

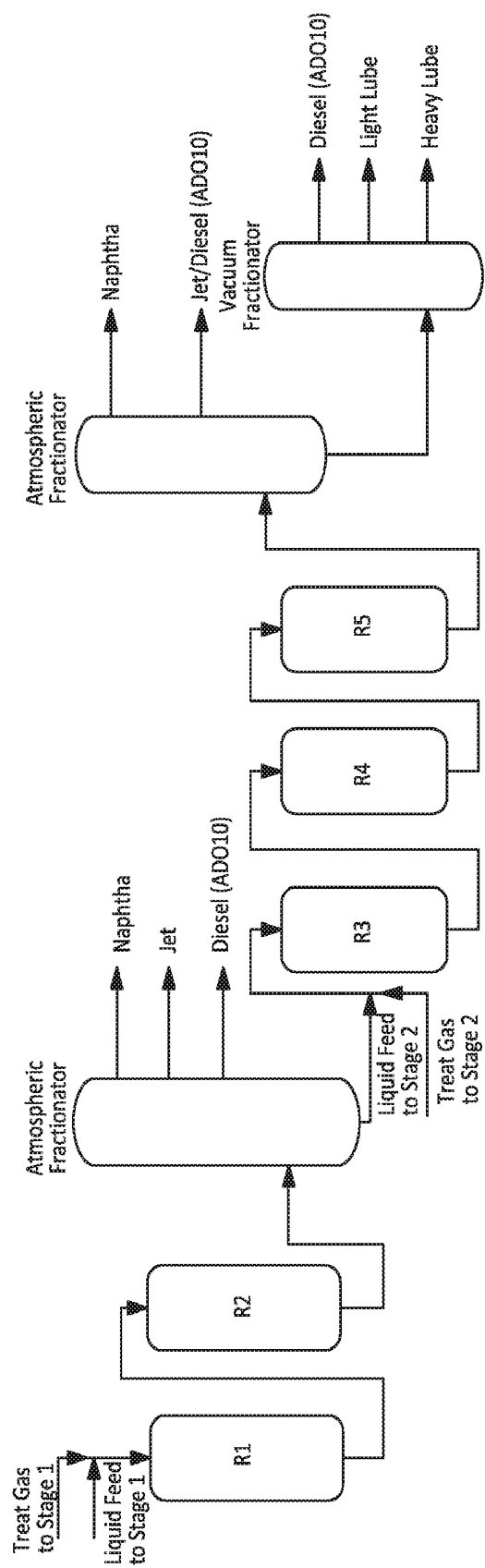


FIG. 1

Fig. 2

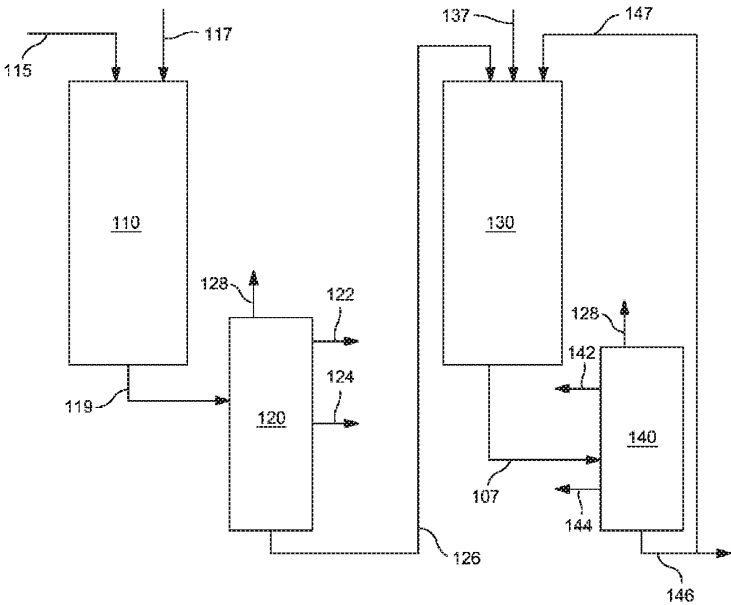


Fig. 3

