

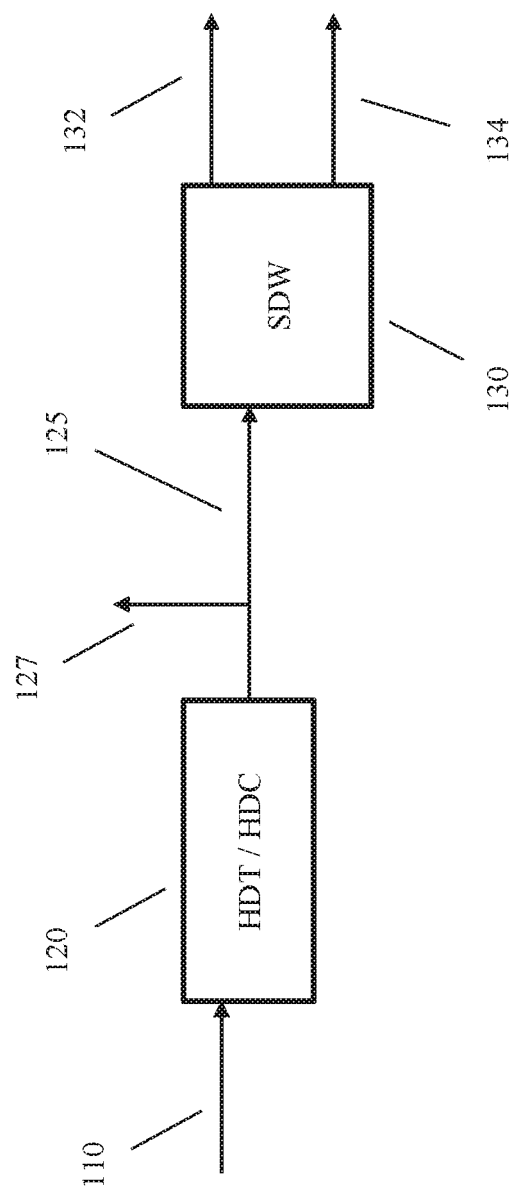


FIG. 1

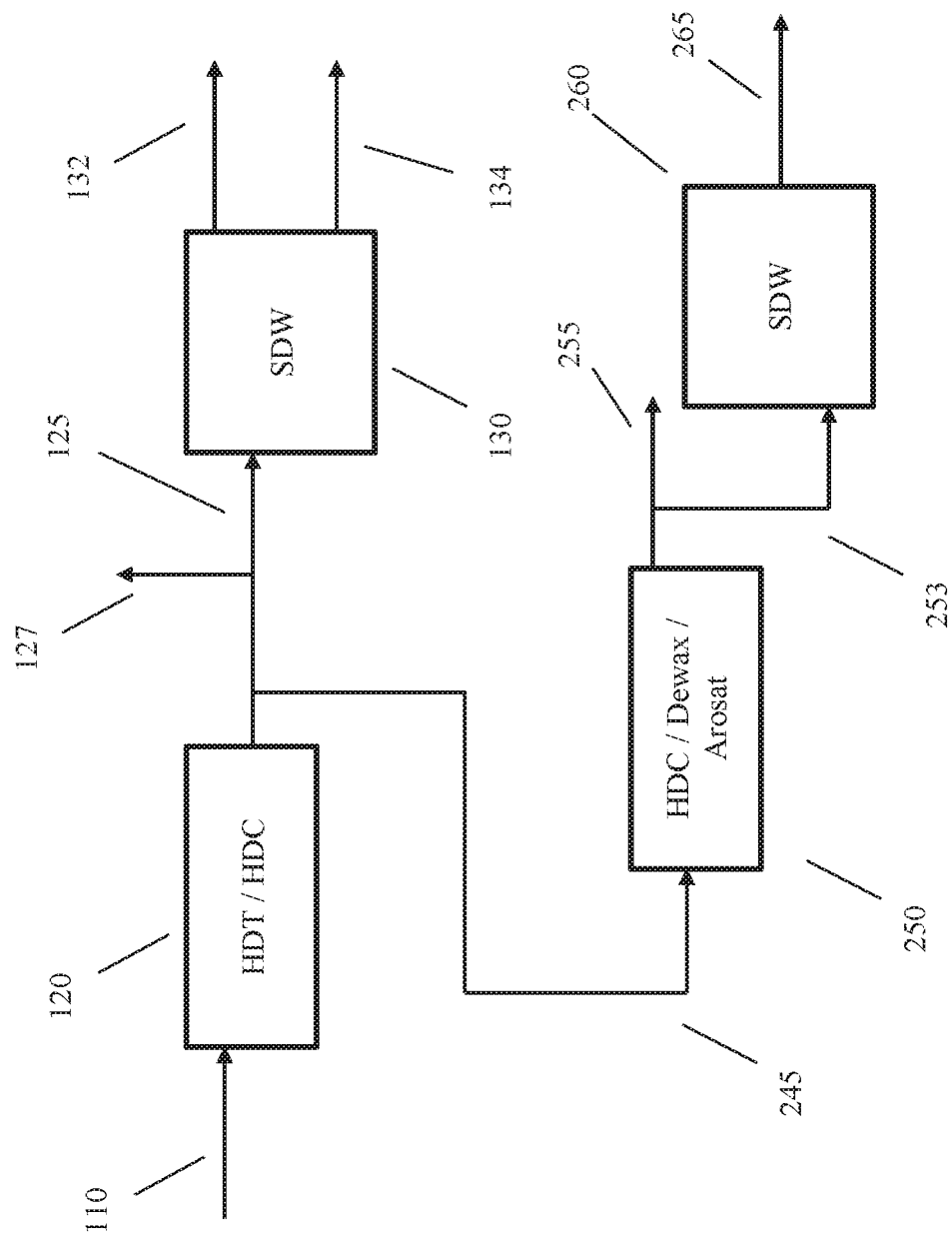


FIG. 2

