

UNITED STATES PATENT OFFICE

2,659,666

STABILIZER FOR RESIDUAL OILS

Richard W. Sage, Fanwood, and Louis A. Jennings, Mountainside, N. J., assignors to Standard Oil Development Company, a corporation of Delaware

No Drawing. Application November 10, 1949, Serial No. 126,704

2 Claims. (Cl. 44-78)

1

The present invention relates to hydrocarbon oils such as petroleum oils which may be used as fuel or furnace oils and relates more particularly to "bunker" fuel oils.

Much of the heavy viscous so-called "bunker" fuel oil of the present day contains residual products from cracking operations. This material varies widely in character with the nature of the crude oil from which it is derived and the method and degree of cracking to which it has been submitted.

Cracked residues usually contain solid or semi-solid particles which are not objectionable if dispersed but which some times agglomerate in troublesome sludges or deposits if the fuels are subjected to unfavorable conditions of storage and use. These cracked residues are not always completely soluble in petroleum distillates, thus complicating the problem of preparing merchantable blends.

Practically all residual fuel oils deposit sediment and sludge in storage tanks. The rate at which these deposits occur is controlled in part by the character of the oil and storage tanks which therefore must be cleaned periodically but it is commercially advantageous to perform this operation as infrequently as possible. Furthermore, accumulated sediments may cause serious difficulties by becoming dislodged and being carried into the burner, thus interfering with satisfactory operations.

The actual use of bunker fuel oils generally involves one or two heating operations. It is some-

2

times necessary to warm the contents of the storage tanks in order to facilitate pumping to boiler rooms and it is practically always necessary to pass the fuel through a preheater which reduces its viscosity so as to insure proper atomization by the burner. The surfaces of these preheaters are prone to become fouled with deposits of insoluble material formed in or separated from the fuel at the elevated temperatures to which it has been subjected.

A laboratory test has been developed which determines the amount of sediment in a fuel oil and which has been found to correlate accurately the tendency of fuel oils to settle. This method involves filtering undiluted but heated oil through an asbestos mat in a special steam jacketed filter funnel, washing the residue free of oil with a high flash point paraffinic naphtha, drying and weighing. This method is known as the hot filtration method and is described in the analytical edition of "Industrial and Engineering Chemistry," vol. 10, page 678, December 15, 1938.

A fuel oil which gives a deposit of 0.6% or more by this method is considered unstable while a deposit of less than 0.6% is considered stable.

This invention is based upon the discovery that the formation of sludge and sediment under normal storage conditions may be prevented substantially by the addition to such an oil of 0.2 to 2% of triphenyl carbinol.

For example, the effectiveness of such addition may be shown by the following tabulation of data:

TABLE 1

Effect of small quantities of organic compounds on hot filtration sediment of bunker fuel

	Sediment (Wt. percent)					
	By Hot Filtration			By Extraction ⁵		
Blend:						
Bunker Fuel Straight ¹	1.05	.81	1.18 ck.	.71		.42 ck.
Bunker Fuel+2% (wt.) Pyridine		.69			.49	
Bunker Fuel+1% (wt.) Tertiary Butyl Catechol		.70			.97	
Bunker Fuel+0.2% (wt.) Diphenylamine	.66		.58 ck.			
Bunker Fuel+2% (wt.) Furfural		.72			.37	
Bunker Fuel+2% (wt.) Phenol		.71			.42	
Bunker Fuel+2% (wt.) Triphenyl Carbinol	.47	.47	.42 ck.	.37		.42 ck.
Bunker Fuel+0.2% (wt.) Triphenyl Carbinol	.63		.64 ck.			
Bunker Fuel+2% (wt.) Naphthalene		.79			.36	
Bunker Fuel+2% (wt.) Paracymene	.82		.81 ck.		1.08	
Bunker Fuel+2% (wt.) Meta Cresol		.71			.57	
Bunker Fuel+2% (wt.) Alpha Naphthol		1.13			.45	
Bunker Fuel+2% (wt.) Parafflow		.99			.38	
Bunker Fuel+2% (wt.) Carbitol		.70			1.45	
Bunker Fuel+2% (wt.) Clearate		.78			.54	
Bunker Fuel+2% (wt.) Armeen 2T ²		.95			.42	
Bunker Fuel+2% (wt.) Armeen TO ³		.81			.43	
Bunker Fuel+2% (wt.) Armac ³		.60			.50	
Bunker Fuel+2% (wt.) C-16 Acid ⁴		.71			.34	
Bunker Fuel+1% (wt.) C-16 Acid ⁴		.79			.66	
Bunker Fuel+1% (wt.) Armeen 2T ²						

¹ AD-28 (Visbreaker tar 59.7%; catalytic heating oil 20.2%; clarified oil 20.1%).

² Straight long chain amines having from 14 to 18 carbon atoms.

³ Acetate salts of the above amines.

⁴ A commercial fatty acid, probably oleic.

⁵ ASTM Method D473-48 sediment in fuel oil by extraction.

In the above tests, various amounts of various inhibitors were added to a bunker fuel oil prepared by blending visbroken tar with 40.3 volume per cent of a catalytic cycle stock and the results compared with those obtained with a fuel oil containing no inhibitor. From these data it is clear that triphenyl carbinol gives a remarkably small amount of sediment as shown by the hot filtration method.

The nature of the present invention having thus been described, what is claimed as new and useful and desired to be secured by Letters Patent is:

1. A bunker fuel oil containing a small amount of triphenyl carbinol sufficient to inhibit the formation of sediment within the fuel oil under conditions of normal storage.

2. A bunker fuel oil containing about 0.2 to 2% by weight of triphenyl carbinol.

RICHARD W. SAGE.
LOUIS A. JENNINGS.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,527,987	Caron et al.	Oct. 31, 1950
2,570,402	Stevens et al.	Oct. 9, 1951

FOREIGN PATENTS

Number	Country	Date
406,658	Great Britain	Feb. 26, 1934

OTHER REFERENCES

The Chemistry of Petroleum Derivatives, Ellis, The Chemical Catalog Co. Inc., N. Y., N. Y., 1934, pages 904-910.