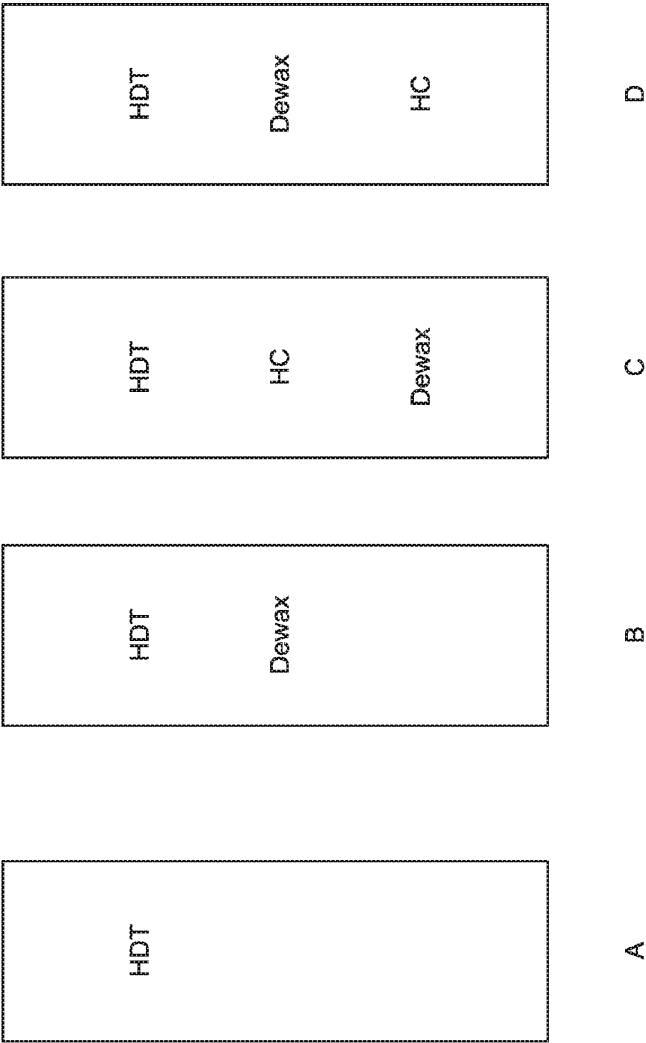


Fig. 4

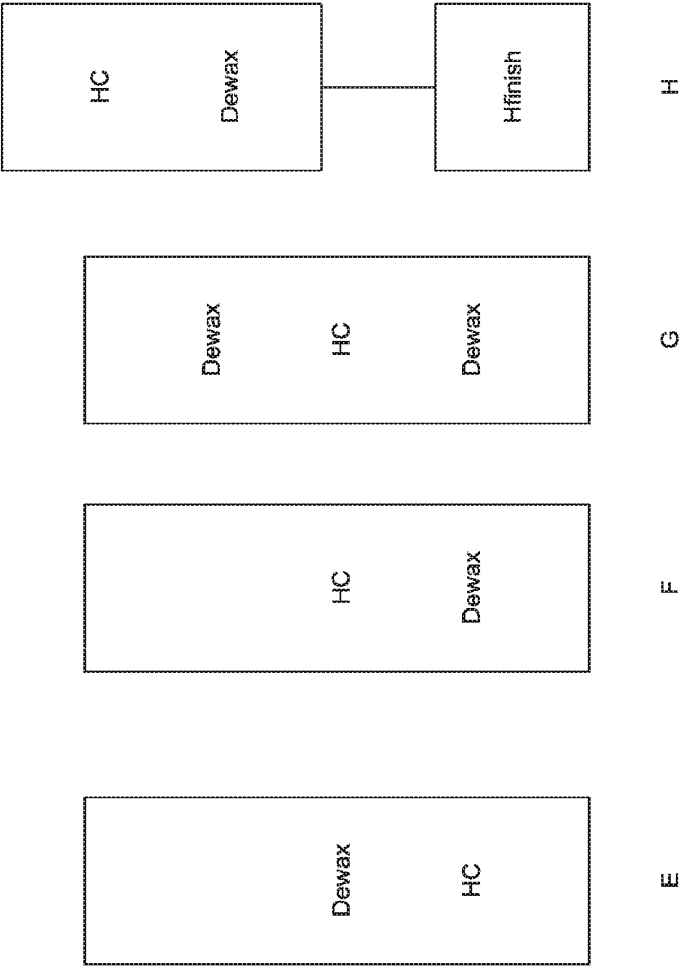


Fig. 5