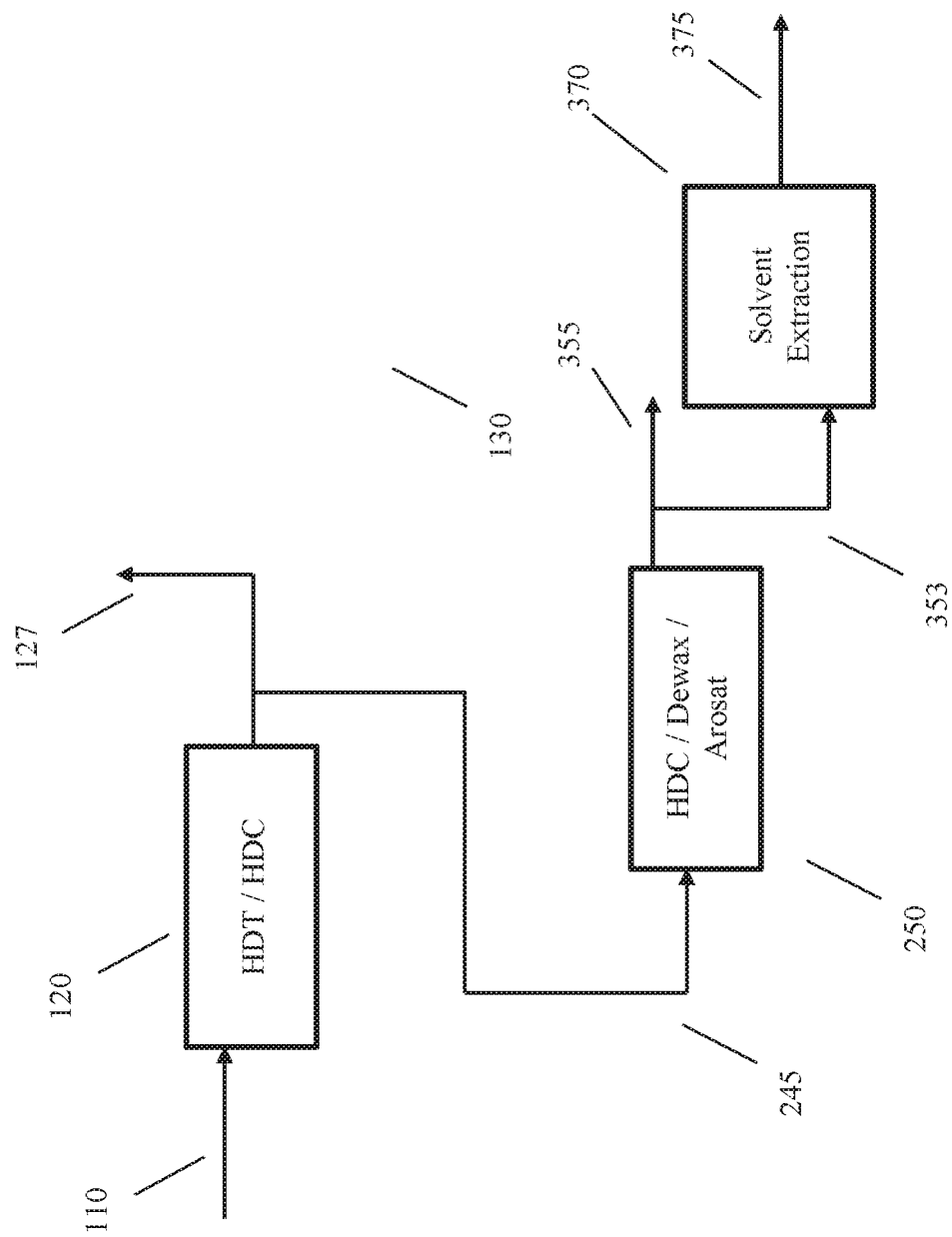


FIG. 3

C5 DAO (340°C TT) & C5 DAO+VGO STAGE 1: SDWed LUBE VI & KV VS. 510°C+ CONVERSION

