stabilizing of cracked gasoline or other gasolines which are unstable in the absence of tetraethyl lead. However, its effectiveness in stabilizing a gasoline fuel stable by itself but which has been rendered unstable by the action of tetraethyl lead, is extremely great.

In the accompanying drawing, the effectiveness of several of the most potent commercial available inhibitors is compared graphically with that of pentamethylphenol, the effectiveness being depicted by plotting induction period obtained by testing the fuel at 110° C. and 100 pounds of oxygen versus inhibitor concentration in an aviation gasoline consisting of a straight-run petroleum fraction containing 3 cc. of tetraethyl lead per gallon.

Eight curves are shown, representing the following inhibitors:

Curves	Inhibitor
1	Pentamethylphenol.
3	Aerohib (product of American Cyanamid and Chemical Corporation).
2	4-methyl-2,6-ditertiary butyl phenol.
4	{80% mono-isoamyl-p-amino phenol. {20% diamyl-p-phenylene diamine.
5	Alpha naphthol.
6	Benzyl para-amino phenol.
7	Alkyl phenols, boiling range 220°-270° C.
8	4-tertiary-butyl catechol.

In addition to the commercial inhibitors shown in the drawing, many others were tested but not shown because of their lesser commercial importance. None of them approached the pentamethylphenol in effectiveness, except 2,4-dimethyl-6-tertiary butyl phenol described in my co-pending application, Serial No. 441,876, filed May 5, 1942.

It may be noted that 4-tertiary butyl catechol is at the bottom of the list being the least effective. This is particularly interesting in view of the fact that this same 4-tertiary butyl catechol is one of the most outstanding inhibitors in stabilizing cracked gasoline.

Effective amounts of the pentamethylphenol may be quite small and may range from about .0001% to about .1%, although quantities not above about .005% are preferred.

I claim as my invention:

1. Stable aviation gasoline consisting essentially of a normally relatively stable saturate gasoline-type fuel containing an amount of tetraethyl lead sufficient to render it relatively unstable on storage, and a small amount of pentamethylphenol.

2. The gasoline of claim 1 wherein the amount of pentamethylphenol is between .0001% and .1%.

3. The gasoline of claim 1, wherein the amount of pentamethylphenol is between .0001% and .005%.

ERNEST L. WALTERS.