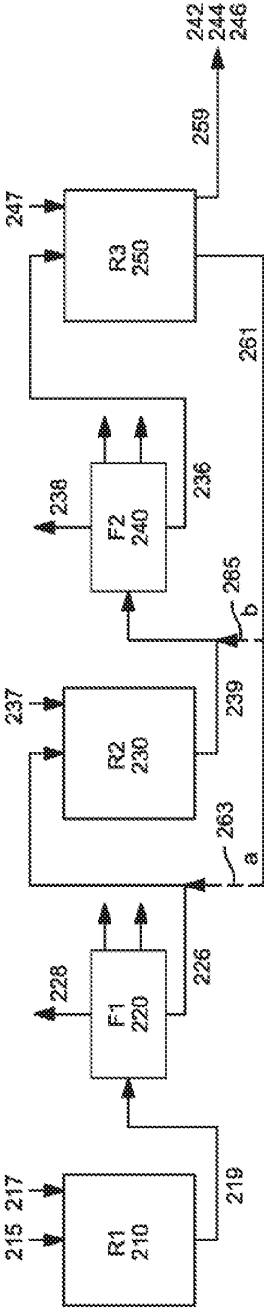


Fig. 6

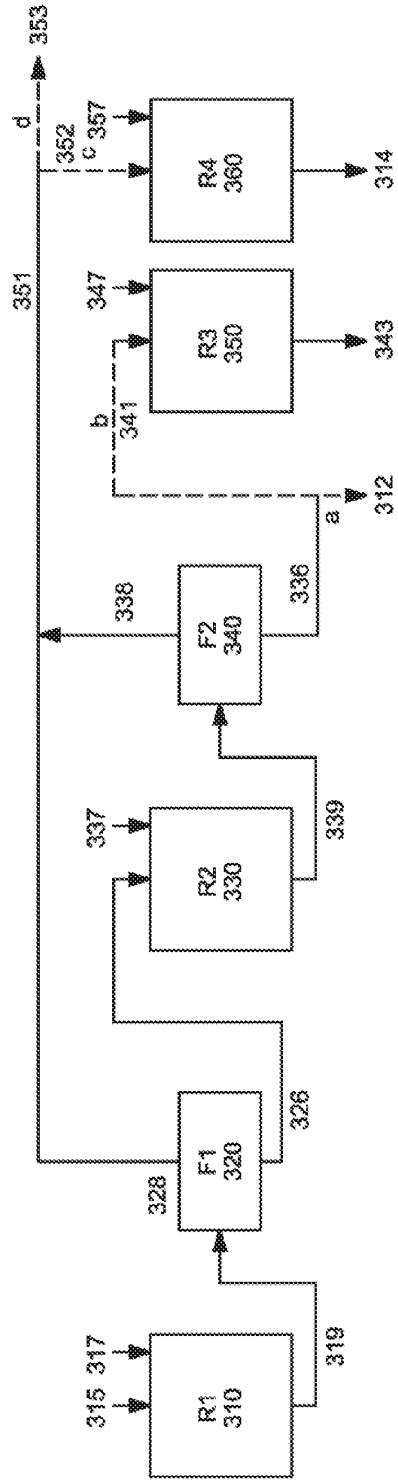
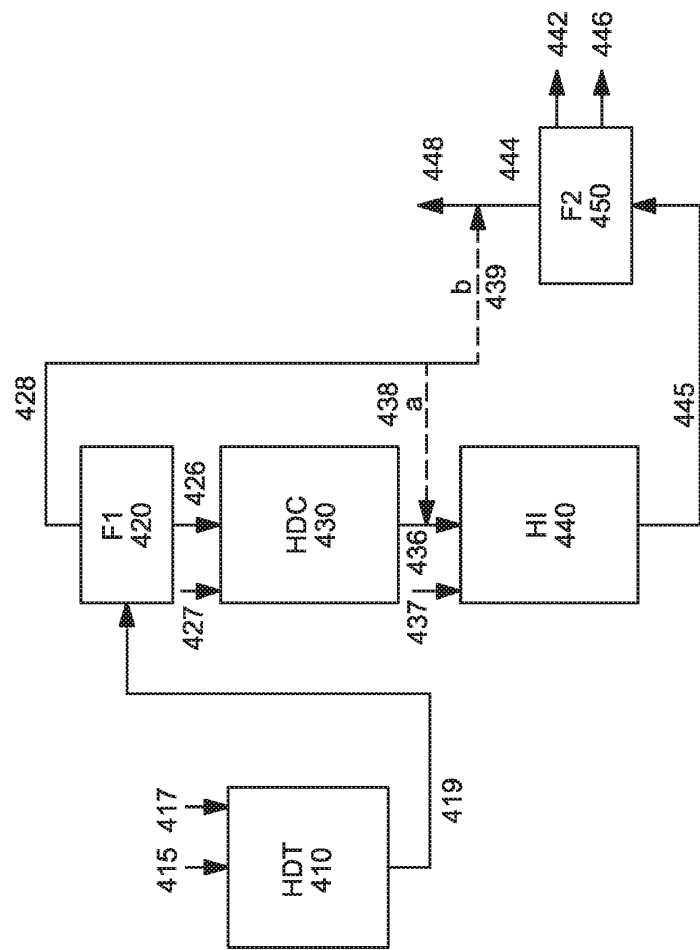