2250 GSIG, 0.2 LHSV, 8000 SCF/B

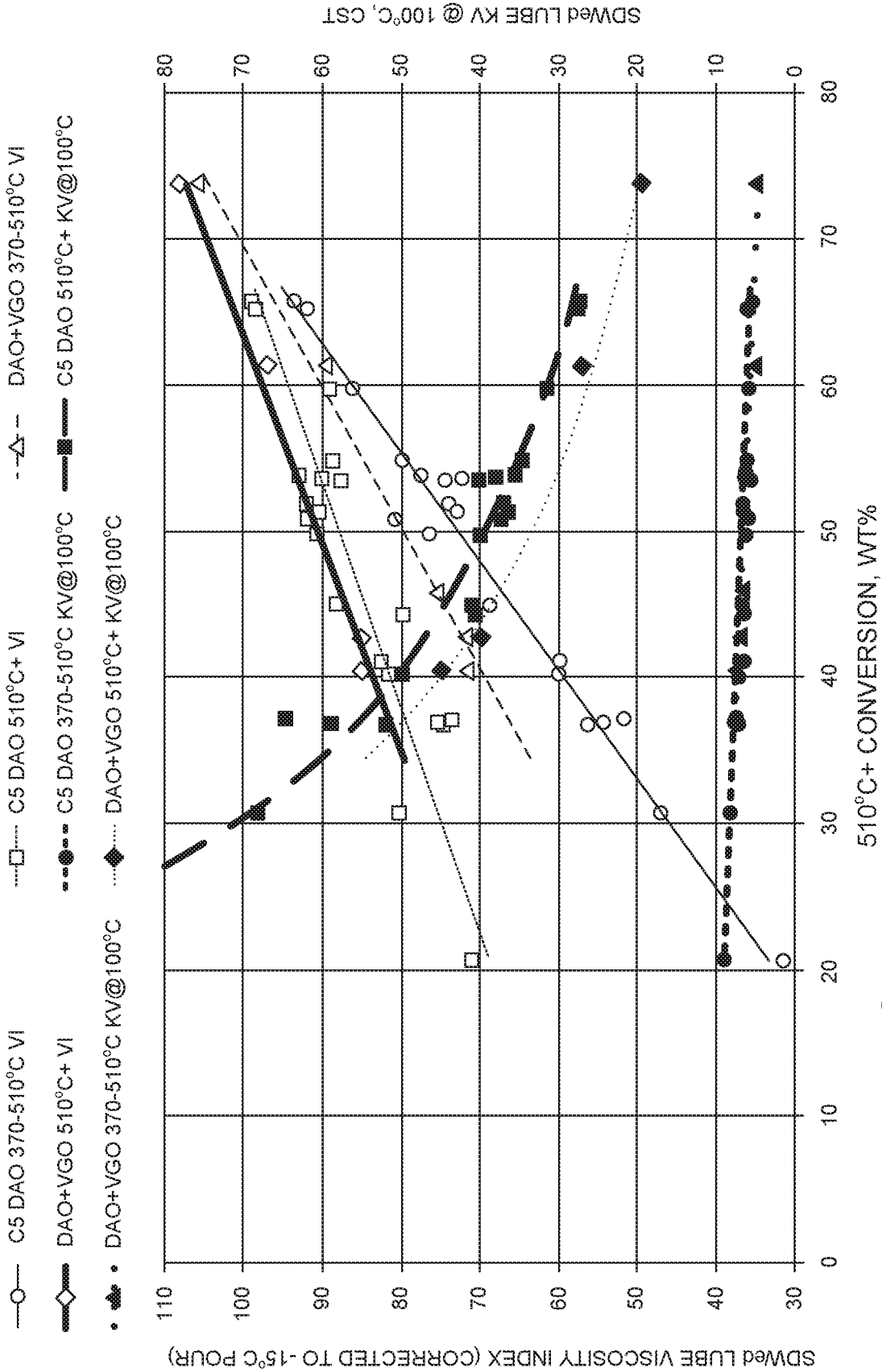


FIG. 4

HDW/HDF AND HDC/HDW/HDF OF 370°C+ HDC'ED 75% YIELD C5 DAO+HVGO+MVGO
VI PROFILE AND LUBE YIELDS FOR Feed 1 (ALL HDC IN ST. 1) VS. 2 STAGE HC (HDC IN ST. 1 & 2)