Fig. 7



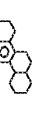
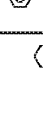
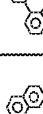
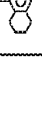
X-Class	2	0	-2	-4	-6	-8	-10
Predominant species	Iso-Paraffins of formula C_nH_{2n+2}	1 ring cycloparaffins of formula C_nH_{2n}	2 ring cycloparaffins of formula C_nH_{2n-2}	3 ring cycloparaffins of formula C_nH_{2n-4}	4 ring cycloparaffins of formula C_nH_{2n-6}	5 ring cycloparaffins of formula C_nH_{2n-8}	6 ring cycloparaffins of formula C_nH_{2n-10}
Example Ring structures	N/A						
Minor species (may or may not be present)	Species with Naphthenoaromatic ring structures of formula C_nH_{2n+2i} ; where $Z=2(\text{Number of ring} + \text{number of double bonds} - 1)$						
Example Ring structures	 	 	 	 	 	 	 

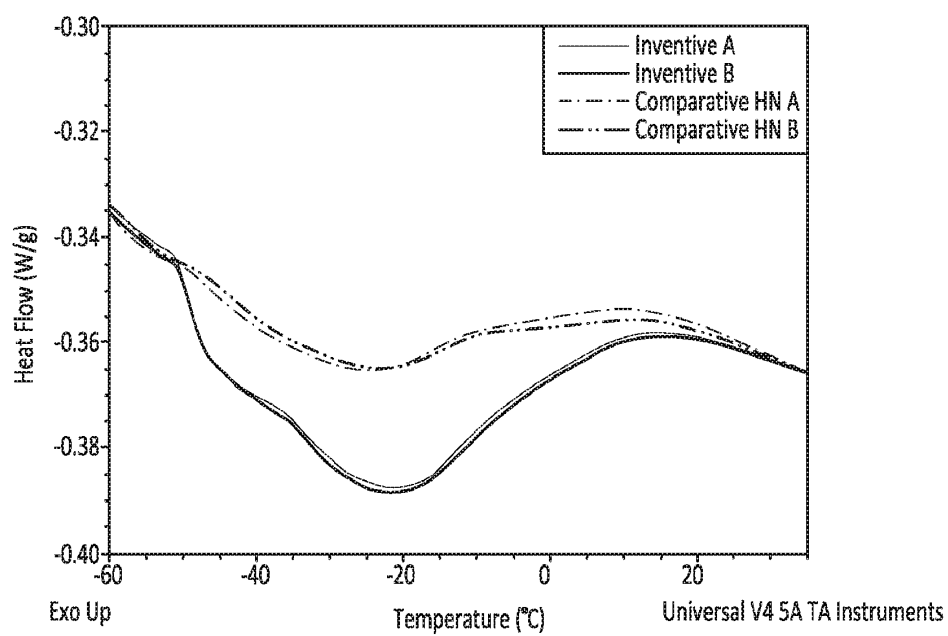
FIG. 8

			Examples of inventive base stocks					Ref LN A	Ref LN B	Ref LN C	Ref LN D	Comparative LNE	Comparative LNF	Comparative LNG
1	Kinematic Viscosity at 100 C	ASTM D445	cSt	5.38	5.40	5.05	5.26	5.24	5.35	5.35	5.38	5.28	5.32	5.34
2	Kinematic Viscosity at 40 C	ASTM D445	Cst	30.51	30.69	27.41	29.23	28.63	29.21	29.63	30.17	30.55	30.11	30.68
3	Viscosity Index			110.5	110.4	111.4	112.2	115.0	117.5	114.5	113.1	104.1	109.3	107.2
4	Total Cycloparaffins	SFC	%	77.8	78.2	77.8	77.7	74.2	77.1	78.5	79.6	79.0	77.1	80.9