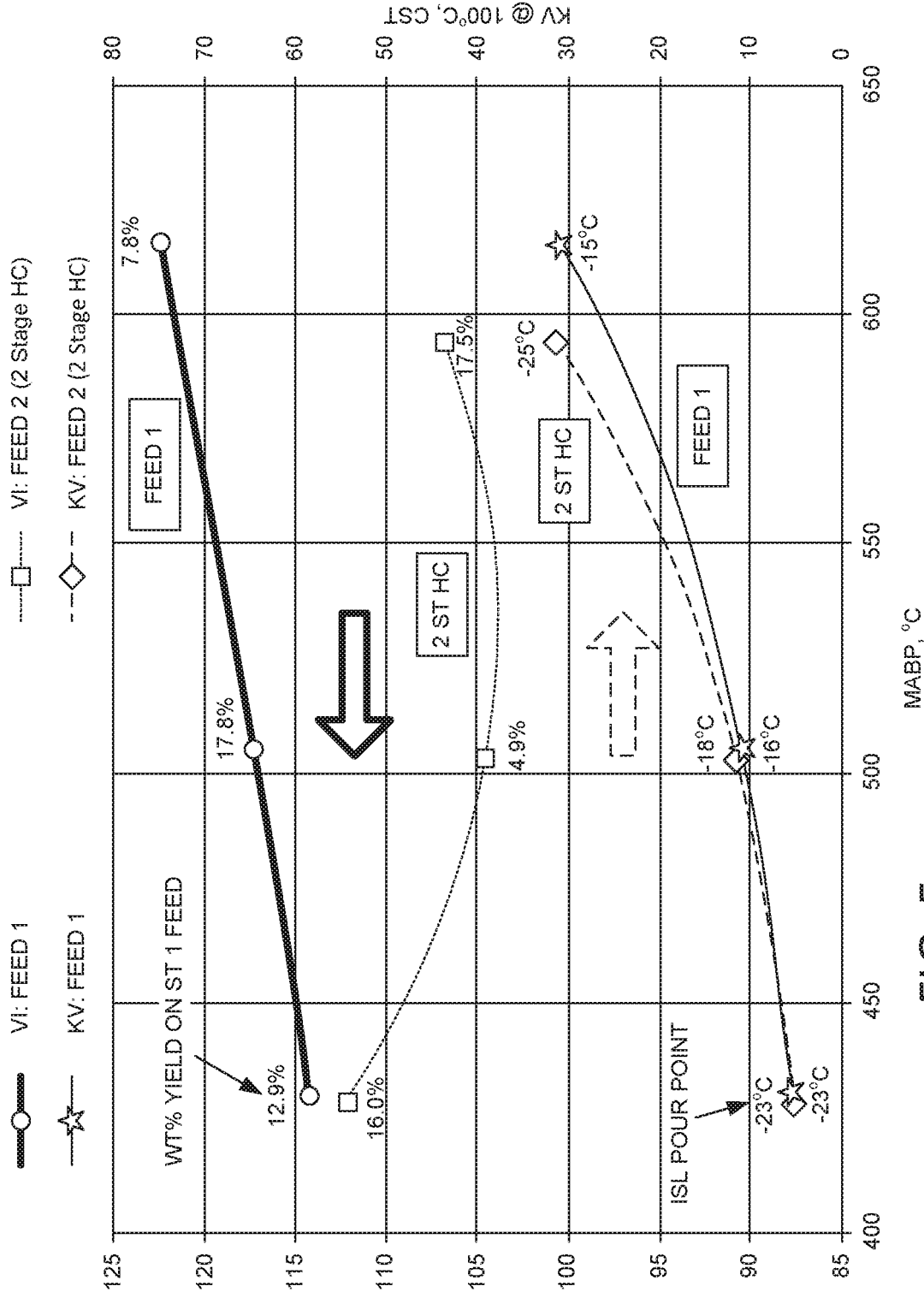


FIG. 5

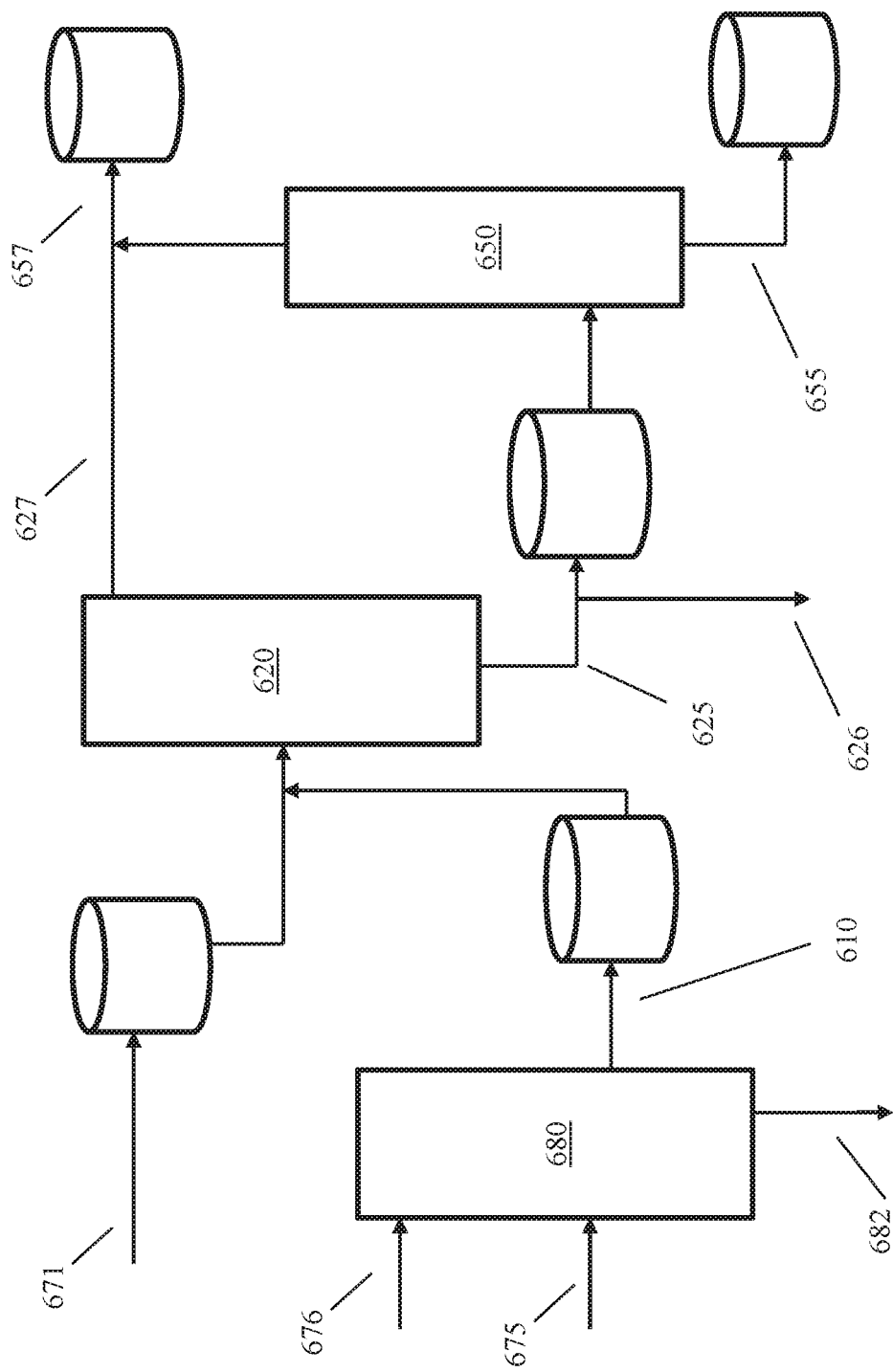


FIG. 6

Property	Unit	Rock #1	Rock #2	Rock #3
Density @ 15°C, D70	kg/m ³	1.1330	1.1390	1.131
C, D5291	wt%	85.8	85	83.9
H, D5291	wt%	7.88	7.78	7.64
N, D5291	wt%	0.68	0.71	0.74
CCR by MCRT, D4530	wt%	53.1	52.1	49.2
n-Heptane Insolubles, D3279	wt%	40.30	53.00	51
GC Simulated Distillation				
0.5%	°C	549	544	554
1%	°C	572	570	580
3%	°C	614	616	626
5%	°C	639	642	653
10%	°C	681	688	700
Viscosity Curve, Brookfield				
@ 230°C	cP	1310	2287	3348
@ 260°C	cP	248	399	761
@ 290°C	cP	84	121	184
Sulfur, wt.%, D1552	wt%	5.72	5.69	7.19
Gross Calorific Value, D5865	Btu/lb	16804	16792	16588