5	Sats X-0 (1 Ring CP)	GCMS	%	48.4	47.5	45.5	44.9	38.5	40.6	40.6	40.5	38.0	37.1	40.2
6	Sats X-2 (2 Ring CP)	GCMS	%	21.2	21.8	24.1	24.2	24.7	25.4	26.5	27.4	26.9	27.4	27.7
7	Sats X-4 (3 Ring CP)	GCMS	%	4.7	5.2	5.7	5.9	7.8	8.1	8.4	8.8	10.0	9.2	9.4
8	Sats X-6 (4 Ring CP)	GCMS	%	1.5	1.6	1.4	1.4	2.1	2.0	2.1	2.1	2.8	2.2	2.4
9	Sats X-8 (5 Ring CP)	GCMS	%	1.3	1.3	0.8	0.8	0.8	0.7	0.8	0.7	1.1	0.9	1.0
10	Sats X-10 (6 Ring CP)	GCMS	%	0.8	0.8	0.4	0.4	0.4	0.3	0.2	0.2	0.3	0.2	0.3
11	Sats X-2 (iso-paraffins)	GCMS	%	22.2	21.8	22.2	22.3	25.8	22.9	21.5	20.4	21.0	22.9	19.1
12	MM-Paraffins	GCMS	%	1.2	1.3	1.2	0.6	1.8	1.5	1.4	1.2	1.9	1.6	1.6
13	DM-Paraffins	GCMS	%	21.0	20.5	21.0	21.7	24.0	21.4	20.1	19.2	19.1	21.3	17.5
14	Cycloparaffin Performance													
14	Ratio	GCMS		1.3	1.3	1.3	1.2	1.0	1.0	1.0	0.9	0.8	0.8	1.0
15	2+R cycloparaffins	GCMS	%	29.4	30.7	32.3	32.8	35.7	36.5	37.9	39.1	41.0	40.0	40.7
16	3+R cycloparaffins	GCMS	%	8.2	8.9	8.3	8.6	11.0	11.0	11.4	11.7	14.2	12.5	13.0
17	4+R cycloparaffins	GCMS	%	3.5	3.6	2.5	2.7	3.3	3.0	3.1	3.0	4.1	3.3	3.6
18	% epsilon	¹³ C NMR	%	10.7	11.2	11.2	11.0	12.1	12.7	12.7	12.1	9.1	9.6	12.5
19	% T/P Pr	¹³ C NMR	%	1.2	1.1	1.3	1.1	1.1	1.0	1.1	1.0	1.2	1.0	1.2
20	% alpha	¹³ C NMR	%	3.2	3.2	3.2	3.0	3.3	3.2	3.3	3.2	2.7	2.9	3.4
21	% P/Tet	¹³ C NMR	%	1.6	1.6	1.4	1.4	1.2	1.2	1.2	1.1	1.5	1.7	1.1