Fig. 7

Property	Unit	LCO Flux	SCGO Flux
Sulfur	mass%	3.13	0.509
IBP	°C	163	143
5% Off	°C	245	189
10% Off	°C	272	197
20% Off	°C	300	202
30% Off	°C	320	209
40% Off	°C	334	218
50% Off	°C	346	234
60% Off	°C	357	249
70% Off	°C	367	258
80% Off	°C	379	273
90% Off	°C	393	302
95% Off	°C	405	323
FBP	°C	431	350
Density @ 15.6°C	g/mL	0.9784	
Density @ 25°C	g/mL		0.8902
Density @ 100°C	g/mL		0.8337
Kinematic Viscosity @ 50°C	cSt	6.011	1.568
Kinematic Viscosity @ 25°C	cSt	14.27	2.454
Kinematic Viscosity @ 135°C	cSt	1.303	
Kinematic Viscosity @ 100°C	cSt		0.8314
Carbon Residue by MCRT	mass%	<0.01	
Flash Point, Pensky Martens Closed Cup	°C		79

Fig. 8

Composition		LCO wt%	67.0	62.3	60.8	58.9
Property	Rock wt%	Unit	Result	Result	Result	Result
Total Sediment, IP 390 Proc. B	% m/m		0.01	0.01	0.01	0.01
API Gravity @ 60°F, D4052			5.1	3.9	4.0	3.0
Kinematic Viscosity @ 50 °C, D445	cSt		159.6 (180)	389.1 (380)	563.7 (500)	785.0 (700)
Sulfur Content, D4294	% mass		4.34	4.49	4.50	4.55
Asphaltenes, IP 143	% m/m		12.1	11.8	18.1	18.7
Ash Content, D482	% mass		0.0641	0.0630	0.0540	0.1369
Pour Point, D97	° C		0	0	3	3
Flash Point, D93 Proc. B	° C		86.0	93.0	100.0	98.0
Vanadium, IP 501	mg/kg		117	63	140	134
Sodium, IP 501	mg/kg		44	22	50	50
Aluminum, IP 501	mg/kg		<5	<5	<5	<5
Silicon, IP 501	mg/kg		<10	<10	<10	<10
Aluminum + Silicon, Calculation	mg/kg		8	4	9	8
Sediment by Extraction, D473	% mass		0.04	0.05	0.06	0.06
Micro Carbon Residue, D4530	% m/m		16.8	20.9	20.9	20.7
Water, D95	% v/v		0.05	0.00	0.05	0.05
BMCI, Calculation			98.3	101.2	100.5	104.0
CCAI, Calculation			905.77	905.1	900.62	905.3

Fig. 9

Composition		SCGO wt%	53.42	49.76	48.53	47.09
Property	Rock wt%	Unit	Result	Result	Result	Result
Total Sediment, ISO 10307-2		% m/m	0.02	0.08	0.06	0.05
API Gravity @ 60°F, D4052			9.2	8.0	7.5	7.1
Kinematic Viscosity @ 50°C, D445	cSt		191.2 (180)	369.3 (380)	465 (500)	578 (700)
Sulfur Content, D4294	% mass		3.24	3.44	3.48	3.61
Asphaltenes, IP 143	% m/m		15.8	14.5	24.4	15.5
Ash Content, D482	% Mass		0.0400	0.0417	0.0524	0.0560
Pour Point , D97	°C		3	6	-9	9
Flash Point , D93 Proc. B	°C		64.5	74.0	73.0	68.0
Vanadium, IP 501	mg/kg		110	123	121	126
Sodium , IP 501	mg/kg		62	67	69	72
Aluminum , IP 501	mg/kg		5	5	5	6
Silicon , IP 501	mg/kg		<10	<10	<10	<10
Aluminum + Silicon, IP 501	mg/kg		11	11	12	13
Calcium, IP 501	mg/kg		4	5	5	5
Zinc, IP 501	mg/kg		2	3	3	3
Phosphorus , IP 501	mg/kg		3	4	3	4
Sediment by Extraction, D473	% mass		0.02	0.03		0.01
Micro Carbon Residue, D4530	% m/m		24.5	25.1	24.5	26.2
Water, D95	% v/v		0.05	0.05	0.05	0.05
BMI, Calculation			83.3	86.5	88.0	89.2
Toluene Equivalence Point	% v/v		21	25	20	21
BMI-TE, Calculation			62	62	68	68
CCAI, Calculation			873	875	876	877

Fig. 10