FIG. 9

				Examples of Inventive Base stocks						Ref HN A	Ref HN B	Ref HN C	Ref HN D	Comparative HN A	Comparative HN B	Comparative HN C	Comparative HN D
				cSt	11.87	11.97	10.56	10.88	10.25								
1	Kinematic Viscosity at 100 °C	ASTM D445	cSt		11.87	11.97	10.56	10.88	10.25	10.42	10.48	10.63	10.45	12.11	12.23	11.97	10.46
2	Kinematic Viscosity at 40 °C	ASTM D445	cSt		100.38	102.62	83.88	86.34	80.29	90.18	91.01	94.42	90.50	102.10	104.90	107.90	89.15
3	Viscosity Index				107.7	106.3	109.5	111.5	109.6	96.9	96.8	94.7	97.0	109.3	107.5	99.6	99.0
4	Total Cycloparaffins	GCMS	%		70.2	70.7	73.8	74.9	72.7	80.8	80.6	80.3	80.6	76.0	80.6	82.7	81.1
5	Sats X-0 (1 Ring CP)	GCMS	%		41.6	41.1	39.7	39.7	39.5	35.4	35.1	34.1	35.6	37.0	38.7	37.1	35.4
6	Sats X-2 (2 Ring CP)	GCMS	%		20.8	21.4	25.1	25.7	24.5	29.7	29.8	29.9	29.5	28.3	30.5	31.2	30.1
7	Sats X-4 (3 Ring CP)	GCMS	%		4.8	5.1	6.2	6.6	5.9	11.0	10.9	11.2	10.7	7.9	8.5	10.2	10.8
8	Sats X-6 (4 Ring CP)	GCMS	%		1.6	1.7	1.7	1.8	1.7	3.1	3.1	3.3	3.1	2.0	2.0	2.8	3.1
9	Sats X-8 (5 Ring CP)	GCMS	%		0.8	0.8	0.7	0.7	0.7	1.2	1.2	1.3	1.2	0.6	0.6	1.0	1.3
10	Sats X-10 (6 Ring CP)	GCMS	%		0.6	0.6	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.5	0.5
11	Sats X-2 (iso-paraffins)	GCMS	%		29.8	29.3	26.2	25.1	27.2	19.2	19.4	19.7	19.4	24.0	19.4	17.3	18.9
12	n-Paraffins	GCMS	%		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	MM-Paraffins	GCMS	%		0.5	0.5	0.4	0.4	0.5	0.7	0.7	0.9	0.9	0.4	0.5	0.3	0.5
13	DM-Paraffins	GCMS	%		29.3	28.8	25.8	24.7	26.8	18.6	18.7	18.7	18.5	23.6	18.9	17.0	18.4
14	CycloParaffin Performance																
14	Ratio	GCMS			1.5	1.4	1.5	1.4	1.5	1.0	1.0	1.0	1.0	1.2	1.2	1.0	1.0
15	2+R cycloparaffins	GCMS	%		28.6	29.6	34.1	35.2	33.2	45.4	45.5	46.2	45.0	39.1	42.0	45.7	45.7
16	3+R cycloparaffins	GCMS	%		7.8	8.2	9.0	9.5	8.7	15.7	15.7	16.3	15.5	10.8	11.4	14.4	15.6
17	4+R cycloparaffins	GCMS	%		3.0	3.1	2.8	2.9	2.8	4.7	4.8	5.1	4.8	2.9	2.9	4.3	4.8
18	% epsilon	¹³ C NMR	%		13.3	14.0	13.6	14.7	14.0	11.6	12.1	10.9	12.2	12.5	13.6	13.0	11.8
19	% T/P Pr	¹³ C NMR	%		1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.0	0.8	0.8	1.3
20	% alpha	¹³ C NMR	%		2.8	2.9	2.9	2.8	3.0	2.6	2.7	2.6	2.6	2.8	2.6	2.7	2.7
21	% P/T Et	¹³ C NMR	%		1.5	1.2	1.2	1.1	1.2	1.0	1.0	1.0	0.9	1.8	1.1	1.0	1.4

FIG. 10

**FIG. 11**

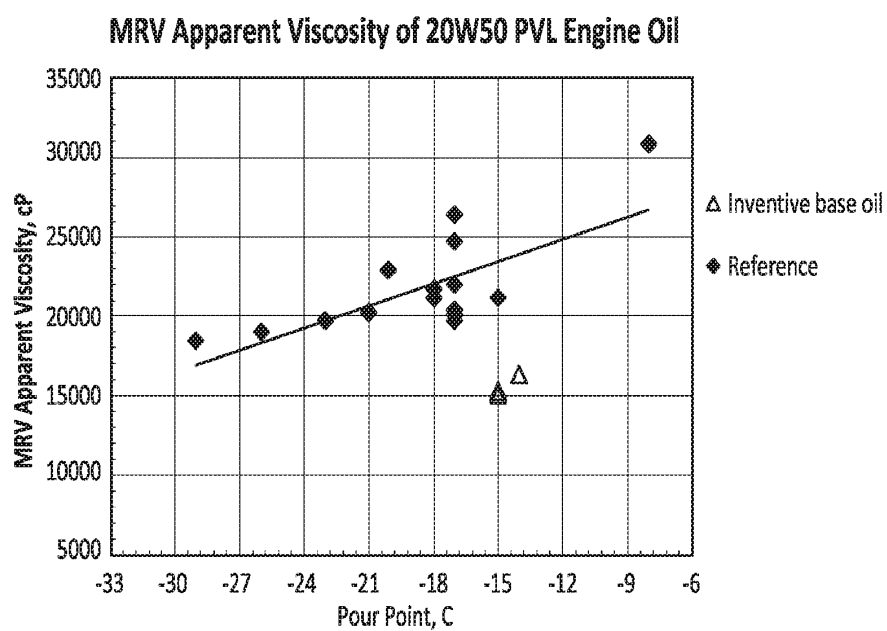
**FIG. 12**

Fig. 13

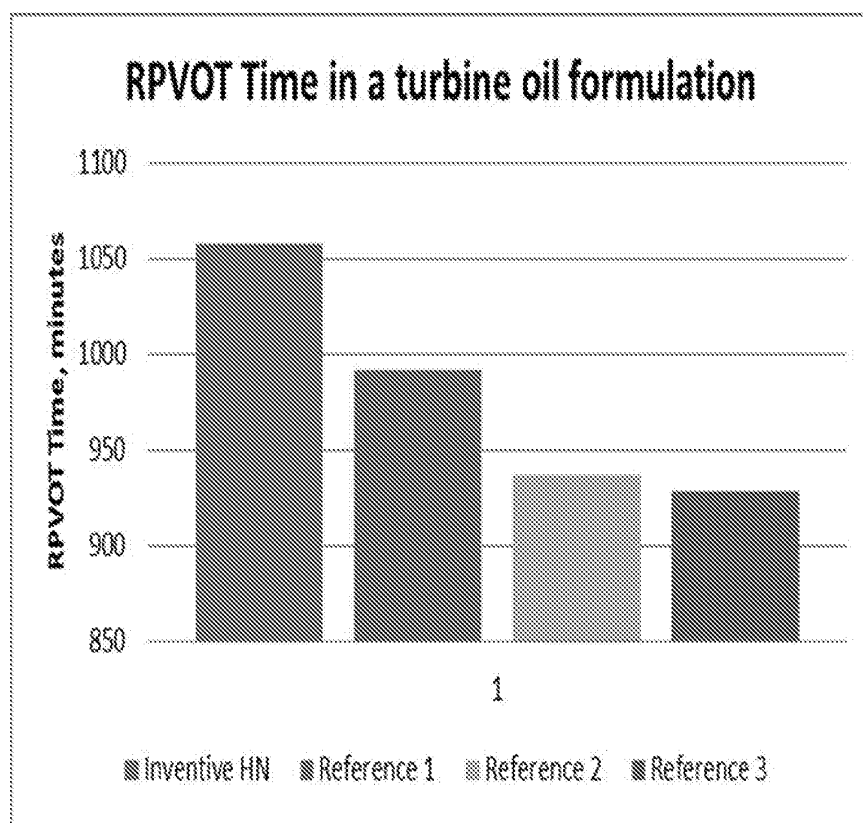


Fig. 14

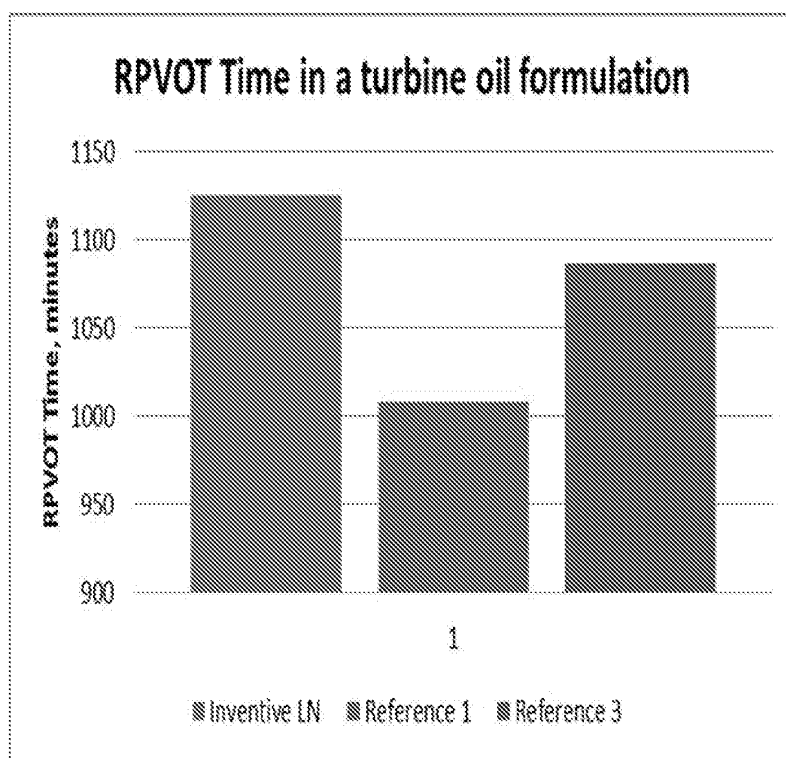


Fig. 15

	Inventive LN A	Inventive LN B	Inventive LN C	Inventive HN A	Inventive HN B	Inventive HN C	Inventive HN D	Inventive HN E
Kinematic Viscosity at 40 deg C, mm ² /s	30.5	30.7	27.4	100.4	102.6	83.9	86.3	80.3
Kinematic Viscosity at 100 deg C, mm ² /s	5.4	5.4	5.0	11.9	12.0	10.6	10.8	10.2
Viscosity Index	110.5	110.4	111.4	107.7	106.3	109.5	110.3	109.6
Density at 15 deg C, g/cm ³	0.8542	0.8545	0.8515	0.8649	0.8658	0.8631	0.8633	0.8623
Pour Point, C	-21	-21		-14	-14	-18	-9	-13
UV Absorptivity at 226 nm, L/g-cm	0.06	0.06	0.27	0.08	0.08	0.33	0.345	0.251
UV Absorptivity at 254 nm, L/g-cm	0.002	0.002	0.016	0.005	0.005	0.039	0.04	0.023
UV Absorptivity at 275 nm, L/g-cm	0.004	0.004	0.025	0.008	0.008	0.044	0.0453	0.0288
UV Absorptivity at 302 nm, L/g-cm	0.0014	0.0013	0.011	0.0111	0.0088	0.0443	0.0454	0.0277
UV Absorptivity at 310 nm, L/g-cm	0.0011	0.001	0.0087	0.0152	0.0127	0.0712	0.0727	0.0441
UV Absorptivity at 325 nm, L/g-cm	0.0003	0.0003	0.0028	0.0057	0.0042	0.0192	0.0193	0.0122
Total Saturates, mass%	>99.8	99.8		99.7	99.7			

Fig. 16

	US 9,487,723			Current Application			
	Prior Art Gp II 4.5 cSt	Inventive 4.5 cSt	Ratio of Inventive 4.5 cSt vs Prior art	Inventive 5 cSt	Inventive 11+ cSt	Ratio of Inventive 5 cSt vs Prior Art	Ratio of Inventive 11+ cSt vs Prior Art
UV Absorptivity at 226 nm, L/g-cm	0.12	0.09	0.8	0.27	0.08	2.3	0.7
UV Absorptivity at 254 nm, L/g-cm	0.007	0.019	2.7	0.016	0.005	2.3	0.7
UV Absorptivity at 275 nm, L/g-cm	0.011	0.022	2.0	0.025	0.008	2.3	0.7
UV Absorptivity at 302 nm, L/g-cm	0.0064	0.0505	7.9	0.011	0.00995	1.7	1.6
UV Absorptivity at 310 nm, L/g-cm	0.0073	0.0370	5.1	0.0087	0.01395	1.2	1.9
UV Absorptivity at 325 nm, L/g-cm	0.0020	0.0106	5.3	0.0028	0.00495	1.4	2.5
UV Absorptivity at 339 nm, L/g-cm	0.0015	0.0147	9.8	0.0017	0.00245	1.1	1.6
UV Absorptivity at 400 nm, L/g-cm	0.00016	0.00112	7.0	0.00023	0.000365	1.4	2.3